Chapter 4
Environmental Consequences

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Chapter 4. Environmental Consequences

4.1 Introduction

This chapter presents the direct, indirect, and cumulative environmental, social, and economic impacts on the human and natural resources that are predicted to result from implementing the alternatives presented in **Chapter 2**. A quantitative analysis of the impacts on each resource or resource use is provided where data are available to inform the analysis. If data were not available for the analysis, a comprehensive qualitative description of the impacts on a resource or resource use is provided.

The goals, objectives, and actions described in **Chapter 2** by alternative are planning-level decisions and do not result in direct, on-the-ground changes. This chapter serves as an impact analysis of the alternative management actions and prescriptions as they impact the affected environment. Impacts are defined as modifications to the existing environment brought about by implementing an alternative. Impacts can be beneficial or adverse, can result from the action directly or indirectly, and can be long term, short term, temporary, or cumulative in nature.

For this analysis, BLM staff used existing data, science, current methodologies, professional judgment, and projected actions and levels of use to determine projected impacts from the proposed management decisions discussed in **Chapter 2**.

4.1.1 Analytical Assumptions

The following assumptions apply to the analysis under all alternatives. Assumptions associated with a single issue (e.g., wildlife habitat) are included within the alternative discussion for that issue.

- All resource management actions recognize valid existing rights.
- The BLM would have the funding and workforce to implement the selected alternative.
- All lands identified as eligible for disposal or exchange meet FLPMA disposal criteria and can be considered for land tenure adjustments. A site-specific analysis is required for all parcels to determine that disposal is appropriate.
- Demand for recreation, energy production, vegetation resources, and wildlife use would increase.
- Short-term impacts would last for fewer than 5 years.
- Long-term impacts would last for 5 years or more.
- State highways and Class B roads through the Planning Area would remain open.
- Acreages were calculated using GIS technology; there may be slight variations in total acres between disciplines. The variations are negligible and do not affect the analysis.
- All acreages and percentages presented in this chapter pertain to the Decision Area, unless otherwise noted.
- Non-BLM-administered lands would have minimal direct impacts from RMP decisions since the BLM does not make land decisions or have jurisdiction on non-BLM-administered lands.
- Reasonable access across BLM-administered lands to state lands would be provided under all alternatives.

4.1.2 Assumptions and Methodology for Minerals Development Impacts

Mineral resources management decisions impact almost all of the other resources and resource uses administered by the RPFO, mainly because of the surface disturbance associated with mineral activities. Because many of the surface-disturbing impacts analyzed in this chapter are related to mineral development, it is important to clarify the assumptions made for future mineral development in the Decision Area early in

the document. The sections below identify the assumptions that were made for analyzing impacts from mineral resources on other resources throughout the document.

4.1.2.1 Leasable Minerals

As of October 2019, there are 33 active fluid mineral leases in the RPFO, all of which are in the San Juan Basin (Crocker and Glover 2019). According to the RPFO reasonably foreseeable development (RFD) scenario for oil and gas leasing, future oil and gas development over the next 20 years (2020 to 2039) is projected to be a maximum number of eight wells per year that could be drilled in the Decision Area (federal mineral ownership), with the large majority of development expected in areas of high and medium development potential in the northern portion of the RPFO in Sandoval County (Crocker and Glover 2019). The RFD states that approximately 55 percent of drilled vertical wells and 80 percent of drilled horizontal wells would be successful and, therefore, operate over the life of the RMP. This assumption projects a total number (over 20 years) of 129 wells (100 vertical and 29 horizontal wells on federal mineral ownership) and approximately 760 additional acres of non-reclaimed disturbance (Crocker and Glover 2019; Glover 2020). Actual acres of disturbance could differ from these estimates as a result of advances in technology, changing industry needs, and site-specific measures employed to protect resources.

It can be assumed that the range of alternatives restricting oil and gas development areas would not influence the number of wells drilled over the next 20 years. This is because the low number of wells predicted to be drilled could be moved to avoid conflicts with other resources. Therefore, the analysis in this chapter associated with fluid leasable mineral development assumes 760 acres would be disturbed (after reclamation) over the next 20 years under all alternatives (Glover 2020). Because the estimated growth of oil and gas wells is low (oil and gas development growth within the Planning Area of approximately 5 percent per year), and because the amount of disturbance associated with the future growth is approximately 0.10 percent of the Decision Area, it can be concluded that the mineral resources management decisions would have negligible impacts on resources analyzed in the RMP/EIS. There is no predicted future development for coal within the Decision Area over the next 20 years (Crocker and Glover 2019).

4.1.2.2 Locatable Minerals

The RPFO Mineral Potential Report states that the RFD potential for locatable minerals is expected to be flat or slightly increasing (Crocker and Glover 2019). Based on historic production in the Decision Area, it can be estimated that the area disturbed by development of locatable minerals would expand by approximately 30 acres per year for a total of 600 acres over 20 years. The impacts analysis for mineral development in this chapter assumes 600 acres of surface disturbance would occur in the Decision Area in moderate or high potential areas for locatable materials. It should be noted that locatable mineral development is estimated to occur on approximately 0.08 percent of the Decision Area.

4.1.2.3 Salable Minerals

The RPFO Mineral Potential Report states that the RFD potential for aggregate, sand, gravel, stone, and cinder is expected to be flat or slightly increasing (Crocker and Glover 2019). Based on historical production in the Decision Area, it can be estimated that the area disturbed by development of salable minerals would expand by approximately 388 acres per year for a total of 7,760 acres over 20 years. The impacts analysis for mineral development in this chapter assumes 7,760 acres of surface disturbance would occur within the Decision Area in moderate or high potential areas for salable materials. It should be noted that salable mineral development is estimated to occur on approximately 1 percent of the Decision Area (**Table 4-1**).

Table 4-1: RFD for All Minerals on BLM Surface Lands in the Decision Area (Acres)

Mineral Type	Annual Surface Disturbance (acres)	20-year Surface Disturbance (acres)
Leasable minerals	38	760
Locatable minerals	30	600
Salable minerals	388	7,760
Total	456	9,120
Percentage of BLM surface lands in Decision Area	0.06%	1.2%

4.1.3 Types of Impacts to Be Addressed

A direct impact is attributed to implementation of an alternative that affects a specific resource and generally occurs at the same time and place. Indirect impacts can result from one resource affecting another, or they can be later in time or removed in location, but are still reasonably foreseeable. Direct and indirect effects are not necessary differentiated in this chapter because it can be difficult to distinguish between them. Long-term impacts are those that would substantially remain for many years or for the life of the project. Temporary impacts are short-term or ephemeral changes to the environment that return to the original condition once the activity is stopped, such as air pollutant emissions caused by earthmoving equipment during construction. Short-term impacts result in changes to the environment that are stabilized or mitigated rapidly and without long-term impacts. Cumulative impacts could also occur as the result of the incremental impact of the action when combined with the effects of past, present, and reasonably foreseeable future actions by federal, state, and local governments; private individuals; and other entities in or near the Planning Area.

4.1.4 Incomplete or Unavailable Information

The CEQ established implementing regulations for NEPA, one of which requires that a federal agency identify relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant impacts (40 CFR 1502.22). If the information is essential to a reasoned choice among alternatives, it must be included or addressed in an EIS.

The BLM has determined that the following resources have incomplete or unavailable information:

- A transportation inventory is not complete for the Decision Area. The RPFO completed an inventory of most of the motorized roads and trails in the Decision Area capable of providing access for full-size vehicles, and will develop a travel management plan (TMP) after the RMP/EIS is approved. At that time, the RPFO would designate specific roads, primitive roads, and trails (routes) available for public and administrative travel, along with specific limitations on such travel. For this Proposed RMP/EIS, OHV area designations ("open," "limited," and "closed") are listed by alternative. Within the "limited" designation, until such time that route designation is completed through the TMP process, travel would be limited to existing roads, primitive roads, and trails. Existing scientific evidence that is relevant to evaluating reasonably foreseeable impacts, and the evaluation of those impacts, is contained in the individual sections in **Section 4.2**.
- The locations and extent of potential renewable energy projects on BLM-administered lands are relatively unknown and are dependent on industry identification of potential project areas. Forecasts for potential future oil and gas development in the area are based on the best available information, which is limited by the potential for oil and gas development in the Planning Area. For these resource uses, generalized effects are described based on typical surface-disturbing scenarios observed by the BLM in similar developments. Existing scientific evidence that is relevant to evaluating reasonably

foreseeable impacts, and the evaluation of those impacts, is contained in the individual sections in **Section 4.2**.

- A comprehensive inventory of invasive species has not been completed for the RPFO. Aquatic and terrestrial invasive species are known to exist in the Planning Area, and certain areas have been inventoried and recorded. This incomplete information is relevant to reasonably foreseeable significant adverse effects if land use planning decisions allocate land uses that would promote or enhance the spread or introduction of invasive species. This incomplete information is not essential for a reasoned choice among alternatives. Existing scientific evidence that is relevant to evaluating reasonably foreseeable impacts, and the evaluation of those impacts, is contained in the individual sections in **Section 4.2**.
- No formal surveys of visitors regarding their experiences and recreation preferences have been conducted. This information would be relevant to the evaluation of reasonably foreseeable significant adverse impacts if there were significant demand for specific recreation types in the Decision Area that the RPFO was unaware of. This information could have changed the estimated impacts of land use plan decisions to specific types of recreation; however, it is unlikely that BLM field staff would be unaware of the desired recreational opportunities in the Decision Area. Existing scientific evidence that is relevant to evaluating reasonably foreseeable impacts, and the evaluation of those impacts, is contained in the individual sections in **Section 4.2**.
- The archeological inventory for the RPFO is incomplete, and existing inventories cover approximately 11.9 percent of the Decision Area. This incomplete information is relevant to reasonably foreseeable significant adverse effects, given the possibility that land use planning decisions would allocate land uses to activities that would irreversibly damage currently unknown sites, which would constitute a significant adverse effect. This incomplete information is not essential for a reasoned choice among alternatives because potential impacts on cultural resources are similar among all action alternatives, and a site-specific NEPA analysis would be required prior to implementation. Existing scientific evidence that is relevant to evaluating reasonably foreseeable impacts, and the evaluation of those impacts, is contained in the individual sections in **Section 4.2**.
- Wildlife surveys during reproductive periods are incomplete. At this time, the exact areas and timing are not known. This information would assist the RPFO in evaluating reasonably foreseeable significant adverse impacts because it would allow quantification of the impacts of limiting oil and gas development and other activities within big game habitat during gestation and lactation periods. Although this information would alter the estimation of adverse impacts of limiting development and the beneficial impacts on big game populations in these areas, the qualitative impacts on these resources would not change. Existing scientific evidence that is relevant to evaluating reasonably foreseeable impacts, and the evaluation of those impacts, is contained in the individual sections in **Section 4.2**.
- Not all ROWs, ROW exclusion areas, and ROW avoidance areas are mapped in Alternative A. Therefore, Alternative A is not entirely quantifiable, so comparisons between each action alternative (Alternatives B, C, and D~~, and E~~) and Alternative A are also not entirely quantifiable.

4.1.5 Cumulative Impacts

Cumulative impacts occur when there are multiple impacts on the same resources. These are incremental impacts of proposed activities or projects when combined with past, present, and future actions. As stated in 40 CFR 1508.7 (1997), a cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Resource decisions from this RMP/EIS could combine with other past, present, and reasonably foreseeable future actions to produce cumulative impacts on resources within the Planning Area. Concurrent planning projects in the region that would contribute to cumulative impacts include the Santa Fe National Forest Plan and the BLM ~~Taos,~~ Farmington~~, and Socorro~~ RMP~~s~~. Also, management direction and resource uses would occur in the adjacent BLM field offices in Arizona. Activities on New Mexico State Land Office (SLO) lands and private lands, and city and county use plans for surrounding communities could have cumulative impacts where land is developed adjacent to BLM-administered lands.

Past and present actions are development, projects, events, or other actions that have occurred and accumulated to create the existing conditions in the Planning Area. The affected environment, described in **Chapter 3**, incorporates the effects of past and present actions within the Planning Area; as such, the impacts of past and present actions have been analyzed in the previous chapter.

Reasonably foreseeable future actions are uses and activities that are planned to occur within the Planning Area in the foreseeable future. The RMP/EIS ~~takes into account~~considers those proposed actions that are actively being proposed by other agencies, organizations, or governments that would impact resources within the Planning Area (**Table 4-2**). The projects were primarily identified through public scoping, internal scoping with BLM resource specialists, input from cooperating agencies, and BLM review of existing planning documents from other organizations. Examples include travel management plans from neighboring Forest Service ranger districts and proposed actions documented in county land use plans. The BLM considered those projects that were within or near the Planning Area and of sufficient scope to impact the resources discussed in this RMP at similar spatial and temporal scales as the direct and indirect impacts. That is, the reasonably foreseeable future projects listed in **Table 4-2** are proposed actions that could result in additional impacts on the same resources evaluated in the RPFO RMP/EIS.

The projects were limited to those within the geographic and temporal scope in which direct and indirect impacts would occur. All sources consulted for Proposed Action details are referenced in the text and contained within the references cited section of the RMP. The RFD scenarios for leasable, locatable, and salable minerals are discussed in **Section 4.1.2**, Assumptions and Methodology for Minerals Development Impacts, above.

Table 4-2: Reasonably Foreseeable Future Projects Relevant to the RMP/EIS

Project Proponent	Brief Description
N55 Road Improvement	
Bureau of Indian Affairs	The 31-mile road improvement project, including the 150-foot buffer and potential borrow pit locations for construction material, would encompass approximately 550 acres. The project is in the southeast portion of Cibola County and crosses Decision Area BLM-administered land. The entire length of the proposed project would be fenced in order to prevent livestock from entering the right-of-way. Livestock tanks within proximity of the right-of-way fencing would be relocated. The finished roadway would be paved with asphalt, and signs would be installed along with pavement markings.
Placitas Master Plan	
City of Albuquerque Open Space	The Placitas open space encompasses an area of 640 acres, 560 of which are actively being pursued for a recreational site. The project is located 3 miles northwest of the village of Placitas in Sandoval County. The City of Albuquerque's Environmental Planning Commission and the Sandoval County Commission are the two organizations that have prepared the Placitas Open Space Master Plan (Sites Southwest 2002).

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The draft ROD was published in September 2021, so this may need to be updated/deleted here when the ROD is signed.

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Commented [AA3]: The Socorro RMP ROD was signed in 2010, so deleted it here because this sentence refers to "concurrent planning projects"

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Project Proponent	Brief Description
Southwest Jemez Mountains Restoration Project	
Forest Service Valles Caldera National Preserve New Mexico Forest and Watershed Restoration Institute The Nature Conservancy	The southwest Jemez Mountains restoration project is a long-term collaborative effort to restore sustainable ecological forest conditions on a landscape of approximately 210,000 acres in the southwest Jemez Mountains. The project involves several phases, including strategic-level planning, project-level planning, implementation, and monitoring. The area comprises primarily the entire upper Jemez River watershed, including nearly 86,000 acres of the Valles Caldera National Preserve, a portion of the Santa Fe National Forest (110,000 acres), and some state, private, and tribal lands (Forest Service 2010a).
Project Proponent	**Brief Description**
Forest Service Travel Management Plans	
Santa Fe National Forest Cibola National Forest	The Santa Fe National Forest's Travel Management ~~Final EIS~~ has been completed (Forest Service 2010b, 2012). The selected alternative~~Proposed Action, as currently described, would~~ opens 186 miles of road that is currently not open, closes 2,469 miles of road to motorized use, allowed for dispersed camping on 423 miles of road, and adds 23 miles of new routes (Forest Service 2010b, 2012). The Mt. Taylor Ranger District in the Cibola National Forest is the ranger district located within the Planning Area. The ~~Proposed Action in the~~ Travel Management Plan selected alternative (which is Environmental Assessment [Forest Service 2010c] Alternative C with modifications) ~~would~~ prohibits cross-country motorized travel off designated roads and trails in the district, opens ~~98~~ 97 miles of road that are currently closed or unauthorized, closes ~~465~~ 312 miles of road to public ~~motorized~~ use, ~~and~~ designates 92 miles of motorized ~~allow for~~ dispersed camping corridors~~on 127 miles of road~~, and designates 344 acres as an OHV area (Forest Service ~~2010c~~2011).
Fire and Fuels Treatments in New Mexico	
BLM Forest Service Bureau of Indian Affairs USFWS National Park Service State of New Mexico	The BLM estimates that federal and state agencies with jurisdiction in New Mexico would treat up to 206,800 acres with prescribed fire, 35,900 acres with mechanical treatments, and 10,000 acres with chemical treatments over the next 20 years (BLM ~~2004b~~2004a, 2017).
Northwest Loop Road	
New Mexico Department of Transportation	The New Mexico Department of Transportation has proposed to build a 39-mile loop road to connect US Highway 550 in southern Sandoval County with Interstate 40, just east of the Rio Puerco, in Bernalillo County (City of Albuquerque 2014). The road would not cross BLM surface ownership, but would cross BLM subsurface lands.
Red Mesa Wind Farm	
Red Mesa, LLC NextEra Energy, LLC	NextEra Energy, LLC, and Red Mesa, LLC, a subsidiary of the former, constructed a 102.4-megawatt wind energy center on the east side of Cibola County near Seboyeta, New Mexico. The project occupies approximately 5,000 acres of private land 60 miles northeast of Grants. The facility consists of 64 wind turbine generators, an underground power collection system, an access road, and an operations and maintenance plant. The towers stand 121 meters (398 feet) high to the top of the blade. The wind farm began commercial operation in 2010 (NextEra Energy Resources 2020).

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Project Proponent	Brief Description
Uranium Mining	
Multiple Corporation Interests	The Grants Mineral Belt between Gallup and Laguna is the main contributory for the state with the second-largest known uranium reserves. While no uranium is currently being mined, multiple companies are assessing the areas around Mt. Taylor for both conventional and in-situ recovery mining of the mineral. The Cebolleta Uranium Project of Cibola Resources, LLC, located on private land 45 miles west of Albuquerque and situated on the southeastern portion of the Cebolleta Land Grant, is one instance of many in which groups are moving forward with both technical reports and feasibility studies that show promise of future uranium mining in the region (Broad Oak Associates 2007).
New Mexico Renewable Energy Transmission Authority (RETA)	
State of New Mexico RETA	With the enactment of New Mexico House Bill 188: Renewable Energy Transmission Authority Act, and its subsequent creation of the New Mexico RETA, the New Mexico State legislature has provided support to identify and establish corridors for the transmission of electricity, both intra- and interstate (Renewable Energy Transmission Authority Act, NM Stat. Section 62-16A-10, Sec. 4B(5)-(6) [2007]). With the mandate to have at least 30 percent of the transmission project's energy coming from renewable resources, it seems likely that a transmission corridor would be required to bring the wind energy from the eastern portions of New Mexico to the energy-demanding western states. It could be suggested that the new transmission corridor would be sited through the Planning Area.

4.2 Environmental Consequences of Alternatives

This section presents the impacts on each resource from management actions proposed by other resource programs according to each alternative.

4.2.1 Air Resources

Impacts on air resources in the Planning Area would primarily result from fire management, mineral resource development, and travel management decisions. Emissions include those from nonrenewable resources, such as oil and gas development activities, and those from renewable resources, such as firewood burning. Oil and gas development has both short-term emissions from well construction and long-term impacts from well operation. Some resource allocations like fuels treatments may result in short-term air quality impairment, but may improve air quality over the long term by creating healthy vegetation and soils that can more readily resist future wildfires and can sequester certain emissions. Travel management decisions would result in short-term impacts from blowing dust (particulate matter) on backcountry roads.

4.2.1.1 Analysis Assumptions

Mineral development potential was assessed in the RPFO reasonably foreseeable development scenario for oil and gas leasing (Crocker and Glover 2019). Mineral development is a permitted activity; therefore, a variety of multilevel regulatory processes exist to ensure that pollutant levels do not increase above identified thresholds and air quality standards. It is assumed that mineral development operations would be carried out in compliance with existing policies and regulations at both the state and federal levels. It is further assumed that roads, pipelines, and other mineral development-related disturbances in areas with soils susceptible to wind erosion would be appropriately surfaced (covering of piles where appropriate, graveling or surfactants applied to roads, etc.) to reduce fugitive dust generated by traffic and related activities. Such treatments would also be applied as appropriate on local and resource roads that represent a dust problem. Lower speed limit best management practices, enforced by the appropriate authority, would also act to limit dust in project and adjacent areas.

4.2.1.1.1 Ozone

Ozone modeling completed for the Four Corners Air Quality Task Force included areas of Sandoval County where oil and gas development are most likely to occur in the Planning Area. The model results for the 2005 base case indicated that ozone levels in this area were much lower than in the heart of the San Juan Basin to the north and generally did not exceed 0.060 parts per million (ppm). The NAAQS for ozone is currently 0.070 ppm. Comparison with a modeled 2018 base case predicted little change in ozone levels and possibly a slight improvement. Modeling of mitigation scenarios to reduce nitrogen oxide (NOx) and volatile organic compound (VOC) production from oil and gas and emission-generating units also showed little change to some slight improvement over the 2005 base case (Environ 2009).

While the Planning Area is currently in attainment for the ozone NAAQS, air monitoring data show that 3-year average ozone concentrations are within 95 percent (0.067 ppm) of the 8-hour ozone NAAQS (0.070 ppm). This form of the standard requires averaging 3 years of monitoring data for the fourth-highest 8-hour average, using the most recent year's data to determine the design value.[1] Air monitors in Rio Arriba County (Coyote Ranger Station–0.067 ppm), Sandoval County (Bernalillo–0.068 ppm), and San Juan County (Bloomfield–0.069 ppm, Navajo Lake–0.070 ppm, and San Juan Substation–0.069 ppm) north of the Planning Area all showed 3-year average ozone concentrations (2016–2018) at or above 95 percent of the 8-hour ozone NAAQS (BLM 2019b). Pursuant to New Mexico Statute 74-2-5.3, if the New Mexico Environment Department determines that emissions from sources within its jurisdiction cause or contribute to ozone concentrations in excess of 95 percent of a NAAQS for ozone, it shall adopt a plan to control emissions of NOx and VOCs to provide for attainment and maintenance of the standard. This plan may include regulations more stringent than federal rules. The NMED has initiated an Ozone Attainment Initiative to address ozone levels in the area (NMED 2019a).

4.2.1.1.2 Climate Change and Greenhouse Gases

Greenhouse gas (GHG) emissions have been estimated for well construction and operation and combustion of produced oil and gas in the Planning Area based on the number of wells and oil and gas production estimates provided in the RFD (Crocker and Glover 2019). These emissions are compared with projected state and national annual GHG emission rates to disclose the relative magnitude of emissions from BLM-authorized oil and gas development in the Planning Area over the life of the RMP. GHG emissions from BLM-authorized actions contribute to GHG concentrations in the atmosphere, which cumulatively result in climate change impacts. The impacts of climate change on the analysis area are inherently cumulative and are discussed in the cumulative climate change impacts section.

4.2.1.2 Direct and Indirect Impacts

4.2.1.2.1 Fire Management Decisions

Fire management decisions would be similar across all alternatives. Fuels treatments are proposed for up to 32,000 acres per year in the Decision Area depending on budgetary and time constraints; approximately 72 percent of fuels treatments, or 23,000 acres, would include prescribed fire.[2]

[1] A design value is a statistic that describes the air quality status of a given location relative to the level of the NAAQS.

[2] Based on current treatments, the Fire and Fuels Plan Amendment (BLM 2004b) and Plan Maintenance Record – Updated Guidance for Implementation of Federal Wildland Fire Management Policy for the Resource Management Plan Amendment for Fire and Fuels Management on Public Land in New Mexico and Texas Record of Decision September 2004, Fort Stanton-Snowy River National Conservation Area Resource Management Plan, Prehistoric Trackways National Monument Resource Management Plan and the Taos Resource Management Plan (Updated Guidance for Implementation of Federal Wildland Fire Management Policy; BLM 2017), approximately 72 percent of fuel treatments would include prescribed fire; therefore, of the 32,000 acres per year proposed for treatment on BLM-administered lands in the Planning Area, approximately 23,000 acres would be treated with prescribed fire.

Several criteria pollutants are emitted during prescribed burning, including particulate matter and carbon monoxide (CO). Prescribed burning also contributes to the release of GHGs (carbon dioxide [CO_2] and methane [CH_4]) and may reduce or eliminate a carbon sink. However, long-term benefits from prescribed fire treatments may reduce criteria pollutant and GHG emissions by reducing the incident of catastrophic wildland fires. The generation of increased particulates is especially noticeable during high-intensity, catastrophic wildland fires, which contribute to regional haze and reduced visibility in Class I areas and Class II areas that are sensitive to visibility impairment.

The prescribed burn program experiences considerable interannual variability in acres treated and treatment method (see the Fire Management section of this chapter). As a result, particulate matter emissions would continue to vary widely from year to year regardless of alternative. Emissions for all prescribed burning can vary from the estimate due to actual versus assumed pile size, pile shape, and the number of piles per acre and in fuel type, fuel loading, and fuel continuity in underburns and broadcast burns. Since fuels are more homogeneous in the activity fuels treatment program, the amount of variation is smaller than in the more heterogeneous fuel beds of the hazardous fuels reduction program. Accounting for these variations, the BLM estimated a potential range in average annual emissions of approximately 330 tons to 1,300 tons of particulate matter with a diameter less than or equal to 10 microns (PM_{10}) and 230 to 1,030 tons of particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$) with an expected annual average of 930 and 685 tons of PM_{10} and $PM_{2.5}$, respectively.

The fuels treatment method (e.g., hand or machine pile burning and broadcast burning) affects the amount of particulates emitted by affecting the amount of fuel consumed and the relative proportions of flaming and smoldering combustion (Hardy et al. 2001). Smoldering combustion emits more than twice the particulates as flaming combustion (Hardy et al. 2001). The current condition is based on the tons of fuels consumed reported by the Fire Program, with insufficient information to determine the proportions of actual treatment methods (Hardy et al. 2001, p. 100). Thus, the BLM assessed the current condition using a generic multiplier applied to the reported tons consumed. The BLM does not know whether this value represents an underestimation or overestimation of current conditions. The BLM estimated projected emissions on more detailed information using more sophisticated tools than a generic multiplier.

Emissions from the BLM's prescribed fires under the alternatives and the Proposed RMP would typically exceed those projected from wildfires burning on BLM-administered lands for both PM_{10} and $PM_{2.5}$. The amount of the difference would vary by decade primarily based on available funding resources for treatments. In more active wildfire periods, the particulate emissions from wildfire would nearly equal or exceed those from prescribed fire. If the predicted increases in wildfire activity arising from climate change occur, as discussed in the Climate Change section in this chapter, particulate emissions from wildfires burning on BLM-administered lands would exceed those from the BLM's prescribed fires more frequently.

The BLM's fire management policy is consistent with the New Mexico Environment Department's Smoke Management Program, and prescribed burning would be timed in conjunction with meteorological conditions to minimize smoke impacts. Specific policies, rules, and procedures are implemented by the BLM to minimize air quality impacts and impacts on regional haze for fire events, in compliance with New Mexico's Regional Haze Program. Additional restrictions on prescribed burns during certain conditions or near federal Class I areas would also apply. These restrictions could impact the size or timing of fire management activities or prescribed burns.

Fire management decisions in the Decision Area would result in beneficial impacts on air resources in that the restoration of natural fire regimes would improve the long-term health of vegetation and may enhance carbon sequestration. In addition, the use of prescribed fire may lead to fewer occurrences of high-intensity, catastrophic wildfire within the Decision Area over the long term. The detrimental air quality impacts from

wildfire would likely be greater than those from prescribed fire and exert a larger adverse effect on air quality in the Decision Area.

4.2.1.2.2 Mineral Resources Decisions

Mineral resources management decisions would likely contribute to direct emission increases (VOCs, NOx, CO, and GHGs) from equipment, fugitive dust, and GHG emissions, resulting in adverse impacts. Short-term air quality impacts from minerals development activities and production would occur from several sources: 1) combustive emissions (vehicle tailpipe and exhaust stack emissions) from the operation of mobile and stationary source construction equipment, which would include NOx, VOCs, CO, and CO_2; 2) fugitive dust emissions (PM_{10}) from earthmoving and construction activities and the operation of vehicles on unpaved surfaces; and 3) fugitive emissions of methane and other VOCs from well completions, pits, pneumatic devices, and leaks. Minerals production could generate long-term combustive and fugitive dust emissions from two sources: 1) stationary sources, such as natural gas flaring, natural gas-fired compressors, and minerals storage and handling equipment; and 2) mobile sources that access and service oil and gas facilities and extract and handle subsurface minerals. Minerals reclamation activities also would produce combustive and fugitive dust. Minerals development activities would reduce vegetative sinks for carbon emissions by removing ground cover in portions of developed areas.

Despite the differences in areas open and closed to fluid minerals leasing under each alternative, actual impacts would be similar across alternatives because a similar level of well development is expected to occur. All counties within the Planning Area comply with the NAAQS and are attainment areas. Because the estimated growth of oil and gas wells is low (five to eight new wells per year), it can be assumed that mineral resources management decisions will have minor impacts on air quality within the Planning Area. However, such decisions will undergo NEPA analysis taking into account any changes in oil and gas development, air quality, and other relevant factors.

The BLM in New Mexico has developed emissions calculators for use in analyzing a single well to represent oil and gas wells in the state. These calculators describe the criteria pollutant, hazardous pollutant, and GHG emissions for one horizontal well. The methodology and assumptions for calculating air pollutant emissions and developing inputs for the calculators are described in the BLM's Air Resources Technical Report for Oil and Gas Development (BLM 2019b, pp. 37–43).

Criteria Pollutants, VOCs, and HAPs

Future potential development would include increased criteria pollutant, VOC, and HAP emissions from well construction and completion activities, including increased particulate matter released from new well pads or roads and criteria pollutant, VOC, and HAP emissions from drilling equipment, compressor engines, vehicles, and dehydration and separation facilities. Venting also would release VOCs and HAPs. The most substantial criteria pollutants emitted by oil and gas development and production are VOCs, particulate matter, carbon monoxide, and NOx.

Future potential federal well development in the Decision Area was estimated at approximately 100 vertical wells and 29 horizontal wells under all alternatives, with 55 vertical wells and 23 horizontal wells expected to be successfully completed (two fewer wells than described in the Draft RMP/EIS; Crocker and Glover 2019). **Table 4-3** shows estimated emissions from potential future well construction and operation based on total wells and using conservative assumptions described in the footnotes to the table. The RFD estimates that between five and eight wells could be developed per year. Thus, while average annual emissions from well construction and operation are shown in the table, emissions may vary from year to year over the life of the RMP.

Table 4-3: Potential Criteria, VOC, and Hazardous Pollutant Emissions from Future Federal Well Construction and Operation

	Emissions						
	PM_{10}	$PM_{2.5}$	NOx	SO_2[5]	CO	VOC[6]	HAPs
Emissions from 1 well (tons)[1, 2]	5.31	0.81	6.01	0.11/0.55	2.55	15.35	1.22
Total emissions from 129 wells (tons)[3]	684.70	105.07	775.64	58.19	328.91	1,980.42	157.27
Average annual emissions (tons per year)[4]	34.24	5.25	38.78	2.91	16.45	99.02	7.86

Source: EMPSi staff calculations

[1] Emissions estimates include activities associated with well construction, operation, maintenance, and reclamation.

[2] The representative well used to calculate emissions is a horizontal oil well, which produces higher emissions than a horizontal gas well and higher emissions than vertical wells, thus representing a conservative estimate of emissions.

[3] Emissions are shown for 129 wells to represent a conservative estimate of emissions; actual emissions would likely be less given that not all wells are expected to be successful and thus would not undergo the full cycle of emissions represented by the emissions per well estimates shown in this table.

[4] Average annual emissions based on 129 wells developed over 20 years.

[5] While horizontal oil wells provide a conservative estimate of emissions compared with horizontal gas wells and vertical wells, as described above, the exception to this is that vertical wells produce 4 to 5 times more SO_2 than horizontal wells; therefore, the emissions of SO_2 from one horizontal well (0.11 ton per horizontal well) have been multiplied by 5 for an emission rate of 0.55 ton per vertical well and the emissions calculated as such for the predicted 29 horizontal wells and 100 vertical wells.

[6] VOC emissions at the operational phase represent uncontrolled emissions and estimate potential emissions representing the contribution for "one oil well" from the emissions at storage tanks, gathering facilities, etc. However, federally enforceable regulations, such as New Source Performance Standards (NSPS) OOOO and OOOOa, require emission reduction of VOCs from well completions following hydraulic fracturing or refracturing and storage tanks with emissions greater than 6 tons per year after federally enforceable controls. Therefore, actual emissions from the one-well scenario are likely to be lower than represented.

Greenhouse Gas Emissions and Climate Change

The BLM estimated that construction of an oil well would result in 525.31 metric tons of carbon dioxide equivalent (CO2e), and construction of a gas well would result in 1,021.59 metric tons of CO2e. The difference between the emissions associated with oil and gas well construction is largely associated with the need for additional venting during well completion. The BLM estimated that operation of a well would result in average annual emissions of 93.67 metric tons of CO2e per year for a gas well and 324.77 metric tons of CO2e per year for an oil well. Estimated total and annual GHG emissions from well construction and operations based on the RFD are shown in **Table 4-4**.

Table 4-4: Estimated Greenhouse Gas Emissions from Future Federal Well Construction and Operation

	Metric Tons (CO_2e)	% of US Emissions[2]	% of NM Emissions[2]
Potential GHG emissions from well construction (129 wells, 1 year of emissions per well)[1]	67,765	0.001	0.067
Potential GHG emissions from operations phase (129 wells, 20 years of emissions per well)[1]	837,910	0.0125	0.824
Total Construction and Operational Life-Cycle Emissions	905,675	0.0136	0.891
Average Annual Emissions[3]	45,284	0.0007	0.045

Source: EMPSi staff calculations

[1] Totals calculated using oil well emission factors of 525.31 metric tons CO_2e for construction and 324.85 metric tons CO_2e for operations (oil wells have lower construction emissions but higher operational emissions and thus higher life-cycle emissions over an assumed 20-year life than gas wells) because the type of well is not known. Construction emissions are assumed to occur over 1 year, while operational emissions would occur over an assumed life of 20 years per well. Emissions for 129 wells represent a conservative estimate of emissions; actual emissions would likely be less given that not all wells are expected to be

successfully completed and thus would not have annual operational emissions. Note, too, that CO_2e values are derived based on uncontrolled emission rates of methane. This is highly conservative given that, in accordance with 40 CFR Part 60 Subpart OOOOa, new hydraulically fractured wells require limitation of methane emissions, and collections of fugitive emissions components at well sites are required to be monitored for leaks semiannually and are subject to stringent repair and reinspection requirements. Maintenance and reclamation activities are not included in the GHG emission estimates, but these would be minimal and sporadic.

[2] Percentage comparisons are based on US 2018 emissions of 6,677 million metric tons (MMT) CO_2e (EPA 2020b) and New Mexico 2020 projected emissions of 101.7 MMT CO_2e (BLM 2019b). While the value used for annual US or state GHG emissions may vary by source, the differences do not change the order of magnitude of comparison.

[3] Average annual emissions based on total emissions divided by 20 years.

The BLM does not direct or regulate the end use of produced oil or gas. While it can be reasonably assumed that the oil and gas produced in the Planning Area will be combusted for energy consumption and use, the challenge in estimating these emissions comes with understanding when and how oil and gas would be distributed and used for energy. End uses of oil and gas could include the combustion of transportation fuels, fuel oils for heating and electricity generation, the production of asphalt and road oil, and the manufacturing of chemicals, plastics, and other synthetic materials. Therefore, the BLM can only provide an estimate of potential GHG emissions using national approximations of where or how the end use may occur. To estimate emissions from downstream combustion of oil and gas produced from federal well development in the Planning Area, the BLM applied emission factors to the 20-year total oil and gas production estimates developed in the RFD. These emissions are shown in **Table 4-5**.

Table 4-5: Estimated Production (Downstream/End-Use)-Related Greenhouse Gas Emissions from Future Federal Well Development

Product Category	RFD Production Quantity	Emission Factors (metric tons CO_2/unit)	Estimated Emissions (metric tons CO_2e)
Crude Oil (bbl)	5,509,000	0.43	2,368,870
Natural Gas (mcf)	2,522,000	0.0551	138,962
Total	-	-	**2,507,832**

Source: EMPSi staff calculations

Bbl = barrels, mcf = thousand cubic feet

Emissions from oil combustion based on an emission factor of 0.43 metric tons CO_2 per barrel; gas combustion based on an emission factor of 0.0551 metric tons CO_2 per mcf (EPA 2020d)

The GHG emissions shown in **Table 4-4** and **Table 4-5** would contribute incrementally to global climate change. As noted previously, the lack of precise scientific tools (models with sufficient spatial and temporal resolution) to forecast climate change at local scales limits the ability to accurately quantify the future impacts on climate change in the Planning Area. Furthermore, potential impacts on climate change are influenced by GHG emission sources from around the world; it is not possible to accurately distinguish the impacts on global climate change from GHG emissions originating from just the Planning Area. Instead, the GHG emissions due to the federal action are compared with global, national, and state GHG emissions.

4.2.1.2.3 Travel Management Decisions

Impacts on air quality from travel management decisions would be similar across all alternatives. Increased travel in the Decision Area would adversely impact air quality through increased vehicle emissions in areas open to travel and where travel is limited to existing or designated roads, primitive roads, and trails. Those areas closed to travel would not necessarily reduce the cumulative adverse impacts on air quality but could result in OHV users recreating on non-BLM-administered lands in or near the Planning Area. The types of emissions that have the potential to be emitted from OHV use include hydrocarbons, CO, NO_x, particulate matter, hazardous air pollutants, and GHGs. Travel on unpaved roads and trails is also a source of localized fugitive dust, primarily in the form of PM_{10}, as dust becomes entrained by OHVs.

4.2.1.3 Cumulative Impacts

The cumulative effects analysis area is the Planning Area and the portions of the San Juan Basin that are northwest of the Planning Area. This is because air pollutants from sources in and outside of the Planning Area can mix and be transported to downwind locations, and to account for the overall effects of oil and gas development in the New Mexico portion of the San Juan Basin. The time frame used for the cumulative impacts analysis is the life of the RMP, approximately 20 years. Past, present, and reasonably foreseeable future actions that may cumulatively affect air quality are coal power generation and fluid mineral development, as described in more detail in **Sections 4.2.1.3.1** through **4.2.1.3.4**, below, as well as roads and agricultural development, and natural events such as wildland fires. Other past and present actions that have affected air quality in the Planning Area include urban development in the Albuquerque area, vehicle emissions along local roadways, and emissions from industrial sources.

Wildfire is the largest natural factor influencing air quality in the Planning Area. In some years, visibility and air quality are affected by smoke and particulate matter from wildland fires during the summer. Particulate matter and smoke created by these fires reduce visibility and affect air quality. Wildland fire is anticipated to increase due to climate change, which would increase particulate matter and smoke emissions. Air quality impacts can also occur from windblown dust from exposed gravel sources, such as riverbeds and unpaved roadways.

4.2.1.3.1 Existing Sources within the Planning Area

The 2017 EPA National Emissions Inventory identified 41 stationary sources emitting over a half ton of any reportable criteria pollutant in the Planning Area counties (EPA 2020c), including airports, petroleum facilities, wastewater treatment facilities, landfills, asphalt plants, electrical generating stations, and compressor stations. (Because sources are reported by county, some sources may be outside the Planning Area boundaries but still are within the cumulative effects analysis area.) As of October 2019, there are 33 active fluid mineral leases in the RPFO, all of which are in the San Juan Basin (Crocker and Glover 2019).

4.2.1.3.2 Existing Sources outside the Planning Area

Northwestern New Mexico is home to two large coal-burning power plants, the Four Corners Power Plant and the San Juan Generating Station. These have been identified as major sources of emissions northwest of the Planning Area; however, the 2017 shutdown of two of the four units at the San Juan Generating Station and the 2016 and 2018 retrofitting of the remaining units at both the San Juan Generating Station and Four Corners Power Plant have decreased emissions substantially (BLM 2019b).

Oil and gas development in the San Juan Basin contributes to increased ozone and particulate matter concentrations within the basin. Modeling completed for the Four Corners Air Quality Task Force indicated that most of this pollution stays north of the Planning Area. North to northwesterly winds could result in occasional transport into the Planning Area. There are approximately 23,034 active oil and gas wells in the New Mexico portion of the San Juan Basin; approximately 16,139 of these wells are federal wells, with the remainder falling under other jurisdictions (BLM 2019b). Between 2014 and 2018 there were approximately 243 federal well completions in the basin (BLM 2019b).

4.2.1.3.3 Proposed Sources inside the Planning Area

Although oil and gas development in the Planning Area has been limited because most of the area is outside the prime production areas of the San Juan Basin, development could continue, with small incremental increases in emissions over the life of the plan. The RFD predicts that up to 200 federal and nonfederal wells could be developed between 2020 and 2039, though not all wells would be successfully producing (Crocker and Glover 2019).

4.2.1.3.4 Proposed Sources outside the Planning Area

Continued development of oil and gas in the San Juan Basin would contribute to additional emissions in the cumulative effects analysis area. The RFD for oil and gas activities in the Farmington Field Office northwest of the Planning Area estimates that 3,200 wells (an average of 160 wells per year) could be developed by 2037 under the unconstrained baseline scenario. **Table 4-6** shows anticipated future emissions based on the average annual total (federal and nonfederal) well development projected to occur in the Rio Puerco and Farmington Field Offices over the next 20 years. Based on wells counts, federal well development in the Rio Puerco Field Office would account for less than 4 percent of all oil and gas development, and thus 4 percent of oil and gas-related emissions, in the New Mexico portion of the San Juan Basin.

Table 4-6: Potential Criteria, VOCs, and Hazardous Pollutant Emissions from Reasonably Foreseeable Development in the New Mexico Portion of the San Juan Basin

	Emissions (tons/year)						
	PM_{10}	$PM_{2.5}$	NOx	SO_2[4]	CO	VOC[5]	HAPs
Human-caused emissions in the New Mexico portion of the San Juan Basin[1]	189,179	28,897	103,409	7,341	274,627	116,242	3,771
Emissions from 1 well[2, 3]	5.31	0.81	6.01	0.11	2.55	15.35	1.22
Total annual emissions from reasonably foreseeable federal and nonfederal well development in the RPFO (10 wells)[2, 3]	53.10	8.10	60.10	4.62	25.50	153.50	12.20
Total annual emissions from 2019 reasonably foreseeable federal and nonfederal well development in the Farmington Field Office (160 wells)[2, 3]	849.60	129.60	961.60	37.40	408.00	2,456.00	195.20
Total annual emissions from reasonably foreseeable federal and nonfederal well development in the New Mexico portion of the San Juan Basin	902.70	137.70	1,021.70	42.02	433.50	2,609.50	207.40
Percent increase in human-caused emissions in the San Juan Basin	0.48	0.48	0.99	0.57	0.16	2.24	5.50

Source: EMPSi staff calculations

[1] Criteria pollutants and VOCs based on 2014 National Emissions Inventory; values include Tier 1 summaries for each county, including combustion, industrial, on-road/non-road, and miscellaneous sectors (biogenic sources are not included). HAP emissions (benzene, ethylbenzene, hexane, toluene, and xylene) based on 2014 National Emissions Inventory; values include all sectors except agriculture, dust, and fire.

[2] Emissions estimates include activities associated with well construction, operation, maintenance, and reclamation.

[3] The representative well used to calculate emissions is a horizontal oil well, which produces higher emissions than a horizontal gas well and higher emissions than vertical wells, thus representing a conservative estimate of emissions.

[4] While horizontal oil wells provide a conservative estimate of emissions compared with horizontal gas wells and vertical wells, as described above, the exception to this is that vertical wells produce 4 to 5 times more SO_2 than horizontal wells; therefore, the emissions of SO_2 from one horizontal well (0.11 ton per horizontal well) have been multiplied by 5 for an emission rate of 0.55 ton per vertical well and the emissions calculated as such for the predicted 29 horizontal wells and 100 vertical wells.

[5] VOC emissions at the operational phase represent uncontrolled emissions and estimate potential emissions representing the contribution for "one oil well" from the emissions at storage tanks, gathering facilities, etc. However, federally enforceable regulations, such as New Source Performance Standards (NSPS) OOOO and OOOOa, require emission reduction of VOCs from well completions following hydraulic fracturing or refracturing and storage tanks with emissions greater than 6 tons per year after federally enforceable controls. Therefore, actual emissions from the one-well scenario are likely to be lower than represented.

494 ***Climate Change***

495 Because the impacts of GHG emissions are not localized to the area where they originate and the impacts
496 of GHG emissions are inherently cumulative, the impacts of climate change are presented in this cumulative
497 effects section. The contribution of the activities under the RPFO RMP, described in **Table 4-4** and **Table**
498 **4-5**, as well as the cumulative actions of the lands under the jurisdiction of the BLM NMSO (BLM-
499 administered lands in New Mexico, Oklahoma, Kansas, and Texas), are inherently included in the cumulative
500 GHG emissions that contribute to global climate change impacts.

501 In addition to cumulative emissions from the four states under the jurisdiction of the BLM NMSO, GHG
502 emissions from BLM mineral activities from the 13 states that contribute most of the federal energy
503 production and consumption are discussed within the context of global cumulative emissions. These
504 emissions were compiled in a climate change report prepared for the BLM (Golder Associates 2017) that
505 calculates emissions associated with production and consumption activities related to coal, oil, natural gas,
506 and natural gas liquids for federal and nonfederal lands on a national level and for 13 energy-producing states,
507 including the four states within the jurisdiction of the NMSO.

508 After disclosing cumulative GHG emissions, this section describes anticipated cumulative impacts of climate
509 change in terms of global impacts and impacts on the New Mexico portion of the San Juan Basin. This not
510 only gives insight into the global nature of climate change impacts, but it also provides more specific
511 projections of impacts at the scale of the RMP. Changes in climate are generally measured over long time
512 periods to avoid the influence of meteorological or climatic cycles occurring on shorter time scales (e.g.,
513 inter-annual variability). While climate change projections are available for different regions, the climate
514 impacts from GHGs are a global issue.

515 ***Greenhouse Gases***

516 Baseline GHG emissions from the extraction and combustion of coal, oil, and natural gas produced on federal
517 lands are described in Golder Associates 2017 and in a USGS report, Federal Lands Greenhouse Gas
518 Emissions and Sequestration in the United States: Estimates 2005–2014 (Merrill et al. 2018):

519 • In 2014, end-use combustion and extraction of fossil fuels produced on federal lands in New Mexico
520 was 91.63 MMT CO_2e. This value is comparable with the 2014 baseline reported value of 93.72
521 MMT CO_2e reported by Golder Associates (2017). When compared with global and national total
522 CO_2e emissions of 48,257 and 6,457 MMT, respectively, from all sources, CO_2e emissions from
523 end-use combustion and extraction activities of fossil fuels produced on BLM-administered lands in
524 New Mexico are 0.19 percent and 1.3 percent, respectively (Table 22 in BLM 2019b).

525 • The 2014 baseline for the 13 states evaluated in the Golder Associates report is 1,275.53 MMT of
526 CO_2e, compared with an estimated 1,332 MMT CO_2e in the USGS report. When compared with
527 global and national total CO_2e emissions of 48,257 and 6,457 MMT, respectively, from all sources,
528 CO_2e emissions from end-use combustion and extraction activities of fossil fuels produced on
529 federal lands are 2.8 percent and 19.4 percent, respectively (Table 21 in BLM 2019b).

530 For the purposes of this analysis, the BLM uses projections of the total federal and nonfederal oil and gas
531 emissions from Golder Associates (2017) to estimate expected annual future GHG emissions from energy
532 production and consumption activity within a subnational region, including New Mexico, Oklahoma, Kansas,
533 and Texas, over which the BLM NMSO has jurisdiction. Assumptions of the analysis are discussed in Golder
534 Associates 2017. The following are key assumptions:

535 • State-specific oil consumption is equal to state total production minus export and reserves for
536 the state based on national averages.

- National averages for sector breakdown percentages (power, industrial, etc.) for oil, natural gas, and natural gas liquids consumptions were applied to state-specific data.
- The value of production and consumption on nonfederal lands is equal to the difference of the total state or national value minus the federal lands value.

At the state level, production does not necessarily translate to 100 percent consumption of the fossil fuel but is representative of future energy consumption and production to show GHG emissions. The development projected in the RFDs for each BLM field office under NMSO jurisdiction is considered in these data. Current and future oil and gas development are part of each RFD developed at the field office level. Because the BLM NMSO has control over oil and gas development in these areas, for NEPA disclosure purposes, this section provides a discussion of reasonably foreseeable cumulative production and consumption within these states and discloses the magnitude of GHG emissions likely to result from BLM NMSO activities on an annual basis. This information is further contextualized by comparing the relative magnitude of these emissions with projected national and global annual GHG emission rates.

Using values reported in Golder Associates 2017, **Table 4-7** shows reasonably foreseeable coal, oil, and gas production and consumption emissions from federal and nonfederal coal, oil, and gas production and consumption in the four states under BLM NMSO jurisdiction for 2020 and 2030 under a high (conservative) emissions scenario.

Table 4-7: Reasonably Foreseeable Coal, Oil, and Gas Production and Consumption Greenhouse Gas Emissions for New Mexico, Oklahoma, Kansas, and Texas

Greenhouse Gas Emissions (MMT CO_2e)					
Category	**New Mexico**	**Oklahoma**	**Kansas**	**Texas**	**4-State Total**
2020 High Scenario					
Federal coal	13.89	1.25	0	0	15.14
Federal oil	25.49	0.33	0.08	0.06	25.95
Federal gas	49.60	0.96	0.29	2.40	53.25
Federal natural gas liquids	6.11	0.09	0.05	0.04	6.29
Total federal	**95.09**	**2.63**	**0.42**	**2.50**	**100.64**
Federal + nonfederal coal	43.12	1.87	0.13	97.46	142.58
Federal + nonfederal oil	55.28	56.72	22.10	518.06	652.16
Federal + nonfederal gas	83.28	152.16	18.14	694.29	947.87
Federal + nonfederal natural gas liquids	12.14	20.09	3.14	84.14	119.51
Total federal and nonfederal	**193.82**	**230.84**	**43.51**	**1,393.95**	**1,862.12**
Percentage of global emissions (48,257 MMT CO_2e)	0.40	0.48	0.09	2.89	3.86
Percentage of national emissions (6,457 MMT CO_2e)	3.00	3.58	0.67	21.59	28.84
2030 High Scenario					
Federal coal	10.14	0.91	0	0	11.05
Federal oil	25.60	0.33	0.08	0.06	26.07
Federal gas	57.44	1.11	0.34	2.78	61.67
Federal natural gas liquids	6.17	0.09	0.05	0.04	6.35
Total federal	**99.35**	**2.44**	**0.47**	**2.88**	**105.14**
Federal + nonfederal coal	31.52	1.37	0.1	71.12	104.11
Federal + nonfederal oil	55.51	56.95	22.19	520.20	654.85

Greenhouse Gas Emissions (MMT CO_2e)					
Category	**New Mexico**	**Oklahoma**	**Kansas**	**Texas**	**4-State Total**
Federal + nonfederal gas	96.45	176.21	21.02	804.05	1,097.72
Federal + nonfederal natural gas liquids	12.25	20.27	3.17	84.88	120.57
Total federal and nonfederal	**195.73**	**254.8**	**46.47**	**1,480.25**	**1,977.25**
Percentage of global emissions (48,257 MMT CO2e)	0.41	0.53	0.10	3.07	4.10
Percentage of national emissions (6,457 MMT CO2e)	3.03	3.95	0.72	22.92	30.62

Source: Golder Associates 2017
Note: Totals may not sum exactly due to rounding.

Although a NEPA document may present quantified estimates of potential GHG emissions associated with reasonably foreseeable energy development, there is significant uncertainty in GHG emission estimates due to uncertainties with regard to eventual production volumes and variability, flaring, construction, and transportation. A rough estimate was possible using publicly available information and estimates from future production for RFDs in the NMSO. Also, there is uncertainty with regard to the net effects of reasonably foreseeable energy development on climate; that is, while BLM actions may contribute to the climate change phenomenon, the specific effects of those actions on global climate are speculative given the current state of the science. Inconsistencies in the results of scientific models designed to predict climate change on regional or local scales limit the ability to quantify potential future impacts of decisions made at this level and to determine the significance of any discrete amount of GHG emissions beyond the limits of existing science.

Climate Change

Golder Associates (2017, Section 4.0) discusses future climate projections, including four representative concentration pathways (RCPs) as identified by the IPCC: RCP 2.6, 4.5, 6.0, and 8.5. The RCP scenarios were developed based on representative GHG emission scenarios, including varying assumptions regarding levels of cumulative global GHG emissions over time. RCP 8.5 assumes increasing GHG emissions over time, with no stabilization, and is meant to be representative of scenarios leading to high GHG concentration levels. RCP 4.5 and RCP 6.0 represent scenarios where GHG emissions are reduced over time through climate policy. RCP 2.6 represents a scenario where drastic action is taken through stringent climate policy, and substantial GHG emission reductions are achieved over time. The pathways are named after the radiative forcing (defined as the difference between insolation [sunlight] absorbed by the Earth and energy radiated back to space) projected to occur by 2100 (e.g., RCP 8.5 would be projected to result in 8.5 watts per square meter radiative forcing by 2100). The radiative forcing of the atmosphere in each pathway is driven by the concentration of GHGs accumulated in the atmosphere. The RCP characterizations and regions are further described by Golder Associates (2017, Section 4.1) in their Climate Change report.

Climate change is driven by radiative forcing, which is influenced by cumulative GHG emissions, not annual emission rates from any individual project. **Figure 4-1** shows a comparison of global cumulative emissions in relation to RCPs 2.6, 4.5, and 8.5, representing low, medium, and high global cumulative emissions scenarios.

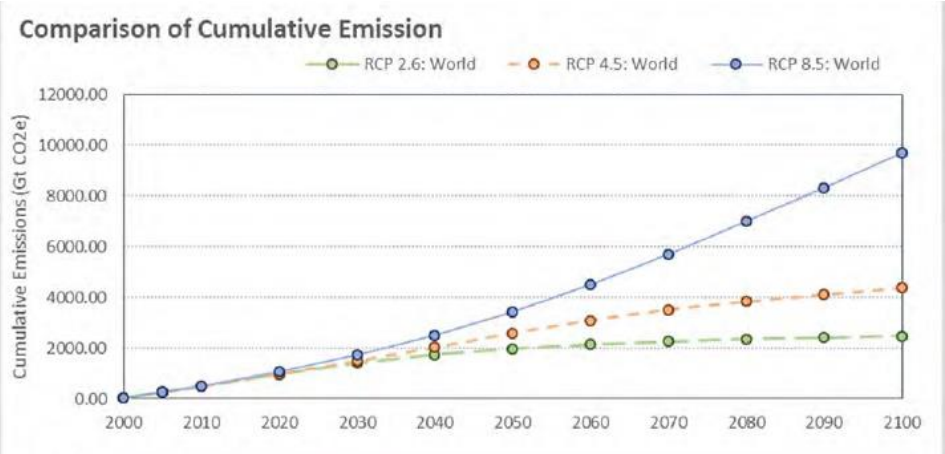

Figure 4-1. Comparison of RCP 2.6, RCP 4.5, and RCP 8.5 Cumulative Emission Estimates over the ~~Twenty-first~~21st Century

When considering the cumulative emissions on a global scale, the annual emission rates of various subnational projects are one of many emission contributions. Any single contribution on a subnational scale is dwarfed by the large number of comparable national and subnational contributors on a global scale. However, the best surrogate for understanding the potential impact of the BLM's subnational scale emissions on climate is estimating the projected annual emission rate due to BLM energy lease sale projects.

Golder Associates (2017) provides projections of GHG emissions from the 13 western states that regulate most of the federal fossil fuel leasing and compares these emissions with GHG emissions from other contributors. To accomplish this comparison, Golder Associates demonstrates a comparison of the projected BLM annual emission rates derived from federal lease sale and production information from the 13 western states against the RCP scenario emissions profile (a derived value estimating the annual GHG emission rate for each scenario). This comparison is provided in **Figure 4-2**. For additional context, 2014 baseline year federal resource production and consumption estimates for these 13 states can be compared with the 2014 baseline national energy consumption and total GHG emissions. The BLM subnational emissions in these 13 states are approximately 25.97 percent of the total national energy consumption emissions and 19.75 percent of national GHG emission totals at 2014 levels. In 2014, federal mineral production and consumption emissions in these 13 states represented approximately 2.64 percent of the global totals from all emission sources. With the relative magnitude of these emissions in mind, climate change trends and impacts are discussed below.

The contribution of GHG emissions from coal, oil, natural gas, and liquefied natural gas for the 13 BLM subject states in 2020 and 2030 under both normal and high production scenarios were evaluated and compared with the GHG emissions profile (the derived annual emission rate for the three RCP scenarios shown in **Figure 4-2**). By comparing the relative emission rates of the derived ranges of BLM emissions profiles (low and high estimates) with the RCP scenarios, the BLM emissions most closely track with RCP 8.5 in 2020 and between RCP 2.6 and RCP 4.5 in 2030 (Golder Associates 2017). The reduction in the BLM's emissions profile in 2030 compared with 2020 is a result of a projected change to the federal energy resource mixture. Less coal development is projected, while a slight increase in oil, gas, and natural gas liquids are projected into 2030 relative to 2020. Because coal is the most GHG-intensive fossil fuel, the reduction in

this resource development is anticipated to reduce the BLM's lease sale emissions profile (annual GHG emission rate) overall (see **Figure 4-2**).

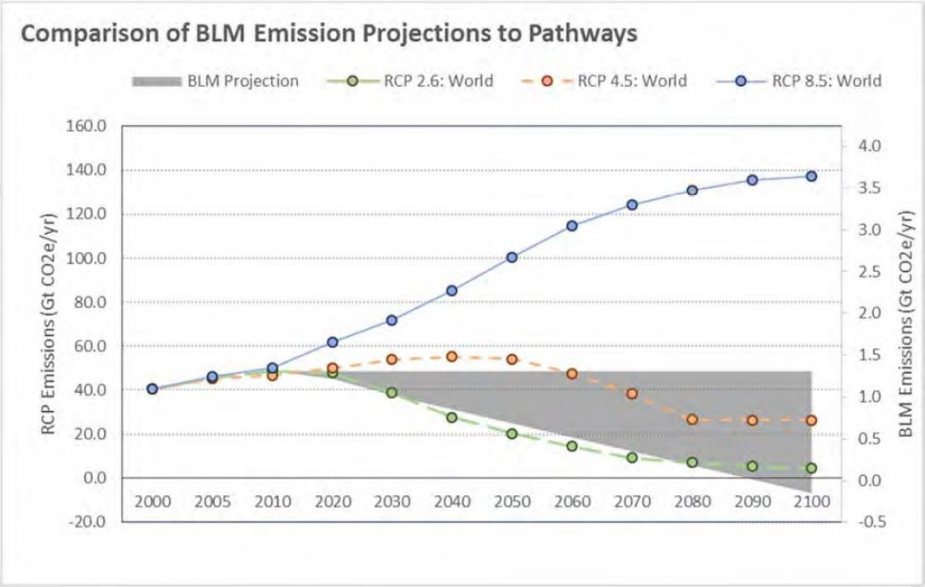

Figure 4-2. Comparison of the BLM Emission Projections with RCP 2.6, RCP 4.5, and RCP 8.5.

Based on the analysis in Golder Associates (2017), BLM activities are estimated to be conducted at a level that would be in line with the level of emissions anticipated in the RCP 2.6 and RCP 4.5 through 2060. Estimates of BLM activities in future years are more uncertain and have a wider range of variability. The projections presented above are based on best available data and assumptions used to provide context to the BLM's cumulative impact. However, due to the levels of uncertainty, some additional information is provided below regarding the BLM's relative contribution to global emissions and, by proxy, climate change. If the BLM operates under the business-as-usual scenario while all other contributors reduce their emissions in line with RCP 2.6, the relative contribution of the BLM increases as the emissions more closely resemble RCP 4.5. If the BLM operates under the decreased emissions scenario, keeping their reductions in line with RCP 2.6 like all the other contributors, the relative contribution of the BLM remains similar to current contributions. If the BLM operates under the decreased emissions scenario while all other contributors maintain constant emissions (business-as-usual) or increasing emissions, the relative contribution of the BLM greatly reduces.

It is unlikely that the global cumulative emissions will be strongly influenced by a single contributor at a national or subnational scale. However, the individual behavior of each contributor, through their relative contribution, has the ability to influence which RCP global emissions scenario is most closely resembled and, therefore, which climate change projections are most likely manifested toward the end of the century (Golder Associates 2017).

To understand the impacts of climate change, three RCP scenario projections of global temperature and precipitation changes in both the near term (representing the period from 2021 through 2040) and far term

(representing the period of 2081 through 2100) are presented below in **Table 4-8**. These estimates are derived from the average of over 30 different climate change models using the inputs of each RCP scenario.

Table 4-8: Projected Changes in Global Climate under Representative Concentration Pathways

RCP Pathway	Near Term (2021–2040)		Far Term (2081–2100)	
	Temperature (°C)	Precipitation (%)	Temperature (°C)	Precipitation (%)
RCP 2.6	0.78	1.44	0.97	2.27
RCP 4.5	0.85	1.49	1.81	3.51
RCP 8.5	0.98	1.62	3.68	5.89

Source: Golder Associates 2017

Under each RCP scenario, projected average global temperatures are expected to increase, and changes in precipitation are anticipated. However, generally, the impacts of climate change are least severe under the RCP 2.6 scenario and most severe under the RCP 8.5 scenario. Regardless of the specific magnitude of the impacts, the impacts on global climate are anticipated to include:

- A long-term global temperature change;
- Intensified droughts impacting agricultural, rural, and urban communities and resulting in changes in land cover and land use;
- Intensified and more frequent wildfires;
- Sea level rise, ocean warming, and reduced ocean oxygen, impacting global weather patterns and flora and fauna;
- Intensified flooding impacting infrastructure, natural resource-based livelihoods, and cultural resources; and
- Human health impacts, such as heat-associated deaths and illnesses, chronic diseases, and other health issues associated with poor air quality (Gonzalez et al. 2018).

To understand climate change impacts in the analysis area of the RMP, impacts anticipated in the region encompassing southern Colorado and New Mexico are discussed. Climate modeling suggests that annual average temperatures in this region may rise by 4 to 6 degrees Fahrenheit by the end of the ~~twenty first~~21st century, with warming increasing from south to north. By 2080 to 2090, the southwestern United States would see a 10 percent to 20 percent decline in precipitation, primarily in winter and spring, with more precipitation falling as rain. A Bureau of Reclamation report (Bureau of Reclamation, Sandia National Laboratories, US Army Corps of Engineers 2013) made the following projections through the end of the 21st ~~twenty first~~ century for the Upper Rio Grande Basin (southern Colorado to central-southern New Mexico) based on the current and predicted future warming:

- There would be decreases in overall water availability by one-quarter to one-third.
- The seasonality of stream and river flows would change, with summertime flows decreasing.
- Stream and river flow variability would increase. The frequency, intensity, and duration of both droughts and floods would increase.

4.2.2 Cave and Karst Resources

The RPFO has established a goal to identify and study karst features and caves to ensure they are available for appropriate uses by present and future generations. Resources and resource uses identified as having adverse and beneficial impacts on cave and karst resources are lands and realty, mineral resources,

recreation and visitor services, cultural resources, special designations, soil and water resources, paleontological resources, and special status species.

4.2.2.1 Direct and Indirect Impacts

4.2.2.1.1 Lands and Realty Decisions

Lands and realty decisions would have an adverse impact on cave and karst resources if those parcels identified for disposal contain cave or karst areas and are removed from federal protection. The Pronoun Cave Complex is the only identified cave system in the Decision Area and is protected by the Pronoun Cave ACEC. However, karst areas and other unidentified caves may be located on parcels identified for disposal. Areas identified for disposal would undergo NEPA analysis prior to disposal; cave or karst areas would be identified at that time. If those resources were found, the RPFO would consider mitigation measures to avoid impacts on cave and karst resources. Between 7 and ~~8~~ 18 percent of BLM-administered lands would be available for disposal under each alternative.

4.2.2.1.2 Mineral Resources Decisions

Management decisions to allow mineral development would have minimal impacts on cave and karst resources in those areas where proposed mineral extraction activities would take place in or near cave or karst features. Areas where mineral extraction would occur could impact the cave or karst resources directly and could also lead to indirect impacts on water resources. To minimize any potential impacts, the RPFO proposes to implement an oil and gas stipulation that limits the amount of surface disturbance near cave and karst resources. Under Alternative B, the RPFO would implement an NSO stipulation within 200 meters (656 feet) of known cave entrances, passages, or aspects of significant caves, or significant karst features. Under Alternative C, the RPFO would implement CSU within 200 meters (656 feet) of known cave entrances, passages, or aspects of significant caves, or significant karst features (see **Appendix H** for stipulations). Under Alternatives A and , D~~, and E~~, standard leasing terms would be applied; therefore, the RPFO would be able to move the location of oil and gas wells up to 200 meters (656 feet) for mitigation purposes.

4.2.2.1.3 Recreation and Visitor Services Decisions

Management decisions for recreation and visitor services would have both beneficial and adverse impacts on cave and karst resources. Impacts may occur as a result of SRMA and ERMA designations and subsequent recreation management. The impacts associated with increased visitation to cave or karst resources would include trampling and degradation of unique or fragile geologic features within caves. Overall disturbance to cave ecosystems could also occur as a result of increased visitation.

Activities that are not subject to the permitting process, such as dispersed recreation and cross-country OHV use, also have the potential to disturb cave and karst resources. When recreational users stray from established trails, adverse impacts may occur, especially in caves.

Beneficial impacts from recreation management decisions on cave and karst resources could also occur. Travel management decisions could have beneficial impacts on cave and karst resources in those areas where travel is restricted to existing roads and trails or closed to motorized travel. Mineral resource management decisions could be restricted within SRMA and ERMAs through site-specific NEPA analysis and could also indirectly protect cave and karst resources. Approximately 1,100 acres of known cave and karst features would receive indirect beneficial impacts from ERMA designations under Alternatives B, C, and D. No similar indirect protections would be realized under Alternative~~s~~ A ~~or E~~.

4.2.2.1.4 Cultural Resources Decisions

Cultural resource management decisions would have a beneficial impact on cave and karst resources where cultural resources are located in or within proximity to cave or karst features. Management restrictions

associated with cultural resources would provide an indirect benefit to caves and karst features because less surface disturbance is generally allowed to take place near cultural resource sites.

4.2.2.1.5 Special Designation Decisions

Special designations would have a beneficial impact on cave and karst resources when they require restrictions on surface-disturbing activities within the boundaries of the particular designation. Travel and mineral resource management decisions are the two major surface-disturbing activities that would be restricted within special designations and that also indirectly protect cave and karst resources. Specifically, the Pronoun Cave Complex ACEC would have beneficial impacts on cave and karst resources because the ACEC protects the only known cave complex in the Decision Area. The Pronoun Cave Complex ACEC was designated under the 1986 RMP (BLM 1986). In the current Proposed RMP/EIS, the ACEC would be maintained at its current size under Alternatives A and C. Alternative B would expand the ACEC to include an updated inventory of cave resources. Alternative~~s~~ D ~~and E~~ would remove the ACEC designation.

Additionally, under Alternative B, the Pronoun Cave Complex ACEC would be recommended for withdrawal from locatable mineral entry, closed to salable mineral extraction, and managed as CSU for leasable mineral development. Under Alternative C, the ACEC would be managed as CSU for leasable mineral development, and salable mineral extraction would be avoided. Under Alternative~~s~~ D ~~and E~~, the Pronoun Cave area would be open to the extraction of salable minerals and locatable mineral entry. Under Alternatives C and~~,~~ D,~~ and E,~~ livestock grazing would also be available within the boundaries of the Pronoun Cave Complex. Cave resources would be adversely impacted under Alternatives C~~,~~ and D~~, and E~~ for the Pronoun Cave ACEC.

4.2.2.1.6 Soil and Water Resources Decisions

A defining characteristic of cave and karst features is their hydrologic properties. As a result, management decisions associated with soil and water resources, as described under Management Common to All Alternatives for soil and water resources in **Chapter 2**, would have a beneficial, indirect impact on cave and karst resources. This is because those policies, laws, and proposed actions to protect soil and water would also protect cave and karst resources.

4.2.2.1.7 Paleontological Resources Decisions

Paleontological resources management decisions would have a beneficial impact on cave and karst resources where paleontological resources are located within or in proximity to cave or karst features. Management restrictions associated with paleontological resources would provide an indirect benefit to caves and karst features because less surface disturbance is generally allowed to take place near paleontological resource sites.

4.2.2.1.8 Wildlife and Special Status Species Decisions

Management decisions associated with wildlife resources and special status species would have a beneficial impact on cave and karst resources if those species were known to inhabit cave or karst features. Management restrictions intended to protect species would provide an indirect benefit to cave and karst features because less surface disturbance is generally allowed to take place near special status species habitat.

4.2.2.2 Cumulative Impacts

The RPFO is unaware of any proposed or planned projects that would specifically impact the cave and karst resources that would be affected by this RMP.

4.2.3 Cultural Resources

Both adverse and beneficial impacts are anticipated from the decisions made in the RMP/EIS. Adverse impacts on cultural resources in the Decision Area would primarily result from activities associated with surface and subsurface disturbance, such as development projects, recreational use/OHV travel, and fire and fuels

management. Adverse impacts would also result from specific cultural resource management decisions and non-surface-disturbing activities that create visual, auditory, and/or atmospheric effects. These latter impacts would apply primarily to sites or locations deemed sacred or traditionally important by Native American tribes and used by these groups in such a manner that visual obstructions or noise levels impinge upon that use, or to NRHP-eligible sites under Criteria A, B, and/or C, which are also more sensitive to visual, auditory, and atmospheric effects. Impacts on cultural resources from program decisions are considered long term for the purpose of this analysis. Beneficial impacts on cultural resources would primarily result from decisions that would restrict surface disturbance, close or limit travel, or stabilize soils through restoration activities.

The primary concern for adverse impacts on cultural resources relates to surface and subsurface disturbance of the artifacts, features, and architecture of sites that reduce their integrity, alter their association with traditional values, and reduce the potential to recover data. Archaeological data consist of both "objects" (in the broad sense of artifacts, architecture, features, etc.) and the horizontal and vertical relationships between these objects. Impacts on cultural resources from surface disturbance are long term and, in most cases, irreversible. Impacts could include elimination or reduction of the setting and physical integrity of a sacred or other sites, including NRHP-eligible sites, landscapes, and cultural theme areas. Other impacts include disruption or reduction of religious values of sites and areas, reduction in the data potential of a site, and damage to traditional collection areas or resource sites.

Potential impacts on specific cultural resources from the various proposed management alternatives are difficult to quantify precisely. The management alternatives do not stipulate precise areas for surface-disturbing activities, and the precise locations of all cultural resources in the area are not known. However, based on archaeological surveys and tribal concerns voiced to the RPFO during past consultations, it is possible to estimate impacts based on the proposed general locations of activities and the relationships of these Planning Areas to zones of high, medium, or low cultural resource site density.

4.2.3.1 Analysis Assumptions

The RPFO created a site density model using site location data from the New Mexico Cultural Resource Information System (NMCRIS) database provided to the BLM in November 2019 clipped to the Planning Area boundary. To maximize the area for which the quantitative analysis of impacts could be conducted, the BLM created a GIS layer consisting of areas for which there has been some level of site identification. This layer was based on both NMCRIS survey polygons and site locations for which no survey polygon was available in NMCRIS. To create a proxy for a survey polygon in these cases, the assumption was made that where site concentrations exist, a systematic inventory probably occurred, but has not yet made it into NMCRIS. This could be the result of a systematic inventory of a small area or of a larger area with low site density. Regardless, some investigation of the area around each site was most likely conducted during efforts to define site boundaries.

The survey polygons that are included in NMCRIS include block surveys, linear corridor surveys, and sample surveys using widely spaced transects (usually 150–200 meters [492–656 feet]). The large number of small surveys, and particularly linear and sample surveys, creates a large edge effect. To lessen this somewhat, an approximate 200-meter (656-foot) buffer was added to survey polygons. The assumption is that the density predicted within the survey area would most likely extend to at least 200 meters (656 feet) from the area observed. The two buffered layers (NMCRIS survey and site location) were merged and dissolved to create the area that the predicted site density model could be applied to. The portions of the site density model that are outside the buffered archaeological data layer are considered areas for which no data exist, and the model could be inaccurate. **Chapter 3** includes the predicted cultural resource site density (in acres) in the Decision Area.

4.2.3.2 Direct and Indirect Impacts

4.2.3.2.1 Mineral Resources Decisions

Management decisions to allow mineral development would have minimal impacts on cultural resources, though the required inventories would add to cultural resources knowledge. Impacts from mineral development on cultural resources would be avoided, minimized, or mitigated, in compliance with Section 106 of the NHPA. In addition, mineral development activities that are visible on or above the surface are expected to have the potential to directly impact the visual integrity of cultural properties that derive their significance from a natural setting or from a setting relatively devoid of modern intrusion.

Mineral resources management decisions are expected to impact 1.2 percent of the Decision Area over the next 20 years, according to the RFD for leasable, locatable, and salable minerals (Crocker and Glover 2019). It is anticipated that mineral extraction activities would be in areas that avoid impacts on cultural resources. Standard BLM policy and the NHPA Section 106 process would be applied to all applications for disturbance, thereby reducing opportunities for direct adverse impacts related to this disturbance. The RPFO has also developed fluid mineral leasing stipulations (see **Appendix H**) that would protect cultural resources under all alternatives. Cultural resources would be protected through combinations of fluid mineral leasing NSO stipulations, CSU, and/or closures under all alternatives, thereby protecting cultural resources through avoidance, minimization, or mitigation of adverse impacts under all alternatives. Inadvertent impacts and impacts from vandalism that often accompany increased human activity in developed areas may occur because there would be more people in the area, increasing the probability that acts of vandalism would be committed. Impacts from looting would likely decrease because increased human presence acts as a deterrent for this kind of activity.

4.2.3.2.2 Fire Management Decisions

Fire management decisions would have adverse impacts on cultural resources when fuel treatments occur where cultural resources are present. Wildland fires can burn artifacts and features, which is of greater concern on sites with combustible cultural material. Fuels treatments and suppression tactics that cause ground disturbance disturb the integrity of deposits or features, and damage artifacts if present. Beneficial impacts on cultural resources from fire management include the improvement of herbaceous cover on or near cultural resource sites and the potential reduction of catastrophic fires that would destroy or damage artifacts, features, or structures. Adverse impacts on cultural resources would be avoided by project-specific compliance with NEPA and Section 106 of NHPA prior to fuels treatments. **Table 4-9** identifies the number of acres of proposed fuel treatments within low to high cultural site density locations. The proposed fuel treatments are common to all alternatives; therefore, the impacts on cultural resources from fire management decisions would be the same for all alternatives.

Table 4-9: Proposed Fuel Treatment Areas (Acres) within Low to High Cultural Site Density Locations, All Alternatives

Fire Management Treatment Areas	Low Site Density	Medium Site Density	High Site Density	No Data	Total
FRCC 2 and FRCC 3 total	23,000	235,900	12,800	335,800	607,500

Source: BLM GIS 2020

*Both FRCC 2 and 3 areas are proposed for 100 percent treatment over the next 20 years.

4.2.3.2.3 Lands and Realty Decisions

Lands and realty decisions would have adverse impacts on cultural resources when lands proposed for disposal lead to the loss of cultural resources. A site-specific NEPA analysis would be applied prior to the disposal of lands administered by the BLM to avoid adverse impacts on cultural resources. In addition, cultural resources on public lands that are otherwise suitable for disposal would be considered for exchange only with state or local agencies or nonprofit, private organizations with wildlife and cultural resource

management responsibilities. **Table 4-10** identifies the number of acres proposed for land disposal and the associated cultural resource site density. Alternatives A and B would result in the greatest protection of cultural resources because the fewest number of BLM acres could be disposed (7.67.4 percent and 7.87.7 percent of the total surface acres, respectively), while the most acres of BLM-administered lands would be considered for disposal under Alternatives E C and D (17 18 percent).

Table 4-10: Lands Identified for Potential Disposal (Acres), by Cultural Resource Site Density Level

Commented [AA6]: To be updated with revised disposal data

Site Density Level	Alternative A (No Action)	Alternative B	Alternative C (Draft RMP/EIS PreferredProposed RMP)	Alternative D	Alternative E (Proposed RMP)
Low	3,300	3,300	9,100	9,100	9,300
Medium	14,000	15,000	18,700	18,700	24,100
High	1,100	1,100	1,300	4,400	1,300
No Data	36,600	37,600	88,300	88,300	91,800
Total	**54,900**	**57,000**	**117,300**	**120,400**	**126,400**

Source: BLM GIS 2020

4.2.3.2.4 Special Designations Decisions

Special designations would have a beneficial impact on cultural resources because of management restrictions that are applied within the boundaries of the particular designation. Travel and mineral resource management decisions are the two major surface-disturbing activities that would be restricted within special designations and that also indirectly protect cultural resources. ACECs and National Scenic Trails are the two special designations that are proposed in the RMP/EIS. The only National Scenic Trail in the Decision Area is the CDNST.

Table 4-11 provides the proposed number and acres of special designations by alternative. Under Alternative B, the largest number of acres would be managed as special designations, while the smallest number of acres would be managed as special designations under Alternative ED. Under Alternative E, 135,500 fewer acres than Alternative B would be managed as special designations.

Table 4-11: Proposed Special Designations (Number and Acres) within the Decision Area, by Alternative

Special Designations	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMPDraft RMP/EIS Preferred)	Alternative D	Alternative E (Proposed RMP)
ACECs	10 ACECs 46,000 acres	18 ACECs 133,300 acres	18 ACECs 123,000 acres	11 ACECs 38,300 acres	7 ACECs 21,600 acres
WSA/Wilderness Area	97,800 acres	97,800 acres	97,800 acres	97,800 acres	97,800 acres
CDNST	1 trail 11,50014,400 acres	1 trail 38,20034,400 acres	1 trail 14,400 23,200 acres	1 trail 14,400 11,500 acres	1 trail 14,400 acres
Total special designations acreages	**158,200155,300 acres**	**269,300265,500 acres**	**244,000235,200 acres**	**147,600150,500 acres**	**133,800 acres**

Special Designations	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Total, not including overlapping special designation areas	105,900	112,500	112,900	114,400	

Source: BLM GIS 2020

Commented [AA7]: This row for Alts A-D to be updated (based on changed CDNST acres)

~~Under Alternative E, one ACEC is specifically proposed for the protection of cultural resources, Jones Canyon. Two other ACECs, Cabezon Peak and Espinazo Ridge, are proposed for designation due to cultural values and other resource values.~~

4.2.3.2.5 Recreation and Visitor Services Decisions

Management decisions for recreation and visitor services would have both beneficial and adverse impacts on cultural resources. Potentially significant impacts on cultural resources would occur as a result of SRMA or ERMA designations and subsequent recreation management. Increased visitation to areas with cultural sites increases the probability that artifact collection, vandalism, and trampling of cultural resources would occur. Increased visitation also increases the likelihood of encounters between recreational users and Native American groups engaged in ceremonial use of an area, which is protected under the American Indian Religious Freedom Act (Public Law No. 95-341, 92 Stat. 469, Aug. 11, 1978).

Activities that are not subject to the permitting process, such as dispersed recreation and cross-country OHV use, also have the potential to disturb cultural resources. When recreational users stray from established trails, adverse impacts occur on cultural resources if they are present. Bicycles and horses, in particular, have the potential to cause adverse impacts on cultural resources that are located on sensitive soils. Some visitors to public lands commit acts of vandalism, which can include illegal excavation of archaeological sites (i.e., pot hunting), illegal collecting of surface artifacts, damage to historic structures (shooting or dismantling), and defacement of petroglyphs.

Beneficial impacts from recreation management decisions would result from surface disturbance restrictions for travel management and mineral resources. Recreation management decisions would have beneficial impacts on cultural resources in those areas where travel is restricted to existing roads and trails or closed to motorized travel. In addition, under Alternatives B, C, and D, ~~and E,~~ where SRMAs and ERMAs would be managed as CSU in developed recreation sites or NSO for fluid leasable minerals, closed to salable mineral extraction, or recommended for withdrawal from locatable mineral entry, this management would protect cultural resources. **Table 4-12** provides the proposed SRMA and ERMAs (in acres) and the associated cultural resource site density within each designated area.

Table 4-12: Cultural Resource Density Classes with the Proposed SRMA and ERMAs (Acres) by Alternative

Site Density Level	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Low	0	15,400	15,400	15,400	~~1,800~~
Medium	0	110,400	110,400	110,400	~~45,700~~

Site Density Level	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
High	0	9,000	9,000	9,000	~~0~~
No data	0	152,000	152,000	152,000	~~26,600~~
Total SRMA/ERMA acreages	0	286,800	286,800	286,800	~~74,100~~

Source: BLM GIS 2020

4.2.3.2.6 Cultural Resource Decisions

Federal historic preservation laws that consider impacts and resolve adverse effects on historic properties from federal actions already protect cultural resources on federal lands. Complying with management measures for authorized actions requires consulting with federally recognized tribes and other interested parties, identifying and evaluating cultural resources, and adhering to procedures for resolving any adverse effects and mitigating impacts. Completion of the Section 106 process is required for all federal undertakings implementing resource management plan decisions. There is a greater risk of impacts resulting from unauthorized activities, natural processes, dispersed activities, and incremental or inadvertent human actions, especially where inventories are incomplete.

In addition, decisions considered in the RMP/EIS that provide for management prescriptions that emphasize cultural resources would have beneficial impacts on cultural resources by four cultural resource areas with focused management. These cultural resource areas, Fort Site and Ojo Pueblo, Azabache Station, Big Bead Mesa, and the Headcut Prehistoric Community, do not meet the relevance and importance criteria for ACECs, but are still in need of protection. Under Alternatives B and C, the Fort Site and Ojo Pueblo would be managed as NSO (Alternative B) or CSU (Alternative C) for fluid leasable minerals on 1,000 acres, closed to salable mineral extraction on 700 acres, and recommended for withdrawal from locatable mineral entry on 700 acres (Alternative B) or 1,000 acres (Alternative C). Under Alternatives A, B, and C, Azabache Station would be managed to protect the cultural resources from surface-disturbing activities. Under all alternatives, Big Bead Mesa would be managed to control access, limit travel, and restrict surface-disturbing activities from occurring on the mesa. Under all alternatives, the Headcut Prehistoric Community would be managed to protect the cultural resources that are on the site and to restrict surface-disturbing activities. However, CSU would be applied to fluid mineral leasing under Alternatives B, C, and D only, which would be more protective than no such restrictions under Alternative~~s~~ A ~~and E~~.

4.2.3.2.7 Livestock Grazing Decisions

Livestock grazing management decisions would potentially have adverse impacts on cultural resources in areas where livestock congregate and increase the risk of damage to cultural resources present within the area of concentration. Site-specific NEPA analysis and NHPA Section 106 compliance would be applied prior to the issuance of grazing permits and implementation of range improvements. Administrative actions, such as fencing high-value cultural sites, would be taken when needed to avoid adverse impacts on cultural resources.

Grazing allotments make up approximately 87 percent of the Decision Area. Based on the prevalence of livestock grazing and site probabilities listed in **Chapter 3**, it is likely that livestock grazing would impact cultural resources under all alternatives. Alternative B is the most restrictive of livestock grazing because grazing would be removed from special designations and riparian areas; therefore, the risk of impacts on cultural resources would be less under Alternative B. Alternatives C and~~,~~ D~~, and E~~ allow for livestock grazing within special designations and riparian areas when resource values are compatible with grazing activities. As

a result, the impact on cultural resources from livestock grazing would be greater under Alternatives C and, D, and E.

4.2.3.2.8 Forests and Woodlands Decisions

Forest and woodland management decisions would have adverse and beneficial impacts on cultural resources. Areas open to the harvesting of forest products would have indirect adverse impacts on cultural resources through increased visitation to harvesting areas that have potential cultural sites. Increased numbers of people in areas with cultural sites increases the probability that unauthorized artifact collection, vandalism, and trampling of cultural resources would occur. However, not all wood product harvest would involve public firewood areas. If contractors or agencies conduct the harvest operation, these adverse impacts are less likely. Adverse impacts could also arise from ground disturbance associated with forest treatment. Alternative A opens the fewest number of acres to forest product harvest.

Beneficial impacts would include the improvement of herbaceous cover on or adjacent to cultural resource sites. Forest treatments could generate slash that could be placed on the ground to reduce erosion in places where cultural resources need protection from erosion. Alternatives D and E would open the largest number of acres to forest product harvest. **Table 4-13** shows the predicted cultural resource site densities within the proposed forest product harvest areas (in acres).

Table 4-13: Predicted Cultural Resource Site Densities within Forest Product Harvest Areas (Acres)

Site Density Level	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP Draft RMP/EIS Preferred)	Alternative D	Alternative E (Proposed RMP)
Low	0	3,900	19,800	24,500	24,500
Medium	8,900	48,800	221,200	252,500	252,600
High	0	3,400	9,600	11,800	11,800
No data	3,300	64,600	297,200	344,800	344,700
Total	12,200	120,600	547,800	633,700	633,700

Source: BLM GIS 2020

4.2.3.2.9 Travel Management Decisions

Travel management decisions would have both beneficial and adverse impacts on cultural resources. Areas closed to motorized travel would reduce the potential for human interaction with cultural resource sites, while those areas open to travel or limited to existing or designated roads, primitive roads, and trails could lead to vandalism, artifact collection, and trampling of cultural resource sites. Areas designated as open to motorized travel would also be adversely impacted by surface disturbance caused by cross-country vehicle travel.

Table 4-14 shows the proposed travel management decisions by alternative. Alternative B would close the largest number of acres to motorized travel and open the least. Alternatives D and E would close the smallest number of acres to motorized travel, while Alternative A would open the most.

Table 4-14: Proposed Travel Management Decisions on Predicted Cultural Resource Site Densities on BLM Lands within the Decision Area (Acres), by Alternative

Travel Management Category	Cultural Resource Site Density	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Closed	Low	3,000	6,200	4,600	3,000	~~3,000~~
	Medium	34,900	66,000	35,700	31,500	~~31,500~~
	High	3,100	3,100	3,100	3,100	~~3,000~~
	No data	61,100	101,200	80,600	60,200	~~60,300~~
Open	Low	16,900	0	1,000	1,000	~~2,000~~
	Medium	71,900	200	400	400	~~0~~
	High	3,900	3,500	0	0	~~0~~
	No data	209,200	900	16,900	18,100	~~16,000~~
Limited	Low	7,600	21,300	21,900	23,500	~~24,500~~
	Medium	177,300	217,900	248,100	252,200	~~252,600~~
	High	7,900	8,300	11,800	11,800	~~11,800~~
	No data	134,900	303,000	307,500	326,800	~~327,000~~

Source: BLM GIS 2020

4.2.3.3 Cumulative Impacts

Surface-disturbing activities, such as the Northwest Loop Road, the Red Mesa Wind Farm, the N55 Road Improvement Project, fire and fuels management on non-BLM-administered land in the Planning Area, the potential RETA transmission corridor, and uranium development, could contribute to cumulative impacts on cultural resources. These projects, where specific project areas are known, account for approximately 500,000 acres of surface disturbance across federal, state, tribal, and private lands. These activities, where applicable, would require adherence to federal and state cultural resource laws and regulations, resulting in the inventory and identification of cultural sites, avoidance, and in some cases data recovery.

Oil and gas development and mineral exploration and development have occurred across this region in the past and would continue into the future, both on BLM-administered lands under the RMP/EIS and on state and private inholdings. The continued development of oil and gas and mineral exploration could also eventually lead to cumulative visual, auditory, and atmospheric effects on historic properties. Mineral development of inholdings and lands adjacent to the Planning Area would continue to increase the human presence in the general area, thereby increasing the risk to cultural resources from looting, vandalism, and inadvertent impacts.

Many decisions related to VRM, special designations, and restrictions on surface disturbance have the potential to provide a net positive benefit to cultural resources within the Decision Area. These decisions would reduce or control the frequency and extent of ground-disturbing activities that present the greatest threat to maintaining the use values of cultural resources.

Specific undertakings that could result in surface and subsurface disturbance and have the potential to impact cultural resources are subject to the Section 106 process of the NHPA, which calls for the identification of historic properties (i.e., NRHP-listed sites or sites determined eligible for listing in the NRHP) within the area of potential effects and the consideration of alternatives to the planned undertaking that could avoid impacts on said properties. In the event that avoidance is not possible, mitigation of the impacts is to be considered.

4.2.4 Fire Management

Management of the RPFO fire management program would follow guidance in this document, which addresses recent issues of concern in fire management to both the public and internal resource specialists. The goal of the RPFO fire management program is to improve the FRCC within the Decision Area. Treatment acreages have been identified in **Chapter 2** that would occur in FRCC 2 and 3, with the target outcome of moving toward FRCC 1 in those treated areas.

In general, the majority of fire management issues deal with the management of terrestrial vegetation. Current terrestrial vegetation management practices under wildlife, range, and forestry resources are conducive to the management goals for fire management.

Programs that have management decisions affecting wildfire ecology are cultural resources, forests and woodlands, lands and realty, livestock grazing, recreation, travel management, vegetative communities, and wildlife and fish.

4.2.4.1 Direct and Indirect Impacts

4.2.4.1.1 Cultural Resources Decisions

Cultural resources management decisions, including the management of ACECs with cultural resource values, would have adverse impacts on fire and fuels management because of restrictions on potential treatment areas. These restrictions would result in a loss of treatable acres or a reduction of treatment options based on recommendations to avoid, minimize, or mitigate adverse impacts on identified cultural resources. Restrictions would be applied on a case-by-case basis, and it is likely that fuels treatments would be modified, but not completely restricted, in most areas. A site-specific analysis would be applied for fuels treatments, and appropriate mitigation measures would be identified at that time.

4.2.4.1.2 Forests and Woodlands Decisions

Forest and woodland management decisions would have beneficial impacts on fire management because removal of forest products, through activities such as Christmas tree harvesting and firewood thinning, would result in the long-term reduction in fuels loading and, subsequently, catastrophic fire threats. Removal of forest products would also result in increased growth of forbs and grasses due to the removal of overstory vegetation. The presence of dried understory vegetation could result in increased fire frequency in some areas.

Table 4-15 identifies the acres of forest product collection areas within proposed fire management treatment areas. Alternative ~~E~~ D would open~~s~~ the most acres to forest product harvest, while Alternative A opens the smallest number of acres. By allowing removal of forest products in these areas, it is anticipated that the FRCC would shift toward FRCC 1.

Table 4-15: Forest Product Harvest Areas (Acres) within RPFO Fire Management Units

Fire Management Unit	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
B6. Sandia	0	3,100	5,700	12,900	~~12,900~~
B8. Candy Kitchen	0	0	12,800	12,800	~~12,800~~
C1. North Malpais	0	29,400	98,100	98,800	~~98,800~~
C3. Wilderness and WSAs	0	100	300	400	~~400~~
C5. Mesa Chivato	1,700	200	4,300	11,900	~~11,900~~

Fire Management Unit	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
C7. Scattered Grass/Shrub	10,500	87,800	426,500	496,800	~~496,900~~
Total	12,200	120,600	547,800	633,600	~~633,700~~

Source: BLM GIS 2020

4.2.4.1.3 Fire Management Decisions

Direction and guidance approved by the decisions for the comprehensive Fire and Fuels Plan Amendment (BLM 2004c), the Updated Guidance for Implementation of Federal Wildland Fire Management Policy (BLM 2017), and the most recent RPFO Fire Management Plan (currently BLM 2011) have been incorporated into the RMP/EIS, which is common to all alternatives being considered. The Fire and Fuels Plan Amendment provides fire management direction that is common to all alternatives being considered in this RMP/EIS. Readers should note that the potential impacts of implementing the Fire and Fuels Plan Amendment across the entire Decision Area were analyzed as part of the environmental assessment prepared for that document (BLM 2004c). Fuels management treatment acres are also detailed in **Chapter 2** in addition to the treatment acres outlined in the Fire and Fuels Plan Amendment. These proposed fuel treatment areas are also considered management common to all alternatives.

Under all alternatives, up to approximately 32,000 acres of land rated FRCC 2 or 3 would be treated annually in the Decision Area depending on budgetary and time constraints. WUI areas, areas with fuel loading that could potentially result in the loss of ecosystem components following wildfire, and areas that meet other management goals and objectives would be treated with prescribed fire and non-fire treatments (such as mechanical removal, chemical and biological treatments, manual removal, and seeding). The overall impact of these treatments would be improvement in FRCC levels within the Decision Area and movement toward FRCC 1. The treatments would occur within 100 percent of the FRCC 2 and 3 areas in the Decision Area throughout the life of the plan, as described in **Table 4-16**.

Table 4-16: Proposed Fuel Treatment Areas (Acres) by FRCC

Fire Management Unit	FRCC 2 Acres	FRCC 3 Acres
B6. Sandia	7,500	3,000
B8. Candy Kitchen	5,900	6,400
C1. North Malpais	66,000	28,800
C3. Wilderness and WSAs	37,100	1,867
C5. Mesa Chivato	37,800	17,100
C7. Scattered Grass/Shrub	353,500	42,500
Total*	507,800	99,700

Source: BLM GIS 2020

*Total acreages represented are for the life of the plan; treatments would not exceed 32,000 acres per year.

4.2.4.1.4 Lands and Realty Decisions

Lands and realty decisions could have adverse impacts on fire management. Proposed land disposals could result in increased development of infrastructure adjacent to public land, which could increase the exposure of private holdings to wildfire, expanding urban interface management needs. Alternative A contains the least amount of acres in FRCC 2 and 3 that meet FLPMA Section 203 criteria for disposal out of federal ownership, while ~~Alternative~~ Alternatives ~~E~~ C and D would contain the largest amount of acres that meet FLPMA

Section 203 criteria for disposal out of federal ownership. **Table 4-17** provides the number of acres in FRCC 2 and 3 that meet FLPMA Section 203 criteria for disposal out of federal ownership by alternative.

Table 4-17: Parcels Identified as Potentially Available for Disposal (Acres) in FRCC 2 and 3 by Alternative

Commented [AA8]: To be updated with revised disposal data

Status	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Potentially Available in FRCC 2	29,400	30,400	73,000	75,000	~~75,000~~
Potentially Available in FRCC 3	21,100	21,900	27,9000	28,100	~~34,600~~
Total FRCC 2 and 3 acres Potentially Available for Disposal	50,500	52,300	100,900	103,100	~~109,600~~

Source: BLM GIS 2020

Lands and realty decisions could also have a beneficial impact on fire management. Disposal and acquisition of parcels within the checkerboard areas within the Decision Area would improve the ability of the RPFO to implement effective fire management decisions.

4.2.4.1.5 Livestock Grazing Decisions

Livestock grazing would have both adverse and beneficial impacts on fire management. Adverse impacts include alterations in FRCC because key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loading, would be altered within the Decision Area though livestock grazing activities. Beneficial impacts from livestock grazing activities include reducing the risk of catastrophic fire by reducing the amount of understory vegetation, increasing water availability for suppression, and maintaining large undeveloped acreages, which reduces the potential for urban interface fires. Treatment areas within grazing allotments would also require a minimum of 2 years of growing season deferment, or as determined otherwise by resource managers through consultation and coordination with the permittee or lessee. Furthermore, with livestock owners and managers living in proximity to BLM-administered lands, there is a general increase of overall awareness of local conditions and fire ignitions, primarily ignitions caused by public land users recreating on BLM-administered lands.

Table 4-18 provides the number of acres available for grazing within each fire management unit in the RPFO by alternative. Alternative~~s~~ ~~E~~ C and D propose~~s~~ the largest number of acres for livestock grazing within the RPFO fire management units (same as Alternative A), while Alternative B proposes the smallest.

Table 4-18: Acres of Available Livestock Grazing (Acres) within RPFO Fire Management Units in the Decision Area

Fire Management Unit	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
B6. Sandia	12,900	1,200	12,900	12,900	~~12,900~~
B8. Candy Kitchen	12,800	12,800	12,800	12,800	~~12,800~~
C1. North Malpais	21,300	20,600	21,300	21,400	~~21,300~~

Fire Management Unit	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
C3. Wilderness and WSAs	50,700	300	50,700	50,700	~~50,700~~
C5. Mesa Chivato	58,500	4,400	58,500	58,500	~~58,500~~
C7. Scattered Grass/Shrub	446,500	401,100	446,500	446,500	~~446,500~~
Total	**602,700**	**440,400**	**602,700**	**602,800**	~~**602,700**~~
No Fire Management Unit	45,800	208,100	45,800	45,700	~~45,800~~

Source: BLM GIS 2020

4.2.4.1.6 Travel Management Decisions

Travel management decisions would have a beneficial impact on fire management in those areas that are identified for closure to travel in the RMP/EIS. Approximately 80 percent of fire starts are estimated to occur from lightning and 20 percent are anthropogenic; therefore, closing portions of the Decision Area to travel would reduce human activity within those closed areas and possibly prevent fires caused by humans from occurring. **Chapter 2** provides the proposed travel management decisions (in acres) under each alternative. Under Alternative B, the most acres would be closed to motorized travel, thereby providing the most beneficial impact on fire management. Alternative A proposes the greatest amount of acres open to motorized travel, providing for the greatest adverse impact on fire management. Alternative ~~E~~ D~~(the Proposed RMP)~~ proposes the greatest number of acres of motorized travel limited to existing or designated roads and trails. Alternative ~~E~~ D would provide less of a beneficial impact on fire management than Alternative A.

4.2.4.1.7 Vegetative Communities Decisions

Similar to forest and woodland management decisions, vegetation management decisions in the Decision Area would have a beneficial impact on fire management. Vegetation treatments such as thinning and prescribed fire would result in the long-term reduction of hazardous fuel loadings and the occurrence of catastrophic wildfires. Specific vegetation treatments in the Decision Area are not identified in the RMP/EIS. Site-specific NEPA analysis would occur prior to implementation of vegetation treatments.

4.2.4.1.8 Wildlife, Special Status Species, and Fisheries Decisions

Wildlife and fisheries management decisions would have both beneficial and adverse impacts on fire management. The Proposed RMP/EIS proposes restrictions on surface-disturbing activities, including buffers around prairie dog towns and raptor nests, and avoidance of big game winter range and big game fawning and calving habitat. These restrictions could potentially require the modification of fire management activities during specific time periods and reduce the options available for fuels reduction, surface-disturbing vegetation treatments, and prescribed fire within the proximity of the wildlife areas disclosed in **Table 4-19**. Under Alternative A, the least amount of surface restrictions are proposed to protect wildlife on BLM-administered lands, while the most surface restrictions would be implemented under Alternative B.

Table 4-19: Proposed Surface Restrictions (Acres) to Protect Wildlife on Decision Area Lands, by Alternative

Surface Restrictions	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Raptor nest buffers (March 1–June 30)	0	48,400	22,100	8,300	~~0~~
Big game winter range (November 15–April 30)	0	189,300	189,300	189,300	~~189,300~~
Prairie dog towns	0	5,100	2,000	200	~~0~~
Wildlife habitat projects	0	700	700	700	~~700~~

Source: BLM GIS 2020

Some wildlife management decisions common to all alternatives would benefit fire management in the Decision Area. Dispersed camping in riparian areas would be restricted under all alternatives, which would slightly reduce the likelihood of human-caused wildfire in these areas. The likelihood of human-caused wildfire would also be slightly reduced with the implementation of a limited fire suppression policy (and initiation of prescribed fires) where fuels treatments, such as thinning and prescribed fire, would increase vegetation productivity and increase forage for wildlife, which is also proposed under all alternatives.

4.2.4.2 Cumulative Impacts

Under the guidance of the RPFO Fire Management Plan and fire management plans in adjacent BLM field offices and Forest Service ranger districts, fuel load reductions, vegetation treatments, and woodland salvaging would reduce the risks of wildfire within the Planning Area. The Southwest Jemez Mountains Restoration Project would have beneficial cumulative impacts on fire management within the Planning Area. The Jemez Mountains are adjacent to the Planning Area; therefore, improved forest conditions in the Jemez Mountains could result in a lower chance of high-intensity wildfires starting in the Jemez Mountains and spreading to the Decision Area.

Adverse impacts on fire management could occur from projects that increase the amount of urban development within the Planning Area, thereby increasing the number of WUI acres adjacent to BLM-administered lands. The Northwest Loop Road may require a right-of-way permit from the RPFO, depending on the final alignment of the proposed project. The final width of the right-of-way is not known, but the length of the proposed project is approximately 39 miles. The proposed Northwest Loop Road could lead to increased WUI lands in the Planning Area; however, the amount of development that would occur from the proposed road and the relative risk are speculative at this time.

4.2.5 Forests and Woodlands

Table 4-20 shows the number of acres potentially open to forest product removal and those areas where such activities would be prohibited under each alternative. It is important to note that the alternatives give a maximum number of acres that would be considered for the location of individual forest product harvest areas over the next 20 years in the Decision Area. Decisions made under this RMP/EIS related for forests and woodlands would not automatically open all acres listed in **Table 4-20** to harvesting. The acreages listed represent the BLM-administered land base in the Decision Area available to be designated as specific forest product harvest areas. A site-specific NEPA analysis would be conducted prior to opening a specific area for forest product harvesting. The restricted areas listed would result in adverse impacts on

the harvesting of woodland products. The great majority of this harvesting is casual collection by individuals, such as for firewood, vigas, latillas, Christmas trees, and greenwood cutting.

Table 4-20: Potential Areas Open for Forest Product Harvesting (Acres) with a List of Restricted Areas, by Alternative

Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
12,200 acres • Bluewater Creek segment that is eligible for inclusion in the NWSRS	117,100 • Riparian areas • ACECs • VRM Class I • SRMAs • ERMAs • Wilderness areas • WSAs • Sensitive soils • Lands with wilderness characteristics managed to protect wilderness characteristics • Bluewater Creek segment that is suitable for inclusion in the NWSRS	544,300 • Riparian areas • ACECs • Wilderness areas • WSAs • Lands with wilderness characteristics managed to protect wilderness characteristics • Bluewater Creek segment that is suitable for inclusion in the NWSRS	633,700 acres • Wilderness areas • WSAs	~~633,700 acres~~ ~~• Wilderness areas~~ ~~• WSAs~~ ~~• Bluewater Creek segment that is suitable for inclusion in the NWSRS~~

Source: BLM GIS 2020

4.2.5.1 Analysis Assumptions

Forest product removal is a permitted multiple use; therefore, a variety of regulations, administrative processes, and best management practices exist to ensure that harvest levels remain sustainable and minimize the chance of adverse impacts on other resources. It is assumed that forest management activities would be carried out in compliance with existing policies and regulations at both the state and federal levels.

It is assumed that forest product removal in areas in the Decision Area open to woodland harvesting could have direct and indirect beneficial impacts on the resource because 1) opportunities would be available for the public to legally harvest wood for a variety of uses, which could reduce the incidence of trespass and timber theft that can cause damage to soils and vegetation and result in the loss of large diameter trees, and 2) managed woodland harvesting (harvesting-related fuel load reductions) could reduce fuels loading and related wildfire risks in dense woodland stands, thereby reducing the likelihood of a stand replacement fire in ponderosa pine woodlands. A stand replacement fire in ponderosa could kill old-growth and large-diameter ponderosa pine and could result in a loss of habitat and forest resources. Additionally, harvest or removal of forest and woodland products could have a direct beneficial impact by increasing the diversity and abundance of herbaceous and woody vegetation (Moore 2006). Studies have shown that where dense stands of piñon-juniper have been thinned, understory vegetation increased dramatically on the heaviest thinned plots, and the number of vegetation species present also increased significantly (Jacobs 2002).

It is also assumed that forest product removal could cause adverse impacts on resources such as wildlife, including direct habitat loss, forage loss, habitat degradation, and habitat fragmentation. Short-term indirect, adverse impacts of wood gathering on wildlife species and their habitats could include trampling and removal of native vegetation, which result in habitat degradation that can include reduced prey species, forage species, and cover. The criteria for the impacts analysis were the number of acres available and unavailable for woodland harvesting in the Decision Area.

The RMP/EIS prohibits the harvest of riparian species such as cottonwood and willow (except for limited Native American uses). Harvest of these riparian species is therefore not analyzed further.

4.2.5.2 Direct and Indirect Impacts

4.2.5.2.1 Fire Management Decisions

One of the main goals of the forests and woodlands program is to restore forests and woodlands to the pre-fire-suppression range of historical variability for species composition, age, size, and density classes. Fire management decisions would support this goal and thereby provide a beneficial impact on forests and woodlands. In terms of harvesting of forest products, fuels treatments in the Decision Area could lead to improved forest conditions and harvest areas. Under all alternatives, up to approximately 32,000 acres of land rated FRCC 2 or 3 would be treated annually in the Decision Area depending on budgetary and time constraints. As a result, fire management decisions would provide beneficial impacts on forest and woodland resources equally across all alternatives. Short-term adverse impacts from fire management decisions would include removal of vegetation cover resulting from fuels treatments.

4.2.5.2.2 Forests and Woodlands Decisions

Forest and woodland management decisions could have a beneficial impact on forest health. Goals and objectives of the forests and woodlands program not only focus on harvesting of forest products but also on managing forested areas for ecosystem health, including, but not limited to, wildlife habitat, watershed processes, and riparian restoration and enhancement. Under all alternatives, the RPFO would consider BMPs as specified under **Chapter 2**, **Section 2.2.5.3**.

Additionally, impacts from forest and woodland decisions vary in scale and scope, depending on the alternative. Under Alternative A, the least amount of acres would be open for forest product removal, so Alternative A would have the least impact. Under Alternatives B, C, and D~~, and E~~, progressively more lands are available for forest product removal; therefore, Alternative ~~E~~ D would have the greatest amount of both potentially beneficial and adverse impacts.

4.2.5.2.3 Mineral Resources Decisions

Mineral resources management decisions would have minimal impacts on forests and woodlands in forest product harvest areas. In areas where mineral extraction would occur, mineral operators would remove forest products and make them available to authorized users.

According to the RFD, development of leasable, salable, and locatable mineral resources are expected to contribute to surface disturbance equating to 1.2 percent of the Decision Area over the next 20 years. It is anticipated that mineral extraction activities would be located in areas that avoid impacts on forests and woodlands. In areas where mineral development would overlap with forest product areas, impacts could include the loss or injury to plants due to excavation or trampling and increased exposure to dust and weed spread associated with construction and use of access roads. However, delineating closed areas to mineral development and implementing use restrictions, NSO and CSU stipulations, and withdrawals would protect woodland stands in delineated areas. A site-specific NEPA analysis would be completed for applications for disturbance, thereby reducing opportunities for direct adverse impacts related to this disturbance.

Table 4-21 shows the acres of forests and woodlands that would be managed as closed ~~or open~~ to fluid mineral leasing ~~with an NSO or CSU stipulation restriction~~. Alternative B has the greatest number of acres closed ~~or restricting to fluid mineral leasing~~, thereby protecting woodland stands the most. ~~Alternative E (the Proposed RMP) has twice the acres restricted to fluid mineral leasing than under Alternative A, increasing protections of woodlands but not as much as Alternative B.~~

Table 4-21: Forest and Woodlands Vegetation Types (Acres) Proposed as Closed to Fluid Minerals Leasing, by Alternative

Vegetation/Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Ponderosa pine	0	0	0	0	~~0~~
Piñon-juniper	8,600	15,700	15,200	8,600	~~8,600~~
Riparian/wetland	100	100	100	100	~~100~~
Shrub, steppe, scrub	~~34,300~~34,700	~~48,000~~48,400	~~39,800~~40,200	~~32,900~~33,400	~~32,800~~
Total	**~~43,400~~43,~~000~~**	**~~64,200~~63,~~800~~**	**~~55,500~~55,~~100~~**	**~~42,100~~41,~~600~~**	**~~41,500~~**

Source: BLM GIS 2020

The RPFO has proposed two leasing stipulations (see **Appendix H**) that would 1) protect ponderosa pine, and 2) require reclamation of abandoned well pads in newly leased areas, as described under Alternatives B and C. These stipulations would minimize impacts on forests and woodlands from mineral resource decisions.

Table 4-22 shows the acres of forests and woodlands that would be managed as open to fluid mineral leasing with an NSO stipulation.

Table 4-22: Forest and Woodlands Vegetation Types (Acres) Proposed as Open to Fluid Mineral Leasing with a No Surface Occupancy Stipulation, by Alternative

Vegetation/ Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Ponderosa pine	0	3,900	3,900	0	~~700~~
Piñon-juniper	800	8,200	3,500	2,700	~~17,400~~
Riparian/wetland	0	200	100	100	~~200~~
Shrub, steppe, scrub	3,600	19,100	15,300	3,300	~~9,800~~
Total	**4,400~~4,400~~**	**31,400~~31,400~~**	**22,800~~22,700~~**	**6,100~~6,100~~**	**~~28,400~~**

Source: BLM GIS 2020

Table 4-23 shows the acres of forests and woodlands that would be managed as open to fluid mineral leasing with a CSU stipulation.

Table 4-23: Forest and Woodlands Vegetation Types (Acres) Proposed as Open to Fluid Mineral Leasing with a Controlled Surface Use Stipulation, by Alternative

Vegetation/ Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Ponderosa pine	0	0	0	0~~300~~	~~0~~
Piñon-juniper	7,800	21,800	26,700	~~11,200~~32,700	~~4,600~~
Riparian/wetland	100	0~~200~~	~~100~~300	~~100~~300	~~0~~
Shrub, steppe, scrub	7,700	90,400	101,800	~~14,100~~115,600	~~7,000~~
Total	15,600~~15,600~~	112,400~~112,300~~	128,800~~128,800~~	148,900~~25,400~~	~~11,600~~

Source: BLM GIS 2020

Table 4-24 shows the acres of forests and woodlands that would be closed to salable minerals to protect other resources, such as ACECs, which would benefit forests and woodland resources. Similar to fluid mineral development, the greater the closure acreage to salable minerals the greater the protection of forests and woodlands. Alternative B has the greatest number of acres and provides the greatest protection. Alternative D~~E (the Proposed RMP)~~ has similar acreage closed to salable minerals ~~as~~ to Alternative A, which provides the least protection of forests and woodlands.

Table 4-24: Forest and Woodlands (Acres) Proposed as Closed to Salable Mineral Extraction, by Alternative

Vegetation/ Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Ponderosa pine	2,300	~~3,000~~3,200	~~3,000~~3,200	2,300	~~2,300~~
Piñon-juniper	35,400	~~46,400~~47,000	~~39,100~~39,700	35,900	~~35,400~~
Riparian/wetland	900	1,300	~~1,100~~1,200	900	~~900~~
Shrub, steppe, scrub	~~45,500~~46,000	~~80,200~~84,300	~~57,700~~61,200	~~45,000~~45,400	~~44,600~~
Total	84,600~~84,100~~	135,800~~130,900~~	105,300~~100,900~~	84,500~~84,100~~	~~83,200~~

Source: BLM GIS 2020

Table 4-25 shows the acres of forests and woodlands that would be recommended for withdrawal from locatable mineral entry to protect other resources, such as ACECs, which would benefit forests and woodland resources. Similar to salable mineral extraction, the greater the withdrawn acreage from locatable mineral entry the greater the protection of forests and woodlands. Alternative B has the greatest number of acres and provides the greatest protection. Alternative D~~E (the Proposed RMP)~~ has similar, but somewhat higher, acreage withdrawing locatable minerals ~~as~~ to Alternative A, which provides the least protection of forests and woodlands.

Commented [AA9]: To be updated with revised Alt D CSU data

Commented [AA10]: To be updated with revised data for Alt B closed to salable minerals

Commented [AA11]: To be verified with revised data for Alt B recommended for withdrawal from locatable minerals

Table 4-25: Forest and Woodlands (Acres) Recommended for Withdrawal from Locatable Mineral Entry, by Alternative

Vegetation/ Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Ponderosa pine	0	~~100~~300	300~~100~~	0	~~0~~
Piñon-juniper	~~700~~600	~~37,200~~37,800	37,800~~37,200~~	~~2,800~~2,700	~~700~~
Riparian/wetland	100	~~300~~400	400~~300~~	100	~~100~~
Shrub, steppe, scrub	~~10,700~~2,700	~~132,200~~128,100	~~125,200~~120,700	~~14,000~~6,000	~~9,700~~
Total	**~~3,400~~11,~~500~~**	**166,600~~169,800~~**	**159,200~~162,800~~**	**8,800~~16,900~~**	**~~10,500~~**

Source: BLM GIS 2020

Commented [AA12]: To be updated with revised data for Alt B recommended for withdrawal from locatable minerals

4.2.5.2.4 Travel Management Decisions

Travel management decisions would have both beneficial and adverse impacts on forests and woodlands. Areas closed to motorized travel would reduce public access to forest product harvest areas. Areas open to travel have the potential to adversely impact forest health conditions by allowing off-road, cross-country travel to occur within forests and woodlands. Under Alternatives C and D, the most acres would be open to motorized travel. Alternative ~~B~~E ~~(the Proposed RMP)~~ would have the least amount of acres open to motorized travel. Areas limiting travel to existing roads and trails would provide access to forest product harvest areas, while minimizing adverse impacts on understory vegetation in forests and woodlands. **Table 4-26** shows the proposed travel management decisions, by alternative, within forest product harvest areas.

Table 4-26: Proposed Travel Management Decisions within Forest Product Harvest Areas (Acres)*

Category	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Closed	79,500	123,400	87,200	76,500	~~76,500~~
Open	194,400	3,200	7,300	7,500	~~200~~
Limited	245,200	392,600	424,600	435,200	~~442,500~~
Total	**519,100**	**519,200**	**519,100**	**519,200**	**~~519,200~~**

Source: BLM GIS 2020
*Forest product categories reviewed: riparian, shrub, steppe, scrub, ponderosa, piñon-juniper

4.2.5.3 Cumulative Impacts

The reasonably foreseeable future actions would have long-term beneficial cumulative impacts on forest and woodland resources. Forest restoration treatments by the Forest Service, State Land Office, New Mexico State Forestry, and other BLM field office activities, such as hazardous fuel reductions, vegetation treatments, and forest product removal, would reduce the risks of wildfire and long-term loss of woodland resources and productivity within the Planning Area. The preponderance of research indicates that these activities (including stand thinning and salvage of dead, diseased, and infested trees) would also improve forest and woodland ecological conditions (Allen 2002; Moore 2006).

Across the landscape, regardless of landownership, past land management actions have resulted in increased tree densities and decreased spatial and vegetative diversity. Past, current, and future forest restoration

efforts by state and federal agencies will have the cumulative effect of improved forest health across the landscape (NMFWHPC 2004). Restoring herbaceous vegetation, shrubs, and browse, as well reducing tree densities and improving the health of old growth by reducing competition will have a beneficial impact on forest health. These actions will reduce the adverse impact of insects and disease and severe wildfire across a broad landscape over time.

There are currently, and have been, a number of forest restoration and fuels reduction projects on Forest Service-managed lands adjacent to and within the vicinity of the Planning Area. Specifically, the Southwest Jemez Mountains Restoration Project would have beneficial cumulative impacts on forests and woodlands near the Planning Area. The Jemez Mountains are adjacent to the Planning Area; therefore, improved forest health in the Jemez Mountains could result in healthier forests and woodlands administered by the BLM. Ongoing forest restoration efforts by the Forest Service in the Mount Taylor and Zuni Mountain areas would add to the BLM work in the Planning Area by enlarging the landscape area receiving forest treatments. Since 1992, the district has had a program to reduce tree densities in piñon-juniper woodlands. Tree densities were reduced and seeded with native grasses and forbs. The planning area for these projects account for approximately 500,000 acres of forest restoration within and near the RPFO RMP Planning Area. The BLM estimates that federal and state agencies would treat up to 206,800 acres with prescribed fire, 35,900 acres with mechanical treatments, and 10,000 acres with chemical treatments over 20 years (BLM 2004c, 2017).

4.2.6 Protection of Public Health, Safety, and Environment

Under all of the alternatives, environmental conditions, as well as public health and safety, would be protected as a result of the BLM hazardous materials management practices. Authorized uses of hazardous materials would adhere to federal and state requirements to reduce or eliminate impacts. BLM procedures (including leasing stipulations), as well as state and local agencies, would address accidental events and unauthorized use. These procedures would help minimize public exposure and environmental impacts to the extent possible.

Management of BLM-administered lands would take into account public safety to varying degrees under all alternatives. Public safety objectives and management strategies would protect people from natural or human-caused hazards on BLM-administered lands. Management to improve access or provide improvements, such as public recreation facilities, would also increase the use of BLM-administered lands and the need for public safety.

Public safety hazards include abandoned mines, hazardous materials, unexploded ordnance and explosives, and safety risks resulting from user conflicts. Maintaining and improving roads would help mitigate the potential for unsafe road conditions. While no alternatives are specifically designed to address public safety, public safety protocols apply to resource management strategies within the RPFO. This section describes the direct, indirect, and cumulative impacts associated with public health and safety management.

4.2.6.1 Analysis Assumptions

1. The population of the western United States will continue to increase, which will likely increase the demand to use BLM-administered lands for recreation.
2. Closing areas or applying surface use restrictions to mineral exploration and development will reduce access and the potential for exposure from hazards affecting public health and safety.
3. Establishing ERMAs and developing management plans for recreation will reduce the potential for conflict between recreation groups.
4. A travel management designation of "open" to unrestricted motorized travel will improve access and increase the potential to expose more people to public hazards.
5. A travel management designation of "closed" will eliminate motorized access and decrease potential exposure to hazardous conditions.

6. SRMAs may increase visitation and concentrate recreational use, but will also allow for intensive management and thereby reduce the potential for user conflicts in popular and high use areas. SRMAs that provide sanitation facilities will maintain public health.
7. Issuance of special recreation permits will reduce the potential for user conflicts during permitted activities.
8. Special designations or delineation of areas will increase public awareness or use of areas, but they will also increase management and protection of special resources.
9. Providing public education and interpretive opportunities will influence public visitation and reduce the potential for associated public health and safety risks.
10. Under all alternatives, there will be an increase in military operations as valid existing rights in the Planning Area by the Department of Defense, which may create some user conflicts for those military training areas the public can access.

4.2.6.2 Direct and Indirect Impacts

4.2.6.2.1 Mineral Resources Decisions

Impacts on health and safety would include exposure from mineral extraction and abandoned mine lands (AML). Mineral extraction activities could pose a risk to health and safety in the following ways:

- The installation of pipelines and supporting services for pipelines (e.g., compressor stations) would be necessary for oil and gas development. Pipelines and their associated features have the potential to leak or spill oil, gas, natural gas, condensate, or other hazardous materials. The companies installing and operating pipelines in the Planning Area are responsible for understanding and abiding by the applicable laws and regulations. The RPFO would be responsible for inspecting and monitoring these operations to ensure that these companies are in compliance with all applicable laws and regulations.
- Mineral development activities would increase the instances of transportation. Transportation (e.g., trucking) companies are responsible for understanding and abiding by all applicable transportation laws and regulations.
- The potential exists for gas flow line leakage or ruptures during natural gas extraction and processing. US Department of Transportation (DOT) data indicate that an average of one rupture annually should be expected for every 5,000 miles of pipeline (Office of Pipeline Safety 2005 in BLM 2007e). More than 50 percent of pipeline ruptures occur as a result of heavy equipment striking the pipeline. Such ruptures would potentially cause a fire or explosion if a spark or open flame ignited the natural gas escaping from the pipeline.
- Pipeline design, materials, maintenance, and abandonment procedures are required to meet the standards set forth in Department of Transportation regulations (49 CFR 192, Transportation of Natural Gas by Pipelines).
- Well fires are rare but can occur under certain conditions, and a well fire could result from a blowout during drilling activities or from a gas leak during extraction operations. Conditions that would cause gas accumulation in a confined space and ignition by a spark would likely produce a well fire.
- The potential risks associated with oil and gas development include geologic hazards. These hazards include natural gas seepage, hydrogen sulfide releases, abnormally high gas pressure, seismic activity, fires, and explosions.

The RPFO recognizes the need to identify and address physical safety and environmental hazards at all AML sites on public lands. Under all alternatives, AML sites would be prioritized for remediation and closure, based on physical safety, watershed protection, and funding by other agencies. Reclamation of AML sites would be completed under all alternatives when funding is available. These reclamation activities would have beneficial impacts on soil and water resources, vegetative communities, and wildlife and fisheries. AML would

be considered in future recreation management area designations, land use planning, and all applicable use authorizations. Under Alternatives B, C, and D~~, and E~~, the RPFO would implement a leasing stipulation that places NSO restrictions on areas managed for maintenance of public health and safety. The objective of the stipulation is to protect public health and safety in areas managed for this value.

In conformance with the BLM's long-term strategies and national policies regarding AML, this RMP/EIS recognizes the need to work with partners toward identifying and addressing physical safety and environmental hazards at all AML sites on public lands.

4.2.6.2.2 Special Designations Decisions

Special designations would have a beneficial impact on health and safety because of management restrictions that are applied within the boundaries of the particular designation. Mineral resource management decisions would be restricted within special designations by leasing stipulations and restrictions on salable and locatable mineral extraction, which also indirectly protect health and safety. ACECs and National Scenic Trails are the two special designations that are proposed in the RMP/EIS. The only National Scenic Trail in the Decision Area is the CDNST.

Under the action alternatives (B, C, and D~~, and E~~), the Legacy Uranium Mines ACEC would have beneficial impacts on health and safety because the ACEC would manage 50 acres of legacy uranium mines to reduce potential public exposure to the mines. Under Alternatives B, C, and D~~, and E~~, the ACEC would be managed as NSO for fluid mineral leasing, closed to the salable mineral extraction and motorized travel, and managed to avoid rights-of-way other than those incidental to the development of the locatable mineral(s). The ACEC would remain open to locatable mineral entry under Alternatives B, C, and D~~, and E~~.

Table 4-11 provides the proposed number and acres of special designations by alternative. Under Alternative B, the most acres would be managed for special designations, while under Alternative D~~E~~, the least acres would be managed for special designations.

4.2.6.3 Cumulative Impacts

Mineral development, including uranium mine development, within the Planning Area would increase vehicular traffic. City and county use plans for surrounding communities could have cumulative effects, whereby mineral resources are in development adjacent to BLM-administered lands. State lands, including the SLO, that are surrounded by BLM-administered lands could have impacts from inholding development.

Continued training by the military on public lands would increase the potential for user conflicts in areas that are used and around existing training areas and helicopter landing zones.

Reasonably foreseeable future actions relating to climate change and livestock grazing would have no quantifiable impacts on public health and safety. Future actions relating to invasive, nonnative, and noxious weed management would increase the potential for health risks. This is because more areas would be treated with herbicides as expansion of nonnative noxious weeds continues.

Lands and realty reasonably foreseeable future actions would have similar impacts as past and present actions on public safety and health management. Mineral development impacts would be similar to those past and present actions. The dependence for renewable energy would increase facilities on BLM-administered lands. Public health and safety impacts would be commensurate with the number of facilities and locations developed and would remain low.

Foreseeable recreation management actions increasing the number of facilities for public use would provide for public health. Travel management would include more access restrictions and fewer acres available to unrestricted cross-country travel. Route designations would provide a route numbering or naming system

that would allow the public to better locate their positions on public lands, increasing traveler safety. Public exposure to hazards would be lower.

Travel management as open to unrestricted motor vehicle travel allows the most public access into potentially hazardous areas or conditions. Cross-country travel also increases the risk for OHV accidents on BLM-administered lands. Past and present management has afforded the most acres as open to unrestricted motorized travel.

4.2.7 Lands and Realty

Impacts on the lands and realty program stem from those resource decisions that limit or hinder permitting rights-of-way or other land use authorizations, affect the BLM's ability to acquire and dispose of land, or make other land tenure adjustments. Rights-of-way are issued for the placement of pipelines, roads, sites, and transmission lines. Within this Proposed RMP/EIS, such decisions primarily result from and are affected by management actions from minerals, special designations, and lands with wilderness characteristics, as well as lands and realty actions. In addition, the wildlife, vegetation, recreation, riparian, soils/watersheds, visual resources, special status species, and cultural resources programs collectively impact the lands and realty program through a variety of restrictions on surface-disturbing activities and the availability of lands for disposal. As such, potential impacts from these program decisions will be analyzed in this section.

4.2.7.1 Analysis Assumptions

The following assumptions were used to complete the impacts analysis for lands and realty:

1. The number of land use authorizations would increase over the life of the plan.
2. Existing withdrawals to other federal agencies would continue.
3. Land acquisition is a support function for resources programs (e.g., cultural resources, wildlife, and recreation). The resource program benefiting from the acquisition establishes the priority or the urgency associated with any acquisition.

4.2.7.2 Direct and Indirect Impacts

4.2.7.2.1 Proposed Land Tenure Adjustments

Table 2-4, Priority Land Tenure Adjustment Decision by Alternative, identifies the total amount of lands that meet FLPMA Section 203 criteria for disposal out of federal ownership per alternative.

Under Alternatives C and D~~E~~, the largest percentage of RPFO BLM-administered lands meet FLPMA Section 203 criteria for disposal out of federal ownership. Under Alternative A, the least percentage of lands meet FLPMA Section 203 criteria for disposal out of federal ownership, and the RPFO has the opportunity to retain the most lands. Additional acreage may be considered for disposal by the RPFO if the parcels under consideration meet the criteria listed in **Chapter 2**.

The RPFO may also pursue land acquisitions within the Planning Area over the next 20 years in order to meet land management goals. Land tenure adjustments not disclosed in the RMP/EIS would be analyzed through site-specific NEPA documents. Additionally, while identified as potentially suitable for disposal, at the implementation stage site-specific analysis with public participation would be conducted. Based on the analysis and public comments received, a determination would be made on whether disposal of the parcel is in the public's best interest. If it is not in the public's best interest, the parcel will be retained in public ownership. Lands identified for disposal or exchange, if disposed or exchanged, would not inhibit recreation access to BLM-administered public lands, per Secretarial Order 3373, Evaluating Public Access in BLM Public Land Disposals and Exchanges (March 21, 2019).

1449 *4.2.7.2.2 Right-of-way Exclusion and Avoidance Areas*

1450 **Chapter 2** provides a detailed list of exclusion and avoidance areas for rights-of-way in the Decision Area.
1451 The designation of avoidance areas would require potential applicants to avoid these areas if at all possible
1452 when planning for the location of rights-of-way. If the applicant's proposal is unable to avoid these areas,
1453 special stipulations and mitigating measures would be incorporated into the authorization to minimize
1454 potential adverse impacts. Restrictions on land use authorizations directly affect the BLM lands and realty
1455 program by limiting or prohibiting use authorizations in those areas and by increasing the application
1456 processing time and costs. There are few existing rights-of-way currently authorized in exclusion areas. New
1457 proposals for rights-of-way in exclusion areas would either be rerouted or dropped from consideration. In
1458 addition, any applications for rights-of-way within VRM III areas may also require mitigation as determined
1459 during the site-specific NEPA process. Existing rights-of-way would remain in effect.

1460 **Table 4-27** provides the number of acres in the Decision Area that would be excluded or avoided from
1461 consideration for rights-of-way by alternative. Readers should note that the quantities provided in **Table**
1462 **4-27** should not be aggregated because many of the resource areas and special designations overlap.

1463 **Table 4-27: Exclusion or Avoidance Areas for New Rights-of-way (Acres) on Decision Area Lands, by Alternative**

Designation	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	~~Avoid~~	~~Exclude~~
100-year floodplains	2,000~~0~~	3,000	~~13,000~~1,000	~~19,000~~17,000	~~17,000~~8,000	10,000	~~19,000~~17,000	~~9,000~~1,000	~~1,000~~	~~3,000~~
ACECs	~~0~~19,000	24,000	0	127,000~~133,000~~	~~59,000~~43,000	75,000	21,000	~~21,000~~17,000	~~24,000~~	~~10,000~~
Cave/karst areas	4,000~~0~~	20,000	0	~~179,000~~162,000	~~149,000~~98,000	~~67,000~~64,000	~~162,000~~144,000	~~51,000~~17,000	~~12,000~~	~~35,000~~
Critical habitat for federally listed threatened and endangered species (designated and proposed)	~~0~~ None currently on BLM-administered lands									
Habitat for BLM sensitive plant and animal species (includes rare plants)	~~0~~ Data not available									
Habitat for federally listed/proposed threatened and endangered species for which critical habitat has not been designated	~~0~~ Data not available									
Habitat for federally listed candidate species	~~0~~ Data not available									
Habitat state listed as crucial/sensitive	~~0~~ Data not available									
Lands with wilderness characteristics managed to protect those characteristics	0	0	0	38,000	0	26,000	~~30,000~~0	~~10,000~~0*	~~0~~	~~0~~
National Scenic and Historic Trails	0~~11,000~~	5,000	~~13,000~~0	~~13,000~~34,000	~~19,000~~0	~~20,000~~22,000	~~7,000~~5,000	~~11,000~~4,000	~~15,000~~	~~9,000~~
Soils, highly erodible (per sensitive soils definition)	14,700 ~~(avoid) 26,100 (exclude)~~	26,100	134,300	16,200	86,400	47,900	~~90,400~~106,800	~~41,800~~25,400	~~10,100~~	~~25,400~~
TCPs**	0	0	37,400	0	37,400	0	37,400	0	~~37,400~~	~~0~~
VRM Class I	~~97,000~~0	97,800	0	97,800~~97,000~~	0	97,800~~98,000~~	0	97,800~~97,000~~	~~9,000~~	~~196,000~~

Designation	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	~~Avoid~~	~~Exclude~~
VRM Class II	~~84,000~~45,000	6,000	~~119,000~~26,000	~~276,000~~242,000	~~21,000~~30,000	~~0~~34,000	~~19,000~~17,000	~~5,000~~0	~~16,000~~	~~0~~
Wetlands and riparian areas	0	0	1,000	0	1,000	0	1,000	0	~~1,000~~	~~0~~
Wilderness areas	~~11,000~~0	11,000	0	11,000	0	11,000	0	11,000		~~22,000~~
WSAs	0~~87,000~~	86,800	0	86,800~~87,000~~	0	86,800~~87,000~~	0	86,800~~87,000~~	~~9,000~~	~~174,000~~

Source: BLM GIS 2020

*The Chamisa E lands with wilderness characteristics unit in Alternative D was changed from "protect" in the Draft EIS to "emphasize multiple use" in the Final EIS to correct a Draft EIS error. On-the-ground management and effects are the same as for Alternative A, so this change is within the range of alternatives considered in the Draft EIS. The Final EIS analysis was corrected

**Mount Taylor is the only TCP quantified in this table due to data availability. Other TCPs are known to exist in the Decision Area, but data are not available for quantification at this time.

Table 2-5, Rights-of-Way Management Decisions by Alternative, provides the total acres avoided or excluded from consideration for rights-of-way per alternative. Alternative B has the greatest restrictions to ROWs and the greatest adverse impact on land use authorizations. Alternative DE has the least amount of restrictions and least amount of adverse impacts on land use authorizations.

4.2.7.3 Cumulative Impacts

City and county use plans could have cumulative impacts where land is developed adjacent to BLM-administered lands. The RPFO is unaware of any conflicts between neighboring city or county land use plans in the Planning Area.

The number of land use authorizations, particularly rights-of-way and permits, is a function of demand for these uses. Additional future development of adjacent federal, state, and private lands would likely result in additional requests for and approval of land use authorizations for facilities such as roads, utilities, and communication sites.

The designation of right-of-way avoidance and exclusion areas on BLM-administered lands, along with similar restrictions on right-of-way development on adjacent lands, particularly National Forest lands, would have a cumulative impact of reducing routing options for right-of-way facilities such as utilities and roads.

The Northwest Loop Road may require a right-of-way permit from the RPFO, depending on the final alignment of the proposed project. The final width of the right-of-way is not known, but the length of the proposed project is approximately 39 miles. A new transmission corridor potentially designated by RETA may require a ROW permit from the RPFO. The latter two projects would be new construction within the Planning Area.

4.2.8 Lands with Wilderness Characteristics

Lands with wilderness characteristics are areas of 5,000 acres or more with landscapes generally in a natural or undisturbed condition. These areas also provide outstanding opportunities for solitude or primitive forms of recreation (nonmotorized and nonmechanized activities in undeveloped settings). Generally, actions that create surface disturbance impact the natural character of these areas and the setting for experiences of solitude and primitive recreational activities. Motorized uses in these areas detract from opportunities for both solitude and primitive forms of recreation. Lands with wilderness characteristics would be impacted by fire management, livestock grazing, mineral resources, travel management, visual resources, and forest and woodland decisions.

4.2.8.1 Direct and Indirect Impacts

4.2.8.1.1 Fire Management Decisions

Under all alternatives, the BLM would attempt to restore natural fire regimes in fire-dependent and adapted ecosystems through the use of prescribed or managed wildfire. Fuels treatment and management activities would be consistent with the resource goals and objectives in the Proposed RMP/EIS and may include mechanical treatments, manual treatments, prescribed fire, chemical or biological treatments, and seeding.

The restoration of fire-dependent and adapted ecosystems would restore a more natural vegetation community (in both species and composition) and would benefit forest health, watersheds, and wildlife populations that depend on those communities. Fire operations (aircraft flights, fire line construction, thinning, etc.) would temporarily degrade the natural landscape and character of the lands with wilderness characteristics. The noise and presence of the people, equipment, and operations would also temporarily diminish opportunities for solitude and primitive forms of recreation.

In the long term, surface disturbance associated with the fire treatment would be restored, with little to no net effect on naturalness. A more natural landscape would benefit the natural character of lands with

wilderness characteristics and enhance the setting and opportunities for primitive forms of recreation, including hiking, backpacking, hunting, wildlife viewing, and nature study. Fire management would enhance the natural conditions of these areas. **Table 4-28** shows the acres within lands with wilderness characteristics that would be subject to fuels treatments.

Table 4-28: Fuels Treatment Areas (Acres) within Lands with Wilderness Characteristics Managed to Protect or Minimize Impacts on those Characteristics

Lands	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Chamisa E	X	2,200	2,200	X*	~~X~~
Ignacio Chavez A	X	2,000	2,000	X	~~X~~
Ignacio Chavez B	X	1,300	1,300	X	~~X~~
Ignacio Chavez C	X	70	70	X	~~X~~
Petaca Pinta A	X	40	40	X	~~X~~
Volcano Hill	X	14,400	14,400	X	~~X~~
Cimarron Mesa	X	2,400	X	X	~~X~~
Total	X	**22,410**	**20,010**	X*	~~X~~

Source: BLM GIS 2020

Note: 'X' indicates no management decisions to manage lands with wilderness characteristic to protect, or to partially protect, wilderness characteristics.

* The Chamisa E lands with wilderness characteristics unit in Alternative D was changed from "protect" in the Draft EIS to "emphasize multiple use" in the Final EIS to correct a Draft EIS error. On-the-ground management and effects are the same as for Alternative A, so this change is within the range of alternatives considered in the Draft EIS. The Final EIS analysis was corrected.

4.2.8.1.2 Livestock Grazing Decisions

Livestock grazing management decisions could have adverse impacts on lands with wilderness characteristics under Alternative C where new facilities may be proposed. It is not anticipated that new facilities are needed within any of these areas. Alternative B would not allow livestock grazing to occur within lands with wilderness characteristics.

Livestock operations can compromise wilderness characteristics, such as naturalness, and opportunities for primitive and unconfined recreation. However, livestock grazing has been ongoing on those lands proposed for management as Wilderness, and the land continues to have wilderness characteristics.

Table 4-29 shows acres available for livestock grazing within lands with wilderness characteristics. Livestock grazing would only impact lands managed for wilderness characteristics under Alternatives B and C because only under these two alternatives would such lands be managed for wilderness characteristics. Under Alternative B, 91 percent of lands managed to protect wilderness characteristics would be available to livestock grazing. All lands managed to protect or minimize impacts on wilderness characteristics would be available to livestock grazing under Alternative C.

Table 4-29: Areas (Acres) Available for Livestock Grazing within Lands with Wilderness Characteristics Managed to Protect or Minimize Impacts on those Characteristics

Land with Wilderness Characteristics	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Chamisa E	X	0	2,200	X*	~~X~~
Ignacio Chavez A	X	2,500	2,500	X	~~X~~
Ignacio Chavez B	X	1,200	1,500	X	~~X~~
Ignacio Chavez C	X	70	70	X	~~X~~
Petaca Pinta A	X	0	40	X	~~X~~
Volcano Hill	X	23,200	23,800	X	~~X~~
Cimarron Mesa	X	7,300	X	X	~~X~~
Total	X	**34,270**	**30,110**	X*	~~X~~

Source: BLM GIS 2020
Note: 'X' indicates no management decisions to manage lands with wilderness characteristic to protect, or to partially protect, wilderness characteristics.
* The Chamisa E lands with wilderness characteristics unit in Alternative D was changed from "protect" in the Draft EIS to "emphasize multiple use" in the Final EIS to correct a Draft EIS error. On-the-ground management and effects are the same as for Alternative A, so this change is within the range of alternatives considered in the Draft EIS. The Final EIS analysis was corrected.

4.2.8.1.3 Mineral Resources Decisions

The greatest number of acres (15,000 acres) would be closed to fluid mineral development under Alternative B due to the protection of wilderness characteristics. This would have a beneficial impact on the preservation of wilderness characteristics. Under Alternative C, 11,900 acres of lands where wilderness characteristics would be protected would benefit from closure to fluid mineral development; no such protections would occur under Alternative~~s~~ D ~~and E~~. Also under Alternative C, 3,100 acres of lands with wilderness characteristics would be closed to the extraction of fluid leasable minerals, but open to the extraction of salable minerals on a case-by-case basis; no such protections would occur under Alternative~~s~~ D ~~and E~~. Considering the low level of predicted development for all minerals within the Decision Area, impacts from mineral resources on land with wilderness characteristics would be minimal.

4.2.8.1.4 Travel Management Decisions

Under Alternative B, the condition of lands with wilderness characteristics would be enhanced, as they would be closed to motorized travel on all 37,500 acres. Under Alternative C, 26,100 acres of lands with wilderness characteristics would be closed to motorized travel, and 4,100 acres would limit motorized travel to designated primitive roads and trails, which would protect the existing wilderness characteristics. Cimarron Mesa (7,300 acres), which would not be protected under Alternatives C or~~,~~ D~~, or E~~, would be open to motorized travel under Alternatives C and D~~, and partially open (1,700 acres) and limited to designated primitive roads and trails (5,700 acres) under Alternative E~~. Volcano Hill (23,800 acres), which would not be protected under Alternative D, would be partially open (1,100 acres) and limited to designated primitive roads and trails (22,700 acres) under Alternative D. Impacts on wilderness characteristics in the Cimarron Mesa unit could occur under Alternatives C and D~~, and less so under Alternative E~~, and in 5 percent of the Volcano Hill unit under Alternative D.

4.2.8.1.5 Visual Resources Decisions

Under Alternative B, the RPFO would manage lands with wilderness characteristics (37,410 acres) as VRM II. VRM Class II objectives would retain the characteristic landscape, allowing for minor changes to the landform and vegetation. This objective would protect the natural condition of the land in non-WSA areas.

Under Alternative C, the RPFO would manage most (26,400 acres) of lands with wilderness characteristics as VRM Class II. Cimarron Mesa (7,300 acres) and Ignacio Chavez (3,800 acres) would be managed as VRM Class IV. Under Alternative D, most (26,300 acres of) lands with wilderness characteristics would be managed as VRM Class III; 40 acres (Petaca Pinta) would be managed as VRM Class I, 2,200 acres would be managed as VRM Class II, and 8,900 acres would be managed as VRM Class IV. ~~Under Alternative E, most (28,000 acres of) lands with wilderness characteristics would be managed as VRM Class III; 2,200 acres would be managed as VRM Class II, and 7,300 acres would be managed as VRM Class IV.~~ The objective of VRM Class III is to partially retain the existing character of the landscape, allowing for moderate changes to land and vegetation. The objective of VRM Class IV is to allow activities that require major modifications to the existing character of the landscape, allowing for high-level landscape changes. When lands with wilderness characteristics are managed to VRM Class III or IV, wilderness values, such as naturalness, could be compromised. As a result, wilderness characteristics may be adversely impacted under Alternatives C and~~, D, and E~~.

4.2.8.1.6 Forest and Woodland Decisions

Forest and woodland management decisions would have both beneficial and adverse impacts on lands with wilderness characteristics. Under Alternative B, all lands with wilderness characteristics (37,410 acres) would be closed to forest product removal, which would have a beneficial impact on the "naturalness" and "outstanding opportunities for solitude" wilderness characteristics by preventing vehicle travel to remove wood products in these areas. The impacts from forest and woodland decisions under Alternative B would benefit an additional 1,100 acres of land with wilderness characteristics not otherwise excluded from forest product removal. The other acres of lands with wilderness characteristics fall within SRMAs, which are excluded from forest product removal under Alternative B, but open under Alternative C.

Chamisa E (2,200 acres) would be closed to forest product removal under Alternative C, but the impact from this decision is neutral because there are not fuelwood harvest areas within Chamisa E (**Table 4-30**). The decision to allow forest product removal on 26,400 acres of lands with wilderness characteristics under Alternative C by limiting travel to existing routes, and on all lands with wilderness characteristics under Alternative~~s~~ D ~~and E~~, would have an adverse impact on the "naturalness" and "outstanding opportunities for solitude" characteristics on those lands. The degree of impact would depend upon the frequency of forest product removal on these lands. In most cases, the impact would be small because occasional forest product removal would not be substantially noticeable to the average visitor. No non-WSA areas would be managed for wilderness characteristics under Alternatives A and~~, D, and E~~. **Table 4-30** shows areas located within lands with wilderness characteristics where fuelwood harvesting activities may be permissible.

Table 4-30: Lands with Wilderness Characteristics Where Fuelwood Harvesting Activities May Be Permissible

Lands with Wilderness Characteristics	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Chamisa E	X	0	0	X*	~~X~~
Ignacio Chavez A	X	0	2,500	X	~~X~~
Ignacio Chavez B	X	0	1,200	X	~~X~~
Ignacio Chavez C	X	0	70	X	~~X~~
Petaca Pinta A	X	0	0	X	~~X~~
Volcano Hill	X	0	0	X	~~X~~
Cimarron Mesa	X	0	7,300	X	~~X~~
Total	X	0	11,070	X*	~~X~~

Source: BLM GIS 2020

Note: 'X' indicates no management decisions to manage lands with wilderness characteristics to protect or partially protect wilderness characteristics.
* The Chamisa E lands with wilderness characteristics unit in Alternative D was changed from "protect" in the Draft EIS to "emphasize multiple use" in the Final EIS to correct a Draft EIS error. On-the-ground management and effects are the same as for Alternative A, so this change is within the range of alternatives considered in the Draft EIS. The Final EIS analysis was corrected.

4.2.8.2 Cumulative Impacts

The analysis of cumulative impacts for areas with wilderness characteristics (designated Wilderness, WSAs, and areas identified with wilderness characteristics) includes all BLM-administered lands in New Mexico that are currently being managed for wilderness characteristics to protect those values. The statewide total of BLM-administered lands where law protects wilderness characteristics or administrative decisions is 1,125,400 acres. Under Alternative B, the RPFO would manage 37,410 acres of additional lands to protect wilderness characteristics. Under Alternative C, the RPFO would manage an additional 26,040 acres to protect wilderness characteristics and 4,070 acres of lands to partially protect wilderness characteristics. No lands with wilderness characteristics would be protected under Alternatives A or, D, or E.

4.2.9 Livestock Grazing

Livestock grazing continues to be one of the major uses of public lands. However, over time, there continues to be a loss of agricultural lands to development and urban sprawl within the Planning Area. The resource impacts analyzed below reflect this continuing trend. Adverse impacts on livestock grazing are anticipated from lands and realty, mineral resources, special designations, travel management, vegetation management (including fire management, riparian resources, and forests and woodlands), recreation, wildlife, special status species, and cultural resources management decisions. Beneficial long-term impacts are anticipated from vegetation management, special designations, and travel management resource decisions by increasing the amount of available forage and acres available for livestock grazing.

Grazing would be impacted when all or part of an allotment is closed to livestock grazing (during vegetation treatments, prescribed burning, reforestation, fire, drought, or watershed or riparian restoration). Grazing exclusion areas designed to protect riparian habitat for wildlife and sensitive species or to protect cultural or paleontological resources would impact livestock grazing by restricting or altering livestock movement and access to forage. Mineral and energy development would impact livestock grazing in the short and long term by decreasing the amount of grazing acreage available during construction and operation of these facilities. Alternative C would best provide opportunities for grazing while meeting New Mexico Standards and Guidelines for Rangeland Health, followed by Alternatives D and E and then Alternative A; Alternative B provides the least opportunities for grazing. Actions under most resource categories have the potential to affect livestock grazing.

4.2.9.1 Analysis Assumptions

Livestock grazing is a permitted multiple use; therefore, regulations and administrative processes exist to ensure that grazing levels do not exceed permitted thresholds and/or standards (BLM 2001b). Livestock grazing would be carried in compliance with existing policies and regulations at both the state and federal levels.

Impacts on livestock grazing are generally the result of activities that affect forage levels, livestock exclusion, reduction of allotment acreage, or interruption of grazing patterns and livestock distribution. The impact analysis is based on interdisciplinary team knowledge of resources and the Decision Area, a literature review, and information provided by BLM specialists. Certain assumptions are made, including the following:

Data regarding grazing allotments are compiled from BLM sources:

- Livestock grazing will occur throughout the majority of the Decision Area.

- The BLM will continue to assess lands in accordance with the New Mexico Standards and Guidelines for Rangeland Health.
- Allotments are monitored periodically, based on allotment priority, resource values, and potential for impacts due to grazing use.

Season of use and number of AUMs used are difficult to control on allotments with scattered public parcels surrounded by private land.

Table 4-31 compares the number of allotments grazed, acres grazed, and AUMs available by alternative. Because the proposed management decisions for livestock grazing under Alternatives B–~~E~~ D are more protective of sensitive resources than the current management under Alternative A, it is expected that rangeland health within grazing allotments would improve under Alternatives B–~~E~~D.

Table 4-31: Comparison of Proposed Livestock Grazing Alternatives

Livestock Grazing Management	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Number of allotments available	204	178*	178–204	178–204	~~178–204~~
Acres available for grazing	648,400	480,200	643,300	643,400	~~643,300~~
AUMs available	89,617	67,602~~67,608~~	89,097	89,102	~~89,097~~

Source: BLM GIS 2020
Note: Acres and AUMs are for BLM-administered land only and are calculated from the Rangeland Administration System.
* The number of allotments in Alternative B does not reflect the 60 allotments that partially fall within proposed special designations because the allotments would continue to be grazed under Alternative B. However, the portions of the allotments within special designations would be unavailable for livestock grazing.

Acreages and AUMs are estimates for impacts analysis. Actual numbers are to be determined and calculated at the activity level when specific actions are taken. The purpose of the information presented here is to assist in determining the impacts of programmatic actions under consideration in this planning process on various resources and resource uses.

Range improvements and rangeland projects would continue to be used to design, plan, and implement rangeland management and watershed goals. Reclamation efforts would be designed in compliance with the New Mexico Standards and Guidelines (BLM 2001b).

4.2.9.2 Direct and Indirect Impacts

4.2.9.2.1 Lands and Realty Decisions

The direct impact on livestock grazing from lands and realty decisions is the loss of forage when a parcel is disposed or devoted to a public purpose that precludes livestock grazing. Direct beneficial impacts on livestock grazing include the addition of forage through acquisition of new lands if they are made available to livestock grazing. Most land disposals would involve small isolated parcels, causing minimal impacts on livestock grazing aside from the loss of revenue generated from grazing fees. Under Alternative B, proposed land disposals would result in the loss of the smallest number of grazing allotment acres, while under Alternative D, proposed land disposal would result in the largest. ~~Alternative E (the Proposed RMP) would result in the loss of slightly less acres and AUMs than Alternative C but more than Alternative A.~~ Most acquisitions would be through land exchanges, which would allow for contiguous land parcels. Overall, acquisition through land exchanges would be for lands similar in stocking rate. **Table 4-32** shows the number of acres available for grazing and AUMs that would be lost through proposed land disposals.

Commented [AA13]: To be updated with revised disposal data

Table 4-32: Acres of Allotments Available for Grazing and AUMs Potentially Lost by Proposed Lands that Meet FLPMA Section 203 Criteria for Disposal out of Federal Ownership, by Alternative

Commented [AA14]: To be updated with revised disposal data

	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Acres	41,900	40,600	103,100	106,100	~~101,800~~
AUMs*	5,238	5,075	12,888	13,263	~~12,725~~

Source: BLM GIS 2020
* AUMs were calculated using 8 acres per AUM, which is an RPFO average factor.

In addition to land disposal decisions, rights-of-way could also adversely impact livestock grazing. Rights-of-way for roads, transmission lines, pipelines, or sites may be within grazing allotments and would remove those acres and AUMs from the Decision Area. No specific rights-of-way are proposed in the RMP/EIS. Site-specific NEPA analysis would need to be completed when such projects are proposed.

Under Alternative A, 18 of the 204 grazing allotments are classified as Section 15 lands, each having a total acreage less than 100 acres. The 18 allotments total 1,024 acres and 285 AUMs of available forage. Under Alternative B, 18 Section 15 allotments with acreages less than 100 total acres (totaling 1,024 acres) would be unavailable for livestock grazing and devoted to a public purpose that precludes livestock grazing and 285 AUMs for other resource benefits. Under Alternative C, 18 Section 15 allotments with acreages less than 100 total acres (totaling 1,024 acres) would be unavailable for livestock grazing in cases where they could not be lumped into larger BLM allotment tracts. Livestock grazing would continue to be authorized under Section 15 of the Taylor Grazing Act until such time these lands are disposed. Under Alternative~~s~~ D ~~and E~~, 18 Section 15 allotments with acreages less than 100 total acres (totaling 1,024 acres) would remain available for livestock grazing, could be offered in exchange to the adjacent producer for private lands in an attempt to block BLM-administered lands, or could be sold to the producer. Like Alternative A, Alternative~~s~~ D ~~and E~~ would maintain the 1,024 acres and 285 AUMs for permitted livestock grazing.

4.2.9.2.2 Renewable Energy

In addition to land disposal decisions, renewable energy developments could impact livestock grazing through surface disturbance that would remove available forage for the life of the project. Renewable energy projects may be within grazing allotments and would remove those acres and AUMs from the Decision Area over the life of the project. No specific renewable energy projects are proposed in the RMP/EIS. Site-specific NEPA analysis would need to be completed when such projects are proposed.

4.2.9.2.3 Vegetation Management Decisions

Vegetation management, as defined for this section, includes any management decisions that are associated with vegetation manipulation: fire and fuels management, vegetative communities, riparian resources, and forest and woodland resources. Vegetation management resource decisions would have an adverse short-term impact on livestock grazing that would last from immediately after vegetation treatments occur until revegetation is complete. Vegetation treated within grazing allotments would require a minimum of 2 years of growing season deferment or as determined otherwise by resource specialists through consultation and coordination with the permittee or lessee. During this time, the permittee/lessee would need to find alternative forage for livestock, which could result in additional financial expenses to the permittee/lessee. In addition, 30,200 additional acres of riparian areas would be unavailable to grazing under Alternative B as opposed to Alterative A. Under Alternatives C, and D, ~~and E,~~ grazing would be available within those riparian areas identified in the Riparian and Aquatic Habitat Management EIS (BLM 2000), which is consistent with

the New Mexico Standards and Guidelines (BLM 2001b). Any future grazing decisions within riparian areas would remain consistent with New Mexico Standards and Guidelines. Under all alternatives, livestock grazing would not be allowed, unless otherwise agreed upon, in exclosures constructed within riparian or upland areas under the HSP. Temporary exclosures are often a tool used to recover impaired riparian or upland vegetative areas that contain unstable soils and inadequate vegetation. Utilizing exclosures would prevent grazing in the short term; however, it would improve forage in the long term.

A site-specific NEPA analysis would need to be completed prior to opening a specific portion of the Decision Area for forest product harvest and fuels treatment projects. During that time, appropriate mitigation measures would be identified to reduce the impact on livestock grazing, if possible.

Table 4-33 shows the total number of acreages proposed for fuel treatments in RPFO allotments available for grazing by alternative. Under Alternative B, the least amount of acres available for grazing would be proposed for fuel treatments, while under Alternatives A, C, and D the most acres would be proposed for fuel treatments. ~~Alternative E would propose the same amount of acres available for grazing for fuel treatments as Alternative A.~~

Table 4-34 shows the number of acres proposed for potential forest product harvest areas within allotments available for grazing in the Decision Area by alternative. Under Alternative A, the least amount of acres ~~in the RPFO~~ available for grazing would be open for product harvest areas, while under Alternative~~s~~ D ~~and E~~ the most acres available for grazing ~~in the RPFO~~ would be open for forest product harvest. No specific treatments have been proposed in the RMP/EIS for riparian restoration or upland vegetation. Readers should note that the numbers shown in **Table 4-33** and **Table 4-34** should not be aggregated; various vegetation treatments could occur in the same areas. For example, areas that are open to forest product harvest could also be treated with prescribed fire.

Table 4-33: Proposed Fuel Treatments within RPFO Allotments Available for Grazing (Acres), by Alternative

Fuels Treatments	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Available for Grazing	492,800	359,200	492,800	492,900	~~492,800~~
AUMs*	61,600	44,900	61,600	61,613	~~61,600~~

Source: BLM GIS 2020
* AUMs were calculated using 8 acres per AUM, which is an RPFO average factor.

Table 4-34: Proposed Forest Product Harvest Areas (Acres) within RPFO Allotments Available for Grazing, by Alternative

Forest Product Harvest Areas	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Available for Grazing	12,200	78,600	422,400	504,600	~~504,700~~
AUMs*	1,525	9,825	52,800	63,075	~~63,075~~

Source: BLM GIS 2020
* AUMs were calculated using 8 acres per AUM, which is an RPFO average factor.

While short-term adverse impacts from vegetation management decisions would impact grazing operators as stated above, long-term beneficial impacts from vegetation management decisions on livestock grazing would be improved rangeland health. Forage conditions would be expected to improve in areas that are restored, especially when those treatments are planned following the New Mexico Standards and Guidelines (BLM 2001b).

4.2.9.2.4 Mineral Resources Decisions

Management decisions to allow mineral resource development would impact livestock grazing because acres and AUMs would be lost in areas where mineral extraction would occur. This is because vegetation would be removed, resulting in reduced forage availability. According to the RFD for mineral resources, development of leasable, salable, and locatable mineral resources are expected to contribute to surface disturbance equating to 1.2 percent of the Decision Area over the next 20 years, which would equate to 1,075 AUMs. Therefore, it is anticipated that mineral extraction activities would be located in areas to avoid impacts on livestock grazing. Site-specific NEPA analysis would be completed for applications for disturbance, thereby reducing opportunities for direct adverse impacts related to this disturbance.

4.2.9.2.5 Special Designations Decisions

Special designations would have both adverse and beneficial impacts on livestock grazing. Restrictions on surface-disturbing activities within special designations promote improved vegetative communities and range conditions by reducing the likelihood that forage would be removed through development activities. Many of the ACECs proposed for designation in the RMP/EIS have at least one alternative where NSO is proposed. Under these alternatives, livestock grazing would benefit.

In contrast, many of the ACECs proposed for designation also include elimination or restriction of livestock grazing under some alternatives. Restricting grazing in special designations would adversely impact livestock grazing because it would decrease acres and AUMs available for livestock grazing. For example, there are 77 permittees/lessees that manage livestock on BLM allotments within special designations. Under Alternative B, these permittees/lessees would need to find alternative forage for livestock on a permanent basis, which could result in the greatest financial expenses to the permittee/lessee. This would adversely impact grazing operations the most out of all of the alternatives. Impacts under Alternative~~s~~ C ~~and E~~ are the same as under Alternative A.

Table 4-35 shows the number of grazing allotment acres impacted by proposed special designation decisions by alternative. Under Alternative B, the largest number of acres would be unavailable to livestock grazing. Under Alternative D, the smallest number of acres would be unavailable to livestock grazing. ~~As discussed above, impacts under Alternative E are the same as under Alternative A.~~

Table 4-35: Livestock Grazing Allotments (Acres and AUMs) Impacted by Proposed Special Designations, by Alternative

Special Designation Restriction	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	~~Acres~~	~~AUMs~~
Acres (AUMs) unavailable to grazing	100	13	108,800	13,600	100	13	0	0	~~100~~	~~13~~

Special Designation Restriction	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Acres	AUMs	Acres	AUMs	Acres	AUMs	Acres	AUMs	~~Acres~~	~~AUMs~~
Acres (AUMs) of available grazing	102,100	12,763	0	0	109,100	13,638	110,700	13,838	~~120,600~~	~~15,075~~

Source: BLM GIS 2020
Note: AUMs were calculated using 8 acres per AUM, which is an RPFO average factor.

4.2.9.2.6 Travel Management Decisions

Livestock grazing would have both beneficial and adverse impacts from travel management. Areas open to motorized travel would result in direct loss of vegetation available for livestock grazing and a long-term decrease in rangeland health. In addition, disturbance from motorized travel could preclude livestock from grazing areas with heavier use. Problems with vandalism, fencing, and harassment of livestock are anticipated where urban areas interface with public lands. Under Alternatives C and~~,~~ D~~, and E~~, Cimarron Mesa would be open to motorized travel. Under Alternative B, the most acres would be closed to motorized travel. Those areas closed to motorized travel would have beneficial impacts on livestock grazing, more than under Alternative A. **Chapter 2** shows the proposed travel management decisions by alternative.

4.2.9.2.7 Recreation and Visitor Services Decisions

Management decisions associated with recreation and visitor services would have adverse impacts on livestock grazing. Approximately 283,000 acres of RPFO grazing allotments are within the proposed SRMA or ERMAs in the Decision Area under all alternatives. There are no grazing restrictions proposed within the SRMA or ERMAs except for where the SRMA or ERMAs include ACECs. However, if increased recreational activities occur within the SRMA and ERMAs over time, vegetation may be trampled or eliminated in some areas. Livestock grazing would incur minor impacts from vegetation loss associated with recreation, depending on the recreational activity.

4.2.9.2.8 Cultural Resources Decisions

Cultural resources management decisions would adversely impact livestock grazing when grazing is restricted to protect cultural resources sites by decreasing the acreage available for grazing. This would reduce acres and AUMs available for livestock grazing. Approximately 87 percent of the Decision Area includes livestock grazing allotments. Based on the prevalence of livestock grazing and site probabilities listed in **Table 3-7** in **Chapter 3**, it is likely that cultural resources could impact livestock grazing, as more sites are discovered and require protection. Within one cultural resources management area, two high-value sites (Ojo Pueblo and the Fort Site) would be closed to grazing in the RMP/EIS. These sites together cover 60 acres and would be closed under all alternatives.

4.2.9.2.9 Special Status Species Decisions

Special status species management decisions could adversely impact livestock grazing by reducing acres and AUMs if grazing is restricted within wildlife exclosures, breeding habitat, and occupied habitat. Permittees and lessees may be restricted from managing their livestock operation during certain breeding seasons or other time periods established to protect special status species. Under Alternative B, the BLM would require the placement of water developments, salt supplements, and mineral supplements for livestock to be located at least 402 meters (1,320 feet) away from known locations of special status plants. Under Alternative C, the BLM would require the placement of water developments, salt supplements, and mineral supplements for livestock to be located at least 152 meters (500 feet) away from known locations of special status plants.

Under Alternatives ~~and E~~, the BLM would require the placement of water developments, salt supplements, and mineral supplements for livestock to be located at least 91 meters (300 feet) away from known locations of special status plants. This would adversely impact grazing operations greater than under Alternative A. Under Alternatives B–ED, the BLM would also consider the concentration of browsing and grazing animals on known locations of special status plants and make adjustments as needed. This would also adversely impact grazing operations more than under Alternative A.

4.2.9.2.10 Livestock Grazing Management Decisions

Grazing practices would be modified if a grazing allotment fails to meet any of the New Mexico Standards and Guidelines (BLM 2001b), where it is determined that livestock grazing management practices are a significant factor in this failure. Modifications could include a change in stocking rate, kind of livestock, season of use, length of season, temporary closures, or any combination of these. These modifications could mean a temporary or permanent loss of acres or AUMs available to livestock for grazing in order to repair or rehabilitate an area, and to progress toward meeting the New Mexico Standards and Guidelines. Data collected from rangeland monitoring studies would assist the Field Manager in the decision of whether or not to restrict livestock access to an area. These kinds of closures, although they cause a temporary loss of accessible forage, are implemented with the goal of restoring the area so that it can continue to support grazing and other resource uses. Under all alternatives, certain allotments could undergo season-of-use changes to facilitate grazing management while maintaining rangeland health standards. Changes in season of use do not affect forage, but they do impact the timing of its availability.

4.2.9.3 Cumulative Impacts

Cumulative impacts on livestock and grazing could result from activities on adjacent private lands, activities scheduled for State lands, and administrative actions on adjacent National Forest System and tribal lands. These effects could be both positive and negative on livestock grazing within the Planning Area. Any future land uses in the surrounding areas that degrade ecological function in the Planning Area could reduce forage quality for livestock. Increased surface disturbances from new roads, transmission lines, or energy exploration in the area could result in reduced grazing acreages and introduction of disturbance-colonizing weed species, which could decrease forage quality in the Planning Area. The potential transmission line corridors proposed by RETA referenced in **Table 4-2** could reduce the acres available to livestock grazing in existing grazing allotments if the rights-of-way permits are approved. There is no known project area for the RETA corridors at this time.

4.2.10 Mineral Resources

Mineral resources include locatable minerals that may be claimed and patented under the 1872 Mining Law, fluid (oil, gas, and geothermal) and solid leasable minerals (coal) leased for development under the Mineral Leasing Act of 1920, and common-variety mineral materials (salable minerals) that may be purchased by private parties or used for free by public agencies and nonprofit groups under the Materials Act of 1947. The preceding laws only apply to federally owned minerals.

The RPFO historically has seen a low level of mineral resource development. The RFD for leasable, locatable, and salable minerals estimates that the same low-level trend would continue. As a result, the RPFO would continue to have the ability to adjust future mineral development activities in order to avoid conflicts and protect other resources to the greatest extent possible. The RPFO takes the approach of allowing mineral development to occur according to regulations. This section describes potential impacts on the management of mineral resources from other resource management decisions, including cave and karst resources, lands and realty, cultural resources, lands with wilderness characteristics, paleontological resources, recreation and visitor services, riparian resources, soil and water resources, special status species, visual resources, wildlife and fisheries, and special designations.

4.2.10.1 Analysis Assumptions

The following assumptions were used to complete the impacts analysis for mineral resources:

- Oil and gas exploration and development would continue to occur in the Planning Area.
- BLM-administered mineral estate, including split-estate lands, would be managed in cooperation and collaboration with surface owners, lessees, permittees, and operators.
- Leaseholders have the exclusive right to explore, develop, and produce mineral resources from their existing lease, even if the area containing the leases were proposed to be closed to future leasing.
- An existing mineral lease is a legally issued lease secured by a leaseholder before the effective date of the ROD for the RMP/EIS.
- Surface use restrictions, including TL, NSO, and CSU stipulations, as well as closed to leasing, cannot be retroactively applied to existing oil and gas leases or to existing use authorizations (e.g., APDs). Post-lease actions and authorizations (e.g., APDs, road and pipeline rights-of-way, etc.) could be encumbered by TL and CSU restrictions on a case-by-case basis, as required through project-specific NEPA analysis or other environmental review.
- Leasable mineral resources would be considered unrecoverable in areas designated closed to leasing, and in those areas open to leasing where surface use constraints prohibit operations on areas larger than can be technically or economically developed from off-site locations (e.g., large block NSO areas). Leasable mineral resources within leased inholdings would be considered recoverable.
- The four categories of oil, gas, and carbon dioxide development potential based on the RFD scenario with analysis presented in **Section 4.1.2** include:
  - High potential for hydrocarbon development indicates areas where all of the following characteristics are present: trapping mechanisms, hydrocarbon sources, and reservoir-quality rock in sufficient quantity to be economic.
  - Moderate potential for hydrocarbon development indicates areas where some but not all of the following characteristics are present: trapping mechanisms, hydrocarbon source, and reservoir-quality rock.
  - Low potential for hydrocarbon development indicates areas where the geologic characteristics of trapping mechanisms, hydrocarbon sources, and reservoir-quality rock indicate low potential for accumulation of mineral resources.
  - No potential for hydrocarbon development indicates areas where there is no geologic environment or processes to form trapping mechanisms, hydrocarbon source, and reservoir-quality rock, and the lack of mineral occurrences indicates no potential for accumulation of mineral resources.
- The primary impact on the leasable minerals program from the land use decisions in the RMP/EIS would be reduction in the availability of the hydrocarbon resources for extraction and consumer use. This would result in an increase in the cost to the producer and consumer.
- No coal leasing or development, nor development of coal bed methane, is anticipated because of the low to moderate potential for coal bed methane and the lack of interest in leasing coal on public lands administered by the RPFO. There are no expected impacts from coal or coal bed methane to the various resources or resource use opportunities.
- There are no areas of high or moderate potential for CO_2 accumulations in areas closed to leasing or restricted by leasing stipulations. The high and moderate potential CO_2 areas are in the Northern and Southern Estancia Fields, near the town of Mesita and Acoma Pueblo.

4.2.10.2 Direct and Indirect Impacts

The impacts analysis presented for mineral resources briefly describes the impacts from other resources in the Decision Area to moderate and high potential mineral resources areas. **Chapter 2** summarizes the

itemized restrictions on mineral development from each resource and provides the amount of lands (acres) available to mineral extraction, by alternative. Site-specific NEPA analysis would be completed for proposed mineral development within the Decision Area. The RPFO would take into account the details of the proposed project and site-specific resources as part of that analysis.

4.2.10.2.1 Cave and Karst Resources Decisions

Under Alternatives B and C, a leasing stipulation is proposed for protection of cave and karst resources. Under Alternative B, surface disturbance would not be allowed within up to 200 meters (656 feet) of known cave entrances, passages, or aspects of significant caves, or significant karst features. Under Alternative C, the BLM would impose CSU restrictions beyond standard leasing terms for surface disturbance within up to 200 meters (656 feet) of known cave entrances, passages, or aspects of significant caves, or significant karst features. No leasing stipulations are proposed for cave and karst features under Alternatives A or, D~~, or E~~.

The Pronoun Cave ACEC, which protects the only known cave complex in the Decision Area, would impact mineral resources because the area would have limited mineral extraction opportunities. There are several inactive travertine mines adjacent to the proposed ACEC boundary. The Pronoun Cave ACEC was designated under the 1986 RMP (BLM 1986) and was left open to mineral development. The ACEC would be closed to the extraction of salable minerals and recommended for withdrawal from locatable mineral entry under Alternatives B and C. Alternative~~s~~ D ~~and E~~ would remove the ACEC designation. Under Alternative~~s~~ D ~~and E~~, the Pronoun Cave area would be open to the extraction of salable minerals and locatable mineral entry.

4.2.10.2.2 Lands and Realty Decisions

Disposal of federal lands will be conducted in compliance with Section 209 of the Federal Land Policy and Management Act of 1976, as amended (FLPMA), and pertinent regulations. Land acquired within special designation areas or with unique resource values would be managed with restrictions on mineral development and other surface-disturbing activities. Under all alternatives, lands acquired within and adjacent to special designations would be managed with the same surface restrictions of the larger special designation. **Table 4-36** summarizes the proposed land disposals and their associated mineral potential, by alternative.

Table 4-36: Proposed Land Disposals (Acres) with Moderate or High Mineral Potential, by Alternative

Commented [AA15]: To be updated with revised disposal data

Mineral Type	Mineral Potential	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Fluid leasable minerals	Moderate	1,400	1,400	1,400	1,400	~~1,400~~
	High	500	500	500	500	~~500~~
Salable minerals	Moderate	~~10,600~~3,300	3,300~~11,000~~	~~12,700~~8,000	~~13,000~~8,100	~~7,900~~
	High	~~100~~1,100	1,100~~100~~	1,100~~300~~	1,100~~3,200~~	~~1,100~~
Locatable minerals	Moderate	3,300	3,300	8,000	8,100	~~7,900~~
	High	1,100	1,100	1,100	1,100	~~1,100~~

Source: BLM GIS 2020

4.2.10.2.3 Cultural Resources Decisions

Under all alternatives, a leasing stipulation is proposed that would apply CSU to sites that are listed or are eligible for listing on the NRHP. The lessee would be given notice that all or portions of the lease area contain special values, are needed for special purposes, or require special attention to prevent damage to surface resources. Any surface use or occupancy within such areas would be strictly controlled. If it would

be impossible to avoid, minimize, or mitigate impacts on a historic property, then the BLM Authorized Officer could deny development. In addition, a leasing stipulation is proposed for protection of cultural resources in specially designated areas that are managed for cultural resource values.

Impacts from cultural resources management decisions on oil and gas exploration and development would include increased well development costs associated with cultural resources inventories, relocation of facilities to avoid a cultural site, implementation of directional drilling techniques, and/or appropriate mitigation under 36 CFR 800.6 if avoidance of cultural resources sites is not possible. Discovery of previously undocumented cultural features during project construction would delay project implementation while the cultural site is evaluated. These impacts would not vary across alternatives because the restrictions would apply to all National Register-eligible cultural sites, the existence of which is independent of any management decision.

4.2.10.2.4 Lands with Wilderness Characteristics Decisions

Mineral resources have a low likelihood of being impacted by management decisions related to lands with wilderness characteristics. Lands proposed for management as lands with wilderness characteristics would be closed to extraction of leasable, salable, and locatable minerals under Alternative B. Alternative C would apply a CSU stipulation to leasable mineral extraction and extraction of locatable and salable minerals after evaluation on a case-by-case basis. Alternatives A and~~,~~ D~~, and E~~ do not include lands proposed for management for wilderness characteristics. Areas proposed for management to protect wilderness characteristics fall within either areas of low mineral potential or areas where there is currently no data to inform the mineral potential. As a result of the low potential within the protected areas, the proposed restrictions on mineral development would not result in an actual adverse impact on future mineral resource developments.

4.2.10.2.5 Paleontological Resources Decisions

Mineral resources would be impacted by paleontological resources management decisions that restrict mineral development. The RPFO is proposing to implement an oil and gas stipulation that limits the amount of surface disturbance near paleontological resources. Alternatives B, C, and D would implement a lease notice in areas of PFYC 3, 4, and 5. A determination by the BLM would be made as to whether a survey by a qualified paleontologist would be necessary prior to disturbance. In some cases, appropriate mitigation measures would be required prior to surface disturbance. No such lease notice would apply under Alternative~~s~~ A ~~or E~~.

Impacts from paleontological resources management decisions, especially in PFYC 4 and 5 areas, on oil and gas exploration and development would include increased well development costs associated with potential paleontological inventories, relocation of facilities to avoid paleontological resources, implementation of directional drilling techniques, and/or site excavation if avoidance of certain paleontological sites is not possible. Discovery of previously undocumented paleontological features during project construction would delay project implementation while the feature is evaluated.

Two ACECs would protect paleontological resources. Under Alternatives B, C, and D, the Bony Canyon ACEC (500 acres) would be designated to protect and allow only professional excavation of vertebrate fossils. Under Alternatives B, C, and D, the Bony Canyon ACEC would be ~~NSO for fluid leasable minerals within a 2-acre area and~~ CSU for fluid leasable minerals~~in the remaining area~~, recommended for withdrawal from locatable mineral entry, and closed to extraction of salable minerals. The Torreon Fossil Fauna ACEC (5,900 acres) would be designated under all alternatives. The purpose of the Torreon Fossil Fauna ACEC would be to protect the Torreon Fauna Type Locality for scientific study. Under Alternative A, the Torreon Fossil Fauna ACEC would be CSU for leasable minerals. Under Alternative B, the ACEC would be closed to all mineral development. Under Alternative C, the ACEC would be NSO for fluid leasable minerals, closed to salable extraction, and recommended for withdrawal from locatable mineral entry. Under Alternative~~s~~ D

and E, the ACEC would be CSU for leasable minerals, open to locatable mineral entry, and open to salable mineral extraction. **Table 4-37** summarizes the mineral potential within these ACECs.

Table 4-37: Torreon Fossil Fauna ACEC and Bony Canyon ACEC (Acres) with Moderate or High Mineral Potential, by Alternative

Mineral Type	Mineral Potential	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP Draft RMP/EIS Preferred)	Alternative D	Alternative E (Proposed RMP)
Fluid leasable minerals	Moderate	0	0	0	0	0
	High	5,900	5,900	5,900	5,900	5,900
Salable minerals	Moderate	0	0	0	0	0
	High	0	0	0	0	0
Locatable minerals	Moderate	0	100	100	100	0
	High	0	0	0	0	0

Source: BLM GIS 2020

4.2.10.2.6 Recreation and Visitor Resources Decisions

Mineral resources would be impacted by recreation and visitor services management decisions that restrict mineral development within developed recreation areas such as the SRMA and ERMAs. Under Alternatives B and C, a fluid mineral leasing stipulation (NSO) is proposed in specific developed recreation areas (two ERMA RMZs and one SRMA) for protection of recreation and visitor services. No recreation-specific NSO would apply under Alternatives D or E. Under Alternatives B and C, the remaining four SRMAs and remaining ERMAs not managed as NSO would be managed as CSU for fluid leasable minerals (in developed recreation sites), open to salable mineral extraction, and open to locatable mineral entry (one ERMA) or recommended for withdrawal from locatable mineral entry (the SRMAs and remaining ERMAs). Under Alternative D, all SRMA and ERMAs would be managed as CSU for fluid leasable minerals (in developed recreation sites), open to salable mineral extraction, and open to locatable mineral entry. Under Alternative E, all SRMAs and the ERMA would be managed as CSU for fluid leasable minerals (in developed recreation sites) and open to salable mineral extraction; all SRMAs would be recommended for withdrawal from locatable mineral entry; and the ERMA would be open to locatable mineral entry.

Under Alternatives B, C, and D, two stipulations are proposed to protect scenic resource values. All three alternatives have two stipulations, one NSO and one CSU stipulation, either of which could be applied based on site-specific circumstances. Although these stipulations are designed to protect scenic resource values in special designation areas, these stipulations could be applied elsewhere.

4.2.10.2.7 Riparian Resources Decisions

Mineral resources management decisions would be impacted by proposed fluid mineral leasing stipulations for riparian areas. Under Alternatives B and C, a leasing stipulation is proposed for protection of riparian resources. Under Alternative B, surface-disturbing activities would be prohibited (NSO) within 200 meters (656 feet) of the channels of ephemeral, intermittent, and perennial streams, or within 200 meters (656 feet) of the outer margins of riparian and wetland areas. Under Alternative C, surface-disturbing activities would be subject to CSU restrictions within 200 meters (656 feet) of the channels of ephemeral, intermittent, and perennial streams, or within 200 meters (656 feet) of the outer margins of riparian and wetland areas. There are no proposed stipulations to leasing related to riparian areas under Alternatives A or D, or E.

One ACEC would protect a specific riparian area. Under all alternatives, the Bluewater Canyon ACEC would be designated to protect the wildlife, scenic, and riparian values in the area. Under all alternatives, the

Bluewater Canyon ACEC would be NSO for leasable minerals, closed to salable mineral extraction, and recommended for withdrawal from locatable mineral entry. Under Alternatives B, C, and D, the ACEC is larger than under Alternatives A ~~and E~~ and would therefore have greater impacts on fluid mineral leasing under Alternatives B, C, and D.

Table 4-38 summarizes the mineral potential within riparian areas proposed for protection in the RMP/EIS. Under Alternatives B and C, riparian areas would be protected by leasing stipulations. Riparian areas would not be protected by leasing stipulations under Alternatives A and D.

Table 4-38: Riparian Areas (Acres) with Moderate or High Mineral Potential Protected by Proposed Fluid Mineral Leasing Stipulations, by Alternative

Mineral Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Fluid leasable minerals	800	69,400	69,400	0	~~800~~
Percentage of moderate and high potential areas on BLM fluid mineral estate in Decision Area	<0.1%	5%	5%	0	~~<0.1%~~

Source: BLM GIS 2020

4.2.10.2.8 Soil and Water Decisions

Mineral resources management decisions would be impacted by proposed stipulations for low reclamation potential soils and steep slopes within the Decision Area. Leasing stipulations for steep slopes are proposed under Alternatives B, C, and D~~, and E~~. Alternatives B and C would implement CSU on steep slopes between 15 percent and 30 percent and CSU on soils with low reclamation potential. Alternatives B, C and~~,~~ D~~, and E~~ would implement NSO on steep slopes over 30 percent. The proposed leasing stipulations would protect soils from adverse impacts from leasable mineral resource development. **Table 4-39** shows the number of acres of moderate and high potential for leasable minerals on low reclamation potential soils and steep slopes protected by the stipulations described above or other stipulations.

Table 4-39: Sensitive Soils and Steep Slopes (Acres) in Moderate and High Potential Areas Proposed for Protection from Fluid Leasable Mineral Development, by Alternative

Category	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Mod	High	Mod	High	Mod	High	Mod	High	~~Mod~~	~~High~~
Low reclamation potential (per sensitive soils definition)	500 (closed) 2,900 (NSO) 8,500 (CSU)~~0~~	0 (closed) 1,500 (NSO) 7,700 (CSU)~~0~~	9,000 (closed) 12,900 (NSO) 8,000 (CSU)	7,400 (closed) 18,700 (NSO) 83,100 (CSU)	9,000 (closed) 12,300 (NSO) 8,500 (CSU)	1,500 (closed) 18,800 (NSO) 88,800 (CSU)	400 (closed) 1,800 (NSO) 27,400 (CSU)	0 (closed) 11,400 (NSO) 96,300 (CSU)	~~8,600 (CSU)~~	~~6,600 (CSU)~~

Commented [AA16]: To be updated with revised Alt D CSU data

Category	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Mod	High	Mod	High	Mod	High	Mod	High	~~Mod~~	~~High~~
Steep slopes 15%–30%	100 (closed) 500 (NSO) 2,700 (CSU)~~0~~	0 (closed) 200 (NSO) 1,000 (CSU)~~0~~	2,800 (closed) 2,200 (NSO) 1,500 (CSU)	700 (closed) 2,800 (NSO) 7,600 (CSU)	2,800 (closed) 2,000 (NSO) 1,700 (CSU)	0 (closed) 2,800 (NSO) 8,300~~2,800~~ (CSU)	100 (closed) 300 (NSO) 6,100 (CSU)	0 (closed) 1,900 (NSO) 9,000 (CSU)	~~2,400 (CSU)~~	~~700 (CSU~~
Steep slopes greater than 30%	100 (closed) 400 (NSO) 2,400 (CSU)~~0~~	0 (closed) 100 (NSO) 400 (CSU)~~0~~	2,500 (closed) 1,500 (NSO) 700 (CSU)	100 (closed) 2,300 (NSO) 2,100 (CSU)	2,500 (closed) 1,300 (NSO) 900 (CSU)	0 (closed) 1,900 (NSO) 2,700 (CSU)	0 (closed) 200 (NSO) 4,400 (CSU)	0 (closed) 1,600 (NSO) 2,900 (CSU)	~~3,000 (NSO)~~	~~2,600 (NSO)~~

Source: BLM GIS 2020
*The sums of the acreages cannot be aggregated because the areas subject to these restrictions overlap.

4.2.10.2.9 Special Designations Decisions

Special designations would have impacts on mineral resources. Many of the ACECs proposed for designation include closures for salable and locatable mineral development or NSO fluid leasing stipulations under at least one alternative. **Table 4-40** shows the acres of mineral development restrictions that would be applied to moderate and high mineral potential areas within ACECs, by alternative.

Table 4-40: Proposed Mineral Restrictions (Acres of Moderate and High Potential Areas) within Proposed ACECs, by Alternative

Mineral Type	Designation	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Fluid leasable minerals	Open with moderate constraints (CSU)	14,500	0	6,300	17,700	~~13,100~~
	Open with major constraints (NSO)	4,000	19,100	18,400	200	~~1,800~~
	Closed	100	15,200	9,200	400	~~100~~
Locatable minerals	Open	12,500	5,400	13,000	11,900	~~8,700~~
	Recommended for withdrawal	~~12,600~~2,900	~~32,600~~22,900	14,700	100	~~1,900~~
Salable minerals	Closed	14,000	22,200	8,200	8,200	~~9,700~~
	Open*	2,800	0	6,300	1,500	~~0~~

Source: BLM GIS 2020
* The Draft EIS included a third salable minerals category here, "Open with moderate constraints (Avoid)." This was changed to "open" in the Final EIS to reflect BLM policy to manage salable mineral development as either open or closed. Managing an area to "avoid" salable mineral development would have the same effects as managing the area as "open" to salable mineral development. The Draft EIS analysis is unchanged.

Commented [AA16]: To be updated with revised Alt D CSU data

Commented [AA17]: To be updated with revised Alt D CSU data

Commented [AA18]: To be updated with revised data for Alt B recommended for withdrawal from locatable minerals

Commented [AA19]: To be updated with revised data for Alt B closed to salable minerals

Commented [AA20]: To be updated with revised data for Alt C closed to salable minerals

4.2.10.2.10 Special Status Species Decisions

Under all alternatives, the RPFO would conserve and protect ESA-listed species and their critical habitats. The RPFO would also conserve and protect BLM sensitive species according to directives in BLM Manual 6840. All federally listed candidate species, proposed species, and delisted species in the 5 years following delisting would be conserved as BLM sensitive species.

All alternatives require some degree of spatial or temporal limitation of surface-disturbing activities to protect special status species and their important habitats. In the case of mineral resource development, specific conditions of approval or lease terms are often required in order to mitigate the adverse impacts of development activities on special status species.

Standard lease terms and conditions (lease notices) have been developed in consultation with the USFWS for fluid leasable mineral developments. The terms and conditions consist of specific measures to protect special status species and comply with the ESA. These measures are required by law, are non-discretionary, and are applicable under all alternatives. The impacts of these non-discretionary measures will not be analyzed in this document, as they are outside the scope of the planning process.

Mineral resources would be impacted by additional, discretionary surface disturbance restrictions that are proposed for special status species. The RPFO has developed surface disturbance restrictions for Gunnison's prairie dog in **Chapter 2**. Under Alternative B, activities determined to adversely impact prairie dogs and/or associated species or habitat would be strictly controlled within 0.5 mile~~s~~ of prairie dog towns. Under Alternative C, surface-disturbing and disruptive activities would be strictly controlled within 0.25 mile~~s~~ of prairie dog towns if an activity would adversely impact prairie dogs and/or associated species. Under Alternative~~s~~ D ~~and E~~, surface-disturbing and disruptive activities would be strictly controlled within prairie dog towns if an activity would adversely impact prairie dogs and/or associated species. No Gunnison's prairie dog towns have been specifically identified for protection; therefore, the specific impacts on mineral resources caused by the surface disturbance restriction for Gunnison's prairie dog towns are unknown. Site-specific NEPA analysis would need to be completed for proposed mineral development activities in the Decision Area.

4.2.10.2.11 Visual Resources Decisions

Mineral resources management decisions would be impacted by VRM decisions. Mineral development activities would be prohibited in VRM Class I areas, subject to the Mining Law of 1872. Under all alternatives, VRM Class I would be proposed for approximately 13 percent of the Decision Area. In addition, VRM Class II areas may also restrict mineral development within 8 percent (under Alternative A), 42 percent (under Alternative B), 9 percent (under Alternative C), or 3 percent (Alternative D)~~, or 2 percent (Alternative E)~~ of the Decision Area. In addition, in specially designated areas that are managed for scenic resource values, such as Jones Canyon ACEC, a lease stipulation would be applied to protect these values.

4.2.10.2.12 Wildlife and Fisheries Decisions

All alternatives include some degree of spatial or temporal limitation on surface-disturbing activities to protect wildlife populations and their important habitats. In the case of mineral resource development, specific conditions of approval, lease terms, and/or discretionary measures are often required in order to mitigate the adverse impacts of development activities on wildlife.

The discretionary measures include spatial and temporal limitations and would have an adverse impact on mineral resource development by increasing exploration costs, time, and effort. However, the degree and magnitude of such increases depend on many factors, including the options for project siting, the locale of the lease, and the drilling schedule and window.

The RPFO coordinates with the NMDGF for the purpose of protecting wildlife species. Under all alternatives, mineral resource developers would be required to avoid surface-disturbing activities in occupied migratory bird habitat during the nesting season. This would result in impacts on mineral resources development. Adverse impacts on mineral resource development in terms of extra costs, time, and effort would result.

Under Alternatives B, C, and D, ~~and E,~~ the RPFO would implement a buffer around occupied and unoccupied raptor nests, between March 1 and June 30, where surface-disturbing activities would be prohibited. Under Alternative B, the buffer would be 1 mile; under Alternative C, the buffer would be 0.5 mile~~s~~; and under Alternative~~s~~ D ~~and E~~, the buffer would be 0.25 mile~~s~~. ~~Under Alternative E, activities determined to adversely impact raptor nests and/or associated species or habitat would be strictly controlled.~~

Under Alternatives B and, ~~C, and E~~, the RPFO would also implement restrictions on surface-disturbing activities within big game winter range between November 15 and April 30. This would be applied to winter range for mule deer, elk, and pronghorn. Travel on designated roads may be included in the timing limitations.

Under Alternatives B and, ~~C, and E~~, the RPFO would prohibit surface-disturbing activities within fawning and calving habitat for mule deer, elk, and pronghorn. The restrictions would occur from May 1 to August 31 for mule deer, May 1 to June 30 for elk, and May 1 to July 15 for pronghorn. Surface disturbance would also be prohibited near wildlife habitat projects under Alternatives B and C. Both alternatives include a restriction to restrict surface disturbance up to 200 meters (656 feet) of existing or planned wildlife improvement projects. Large-scale vegetation manipulation, such as prescribed burns, would be expected.

The exact impact of wildlife management decisions common to all cannot be quantified. This is because exact acreages of habitat to be restricted would depend on the results of field surveys associated with specific projects. However, some general conclusions can be drawn regarding the TL stipulations. The fall and winter months (i.e., September to February) generally would have the fewest TL stipulations on mineral resources development, while the spring and summer months (i.e., March to August) generally would have the most. The most restrictive months of the year would be April through July, as most TL stipulations would be in effect during that period. Together, these decisions would result in adverse impacts on mineral resources.

Table 4-41 provides a summary of the acres that could be impacted by surface restrictions intended to protect wildlife. Note that **Table 4-41** provides an estimate of the potential impacts based on current conditions in the RPFO's jurisdiction. These estimates may change as new habitat, raptor nests, prairie dog towns, or wildlife habitat projects are surveyed, and the number presented below should not be aggregated because habitats may overlap. Alternative B would place the most restrictions on mineral development due to the size of the buffers and timing restrictions for wildlife. Alternative A would place the least restrictions on mineral development because there are currently no surface-disturbing restrictions in place for wildlife.

Table 4-41: Proposed Surface Restrictions (Acres) on High and Moderate Mineral Potential Areas to Protect Wildlife, by Alternative

Surface Restrictions	Mineral Type[1]	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Raptor nest buffers (March 1–June 30)	Fluid leasable	0	1,00050,000 (Closed~~Open~~) 22,000 (NSO) 25,000 (CSU)	~~13,000 (Open)~~ ~~6,700~~7,000 (NSO) ~~400~~ 6,000 (CSU)	~~5,000 (Open)~~ 300 (NSO) 2,000 (CSU)	~~5,000 (Open)~~ ~~600 (NSO)~~
	Salable	0	~~50,000~~0	~~13,000~~500	~~5,400~~0	~~5,400~~

Commented [AA21]: To be updated with revised Alt D CSU data

Commented [AA22]: To be updated with revised data for Alt B closed to salable minerals

Commented [AA23]: To be updated with revised data for Alt C closed to salable minerals

Surface Restrictions	Mineral Type[1]	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
	Locatable	0	~~31,000~~4,000	~~8,000~~600	~~5,400~~0	~~5,400~~
Big game winter range (November 15–April 30)[~~2~~2]	Fluid leasable	~~5,000~~9,000 (CSU)	~~5,000~~9,000 (Closed)	9,000 ~~5,000~~(Closed)	9,000 (CSU)	~~2,000 (NSO)~~ ~~7,000 (CSU)~~
	Salable	~~1,000~~9,000	9,0000	9,3000	~~9,000~~1,000	~~1,000~~
	Locatable	~~14,000~~0	~~5,000~~9,000	9,000~~5,000~~	~~14,000~~0	~~14,000~~
Prairie dog towns	Fluid leasable	0	~~3,100~~300 (Closed)	~~1,500~~100 (Closed)	300 (CSU)	~~300 (CSU)~~
	Salable	0	0	0	0	~~0~~
	Locatable	0	0	0	0	~~0~~
Wildlife habitat projects	Fluid leasable	0	360	360	360	~~360~~
	Salable	0	100	100	100	~~100~~
	Locatable	0	160	160	160	~~160~~

Source: BLM GIS 2020

[1]For fluid leasable minerals, includes areas closed to leasing or with major (NSO) or minor (CSU) restrictions; for salable minerals, includes areas closed to salable mineral extraction; for locatable minerals, includes areas recommended for withdrawal from locatable mineral entry

[2]~~Note:~~ These numbers differ from the Draft RMP/EIS due to Draft RMP/EIS data not being clipped to the BLM Decision Area.

4.2.10.2.13 Summary of Direct and Indirect Impacts on Mineral Resources

Chapter 2 summarizes the amount of Decision Area land (acres) that would be restricted through leasing stipulations, open/closed decisions for salable minerals, and open/withdraw decisions for locatable minerals. Under Alternative B, the largest number of acres would be closed to leasable minerals and salable minerals, and recommended for withdrawal from locatable mineral entry. Under Alternative D~~E~~, the least number of acres would be closed to fluid leasable and salable minerals, followed by ~~Alternative D then~~ Alternative A. Under Alternative A~~E~~, the least number of acres would be recommended for withdrawal from locatable mineral entry, followed by Alternative D~~A then Alternative D~~.

4.2.10.3 Cumulative Impacts

The predicted level of mineral development within the Planning Area over the next 20 years is low. The RFD for the Decision Area estimates that eight oil and gas wells would be drilled annually over the next 20 years. Similar low levels of activity are predicted for locatable and salable minerals as well. Considering this level of activity, it is anticipated that there would be minimal cumulative impacts on mineral resources because the demand for access to minerals within the Planning Area is lower than that which could be provided by BLM-administered lands open to potential mineral development. Specific to uranium mining, the RFD for locatable minerals includes the projected growth in uranium mining on BLM-administered lands; however, additional uranium exploration could occur outside the Decision Area. The proposed Northwest Loop Road, with a proposed project length of 39 miles, could potentially cross lands where the BLM owns the subsurface mineral rights. The proposed project could include using fill material from BLM-administered lands to construct the roadbed. The potential use of fill material from BLM-administered lands is not anticipated to adversely impact mineral resources in the Planning Area due to the low level of predicted mineral development and the amount of material available in the project vicinity.

4.2.11 Paleontological Resources

Impacts on paleontological resources can be characterized as those management decisions that result in loss, degradation, destruction, or benefits to vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. Avoidance is the preferred method to prevent loss, but other mitigation can reduce and resolve

Commented [AA24]: To be updated with revised data for Alt B recommended for withdrawal from locatable minerals

Commented [AA25]: To be updated with revised Alt D CSU data

Commented [AA26]: To be updated with revised data for Alt B closed to salable minerals

Commented [AA27]: To be updated with revised data for Alt C closed to salable minerals

Commented [AA28]: To be updated with revised data for Alt B recommended for withdrawal from locatable minerals

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Commented [AA31]: To be updated with revised data for Alt B closed to salable minerals

Commented [AA32]: To be updated with revised data for Alt C closed to salable minerals

Commented [AA33]: To be updated with revised data for Alt B recommended for withdrawal from locatable minerals

adverse effects on significant localities, including records and literature searches, sampling or survey by a qualified paleontologist, or other types of paleontological research. Under all alternatives, adverse impacts on paleontological resources would be avoided or minimized to the maximum extent possible through management actions and BMPs.

The RPFO would use a PFYC map during the environmental impact evaluation process for all proposed ground-disturbing projects. The map is developed using geologic maps, known locality data, and professional judgment to evaluate geologic units' potential to produce important paleontological resources. All land use actions with a potential to impact vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils would be screened using the PFYC system.

4.2.11.1 Direct and Indirect Impacts

4.2.11.1.1 Lands and Realty Decisions

Lands and realty decisions would have impacts on paleontological resources if lands proposed for disposal lead to loss of paleontological resources. Other land and realty actions such as pipeline and road ROWs could have adverse impacts if these actions occur in PFYC units with medium to high paleontological occurrences. The impact would consist of possible damage to specimens during ground-disturbing activities, or unauthorized collection associated with increased traffic. Site-specific NEPA analysis would be applied prior to disposal of land administered by the BLM and ROW issuances to avoid adverse impacts on paleontological resources. **Table 4-42** identifies the number of acres proposed for land disposal and associated PYFC classification. Under Alternatives C and ~~E~~D, the largest acreage is proposed for disposal, while under Alternative A, the smallest acreage is proposed for disposal.

Table 4-42: Lands Identified for Disposal (Acres), by PFYC and Alternative

Commented [AA34]: To be updated with revised disposal data

PFYC	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
1	8,300	8,400	16,400	16,400	~~16,400~~
2	15,800	16,300	38,000	39,300	~~38,700~~
3	26,600	28,000	53,000	53,000	~~58,400~~
4	3,800	3,800	9,500	11,300	~~15,500~~
5	500	500	500	500	~~500~~
Unknown	0	0	0	0	~~0~~
Total	**54,900**	**57,000**	**117,300**	**120,400**	~~**129,500**~~

Source: BLM GIS 2020

4.2.11.1.2 Special Designations Decisions

Special designations would have impacts on paleontological resources because of management restrictions that are applied within the boundaries of the particular designation. Travel and mineral resources management decisions are the two major surface-disturbing activities that would be restricted within special designations and that also indirectly protect paleontological resources. ACECs and National Scenic Trails are the two special designations that are proposed. The only National Scenic Trail in the Decision Area is the CDNST. **Table 4-11** provides the proposed number and acres of special designations by alternative. Under Alternative B, the largest amount of acres would be managed as special designations, while under Alternative D~~E~~, the smallest number of acres would be managed as special designations.

Two proposed ACECs would protect paleontological resources. Under Alternatives B, C, and D, the Bony Canyon ACEC (500 acres) would be designated to protect and allow only professional excavation of vertebrate fossils. The Torreon Fossil Fauna ACEC (5,900 acres) would be designated under all alternatives.

The purpose of the Torreon Fossil Fauna ACEC would be to protect the Torreon Fauna Type Locality for scientific study.

4.2.11.1.3 Mineral Resources Decisions

Mineral resources management decisions would have adverse and beneficial impacts on paleontological resources by potentially disturbing areas with PFYC 3–5, though the required pre-disturbance surveys would add to our knowledge of paleontological resources. The adverse impact would be through possible destruction or unauthorized collection of specimens. The beneficial impact would be through discovery of specimens that would then be available for study. According to the RFD for mineral resources, development of leasable, salable, and locatable mineral resources are expected to contribute to surface disturbance equating to 1.2 percent of the Decision Area over the next 20 years. It is anticipated that mineral extraction activities would be located in areas to avoid impacts on paleontological resources. BLM policy for PFYC and site-specific NEPA analysis would be applied to applications for disturbance, thereby reducing opportunities for direct adverse impacts related to this disturbance.

The RPFO proposes to implement a leasing stipulation that limits the amount of surface disturbance near paleontological resources. Alternatives B, C, and D would implement a lease notice in areas of PFYC 3, 4, and 5. A determination by the BLM would be made as to whether a survey by a qualified paleontologist would be necessary prior to disturbance. When needed, appropriate mitigation measures would be required prior to surface disturbance. No such lease notice would apply under Alternative~~s~~ A ~~or E~~.

4.2.11.1.4 Renewable Energy Decisions

Renewable energy management decisions would have an adverse impact on paleontological resources if renewable energy projects were proposed in areas with vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. Surface disturbance may create adverse impacts by degradation or unauthorized collection of specimens. Site-specific NEPA analysis would be conducted prior to the RPFO approving renewable energy projects in the Decision Area. At that time, the PFYC maps and data would be used to analyze the impacts on paleontological resources from a particular proposed project.

4.2.11.1.5 Travel Management Decisions

Travel management decisions would have both adverse and beneficial impacts on paleontological resources. Exposed fossil resources would be adversely impacted by open travel designations. These impacts are more likely to occur in PFYC 4 and 5 areas. There are 0 acres of PFYC 4 and 5 areas within Cimarron Mesa, the only area that would be open to cross-country motorized use under Alternatives C and~~,~~ D~~, and E~~. Beneficial impacts on surface fossil resources would occur from the closure of areas to vehicle travel. Vehicle closures reduce the likelihood that fossil resources would be damaged by vehicles.

4.2.11.2 Cumulative Impacts

Surface-disturbing activities, such as the Northwest Loop Road, the Red Mesa Wind Farm, the N55 Road Improvement Project, fire and fuels management on non-BLM-administered land in the Planning Area, the potential RETA transmission corridor, and uranium development, could contribute to cumulative impacts on paleontological resources through incremental degradation of the resource base by a variety of sources, reducing the information and interpretive potential of the paleontological resources in the region. These projects, where specific project areas are known, account for approximately 500,000 acres of surface disturbance. The activities that would require federal approval would adhere to laws, regulations, and policies established to protect significant paleontological resources.

4.2.12 Recreation and Visitor Services

Impacts on recreation and visitors services would be both adverse and beneficial, depending on the resource management decision. Impacts are expected to occur from management decisions related to livestock

grazing, special designations, recreation, lands with wilderness characteristics, cultural resources, lands and realty, renewable energy, travel management, special status species, vegetation management (consisting of forests and woodlands, vegetation, and fire management decisions) and mineral resources. These resources or resource uses would have both short-term adverse impacts and long-term beneficial impacts, based on the proposed management decisions.

4.2.12.1 Direct and Indirect Impacts

4.2.12.1.1 Livestock Grazing Decisions

Livestock grazing management decisions would have both beneficial and adverse impacts on recreation. Range improvements would benefit some recreational users such as hunters and wildlife observers. Artificial water sources constructed for livestock are used by a variety of both game and non-game species alike. Wildlife viewing and hunting opportunities are increased in areas with the availability of water. These management actions are anticipated to influence the distribution of wildlife throughout the Planning Area, thereby influencing recreational use patterns. Occasional encounters with livestock or fencing as a range improvement could compromise the recreational setting for some recreational users that prefer not to view livestock or fencing during recreational activities. Opportunities for motorized and mechanical recreation would be impacted if livestock were encountered on trails and roads. There are 637,535 acres of grazing allotments in the Decision Area, which makes up approximately 87 percent of the Decision Area. This indicates that it is likely that recreational users could encounter livestock during their recreational activities within the Decision Area. The frequency of encounters with livestock would depend on the timing and location of the recreational activity.

The probability of encountering livestock during recreational activities would be lowest under Alternative B because 162,600 acres would be removed from livestock grazing, and areas with existing and proposed special designations, such as ACECs, would be unavailable for livestock grazing. The RPFO would also remove grazing from riparian areas under Alternative B. Under Alternatives C and~~,~~ D~~, and E~~, grazing would be available in riparian areas that meet the New Mexico Standards and Guidelines (BLM 2001b) and on ACECs where grazing would not conflict with resource protection goals of the specific ACEC. As a result, recreational users would have a lower chance of interacting with livestock when visiting riparian areas and ACECs.

4.2.12.1.2 Special Designations Decisions

Special designations would have a beneficial impact on recreation and visitor services because of management restrictions that are applied within the boundaries of the particular designation. Travel and mineral resources management decisions are the two major surface-disturbing activities that would be restricted within special designations and that also indirectly impact recreational setting. ACECs and National Scenic Trails are the two special designations that are proposed in the Proposed RMP/EIS. The only National Scenic Trail in the Decision Area is the CDNST. The CDNST is a venue for a popular trail-running event within the Planning Area. **Table 4-11** provides the proposed number and acres of special designations by alternative. Under Alternative B, the largest amount of acres would be managed for special designations, while the smallest number of acres would be managed for special designations under Alternative D~~ E~~.

4.2.12.1.3 Recreation and Visitor Services Decisions

Recreation management decisions would have a beneficial impact on recreation within the Decision Area. Five SRMAs and six ERMAs are proposed under Alternatives B, C, and D in the Proposed RMP/EIS. Descriptions of the proposed management of specific SRMAs and ERMAs are provided in **Appendix P**. As explained in **Chapter 2**, the number of SRMAs and ERMAs vary across the range of alternatives as a result of changes to four areas from ERMA zones in the Draft EIS to SRMAs in the Final EIS to meet the clarifying definitions for SRMAs under a BLM policy (Handbook H-8320-1, Planning for Recreation and Visitor Services) that was issued in 2014 after the Draft EIS was published.

Proposed management decisions, such as travel and mineral resource decisions, within the SRMAs and ERMAs also vary across alternatives (see **Appendix P**). Generally, Alternative B proposes more travel restrictions and fewer acres available for mineral extraction within the SRMAs and ERMAs, while Alternatives C and, D, ~~and E~~ propose fewer travel restrictions and more flexibility for future mineral resource extraction, depending on the location of the SRMA or ERMA. The purpose of designating the SRMAs and ERMAs is to identify areas of recreation importance or potential. This makes recreational use a primary purpose of these areas and recognizes the importance of recreation in public lands management. **Table 4-43** shows the size of each proposed SRMA and ERMA. All other acres of the Decision Area that fall outside SRMA and ERMA boundaries are managed as public lands not designated as recreation management areas, which provide unconfined recreation opportunities and recreation areas that are free of unneeded regulation and control.

Table 4-43: Proposed SRMAs and ERMAs (Acres) in the Decision Area

SRMA or ERMA Name	Alternatives B, C (Proposed RMP), and D	~~Alternative E (Proposed RMP)~~
Boca del Oso ERMA	106,400	~~0~~
Cimarron Mesa*	18,300	~~1,700~~
Continental Divide National Scenic Trail SRMA	11,000	~~0~~
Crest of Montezuma ERMA	900	~~0~~
Herrera ERMA	18,400	~~0~~
Endurance Trails SRMA*	17,400	~~17,400~~
Petaca Pinta ERMA	50,900	~~0~~
San Juan Basin Badlands ERMA	53,700	~~47,800~~
San Ysidro ERMA	2,500	~~0~~
San Ysidro Trials Area*	4,400	~~4,400~~
White Ridge Bike Trails*	2,800	~~2,800~~
Total SRMA and ERMA Acreage	**286,700**	~~**72,400**~~
Percentage of the Decision Area	39%	~~10%~~

Source: BLM GIS 2020

* In the Draft EIS, this was an ERMA zone (in Alternatives B, C, and D). Since the Draft EIS, this area was changed to an SRMA to reflect BLM policy (Handbook H-8320-1, Planning for Recreation and Visitor Services) that was issued in 2014 after the Draft EIS was published.

Appendix P details the supporting management actions and allowable use decisions for SRMAs and ERMAs under each alternative. The BLM would issue SRPs as a discretionary action as a means to help meet management objectives, provide opportunities for economic activity, facilitate recreational use of the public lands, control visitor use, protect recreational and natural resources, and provide for the health and safety of visitors. All SRPs would contain stipulations appropriate for the type of activity and may include additional stipulations necessary to protect lands or resources, reduce user conflicts, or minimize health and safety concerns.

Under Alternative~~s~~ A ~~and E~~, no SRMA is proposed for the CDNST. The BLM would continue to use the current guidelines for issuing SRPs, which include commercial activity, competitive events, organized groups, special area permits, and vending permits.

Alternative B would enhance recreational opportunities for nonmotorized recreation on the CDNST. Other alternatives would provide the most opportunity for motorized recreation. Under Alternative B, no SRPs would be granted for CDNST activities. The trail would be managed as an SRMA and open to hiking and equestrian use but closed to motorized and mechanized travel.

Under Alternatives C and D, the trail would be managed as an SRMA, and motorized and mechanized travel would be limited to designated roads and trails. The SRMA would be closed to salable minerals extraction under Alternative B. Mineral resources within the CDNST SRMA would be leased with a NSO stipulation.

Under all alternatives, camping would be prohibited within 46 meters (150 feet) of riparian areas in the Decision Area. This would result in adverse impacts on those recreational camping groups that prefer to camp within riparian areas.

4.2.12.1.4 Lands with Wilderness Characteristics Decisions

Lands with wilderness characteristics management decisions would have beneficial impacts on recreation and visitor services. These lands would provide increased recreational opportunities to user groups that prefer wilderness characteristics such as solitude and primitiveness, in addition to existing Wilderness areas and WSAs. Under Alternative B, lands with wilderness characteristics would be closed to motorized travel, thereby restricting OHV use in the Decision Area. Under Alternative C, lands with wilderness characteristics decisions would close 26,100 acres to motorized vehicle traffic, limit motorized vehicles to designated primitive routes on 4,100 acres, and open 7,300 acres in the Cimarron Mesa area to motorized vehicle travel. Alternative D would open 8,500 acres to motorized vehicle travel in the Cimarron Mesa and Volcano Hill areas, the most of any alternative~~, while Alternative E would open 18,300 acres in the Cimarron Mesa area~~. Alternative B would enhance recreational opportunities for nonmotorized recreation such as hiking, while Alternative D would provide the most opportunity for motorized recreation.

4.2.12.1.5 Cultural Resources Decisions

Cultural resources management decisions would have both adverse and beneficial impacts on recreation and visitor services. Beneficial impacts on recreation from cultural resources management decisions would occur when cultural resource sites are allocated for public use because this would provide additional recreational opportunities. Big Bead Mesa (300 acres) is a cultural resources area where camping would be prohibited under all alternatives in order to protect the site. The site would not be closed to hiking, but recreational users would have to find other camping locations in the areas, which could easily take place on adjacent public or other federal lands in the area. Compared with other alternatives that would limit motorized vehicle travel to existing primitive roads and trails at Big Bead Mesa, Alternative D would allow motorized vehicle access to the mesa top. **Table 4-44** shows the proposed management of cultural resources sites for public use in the Decision Area. Compared with no action, all action alternatives would allow limited motorized vehicle travel at Azabache Station.

Table 4-44: Proposed Management of Cultural Resource Sites for Public Use, by Alternative

Status	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Ojo Pueblo and Fort Site	No special management	Motorized vehicle travel would be limited to designated primitive roads and trails.	Motorized vehicle travel would be limited to designated primitive roads and trails.	No special management	~~No special management~~

Status	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Azabache Station	Closed to motorized vehicle travel	Motorized vehicle travel would be limited to existing primitive roads and trails.	Motorized vehicle travel would be limited to existing primitive roads and trails.	Motorized vehicle travel would be limited to existing primitive roads and trails.	~~Motorized vehicle travel would be limited to existing primitive roads and trails.~~
Big Bead Mesa	Motorized vehicle travel would be limited to existing primitive roads and trails.	Motorized vehicle travel would be limited to existing primitive roads and trails.	Motorized vehicle travel would be limited to existing primitive roads and trails.	Motorized vehicle access to the mesa top would be allowed.	~~Motorized vehicle travel would be limited to existing primitive roads and trails.~~
Headcut Prehistoric Community	Motorized vehicle travel would be limited to existing primitive roads and trails.	Motorized vehicle travel would be limited to existing primitive roads and trails.	Motorized vehicle travel would be limited to existing primitive roads and trails.	Motorized vehicle travel would be limited to existing primitive roads and trails.	~~Motorized vehicle travel would be limited to existing primitive roads and trails.~~
Mesa Portales	No special management	Mesa Portales would be managed as part of the Cañon Jarido ACEC.	Mesa Portales would be managed as part of the Cañon Jarido ACEC.	Special management for the cultural site would include limiting motorized vehicle travel to existing routes.	~~No special management~~

4.2.12.1.6 Lands and Realty Decisions

Under all alternatives, land tenure adjustments, including land acquisition and disposal, would benefit recreation, as the BLM is required to consider public access for outdoor recreation in lands identified for disposal (Secretarial Order 3373, Evaluating Public Access in BLM Public Land Disposals and Exchanges [March 21, 2019]). Acquisitions can improve public access in areas with intermingled landownership and can facilitate increased or improved access to recreation areas. Acquiring private or state inholdings would improve access and user enjoyment of BLM-administered lands, especially in SRMAs, which are managed for specific recreation experiences. Future acquisitions that occur with the proposed SRMA or ERMAs would beneficially impact recreation due to an increase in the SRMA land base. The acquisition of access easements can also increase recreation use across the Decision Area. There are no land disposals proposed in the RMP/EIS that would fall within the proposed SRMA or ERMA boundaries.

Commented [AA35]: To be confirmed with revised disposal data

4.2.12.1.7 Renewable Energy Decisions

Renewable energy management decisions would adversely impact recreation within the Decision Area. Renewable energy developments would remove recreation potential on the lands being developed and would degrade the recreation experience for most users on adjacent lands. Additional impacts would include fragmentation from roads, structures spread across open space, and associated traffic and noise. No renewable energy projects are currently proposed in the RMP/EIS. Site-specific NEPA analysis would be

completed prior to constructing a renewable energy project on BLM-administered lands. Impacts on recreation would be analyzed at that time.

4.2.12.1.8 Travel Management Decisions

Travel management decisions would have both adverse and beneficial impacts on recreation. The Decision Area would be assigned a travel management status to determine the type of public motorized vehicle use to be allowed. These designations (open, closed, limited to existing or designated roads, primitive roads, and trails) would have various impacts on recreation based primarily on the amount of motorized access available to specific areas. The type of impact depends on the particular user. OHV users would continue to have a wide variety of routes available for use under all alternatives. OHV users enjoy cross-country travel and free play. Under Alternatives C and D, the Cimarron Mesa area would be designated as open to travel, which would allow cross-country travel to OHV users on 7,300 acres of lands with wilderness characteristics. ~~Alternative E would limit travel on 5,700 acres, with 1,700 acres remaining open.~~ Alternative B does not propose an open travel area in the Decision Area; therefore, OHV users that enjoy cross-country travel and free play would be adversely impacted by having no public lands open for their use.

In contrast, other recreational user groups, such as hikers, campers, and wildlife viewers, are adversely impacted by open travel areas. Often these groups prefer more secluded settings. Those areas closed to travel and limited to existing or designated roads, primitive roads, and trails would provide beneficial impacts on these groups. All management decisions that affect motorized use would be covered by these travel management designations. **Table 4-45** shows the proposed travel management categories, in acres, by alternative. Alternative B would close the largest amount of acres to motorized travel compared with all other alternatives. The largest amount of acres would be open to motorized travel under Alternative D.

Table 4-45: Proposed Travel Management Categories (Acres), by Alternative

Category	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Open	301,900	4,600	18,300	19,500	~~18,300~~
Limited	327,600	550,500	589,300	614,300	~~615,500~~
Closed	102,100	176,600	124,000	97,800	~~97,800~~
Total	**731,600**	**731,600**	**731,600**	**731,600**	~~**731,600**~~

Source: BLM GIS 2020

4.2.12.1.9 Special Status Species and Wildlife Decisions

Wildlife and special status species management decisions would have both adverse and beneficial impacts on recreation. Seasonal timing or access restrictions on use of public lands may be needed to protect wildlife and special status species. Closure or other wildlife management decisions would impact the design or creation of new recreation projects, such as trails and campground facilities, as well as projects or maintenance in existing recreation developments. No specific wildlife or special status species projects are proposed in the RMP/EIS. Site-specific NEPA analysis would need to be completed prior to implementing wildlife or special status species projects. The impacts on site-specific recreational activities and user groups would be disclosed at that time.

Long-term beneficial impacts from wildlife and special status species management decisions on recreation would be improved wildlife habitat and populations. Improved wildlife and special status species conditions would improve the recreational setting for many user groups, including hikers, campers, and wildlife viewers.

4.2.12.1.10 Vegetation Management Decisions

Vegetation management includes fire management and mechanical and chemical treatment of vegetative communities in riparian, forest, and woodland areas. Vegetation management resource decisions would have a short-term adverse impact on recreation immediately after vegetation treatments occur. Recreation would be displaced when the vegetation treatment activity is taking place, which typically ranges from a few days to a few months. Recreation users would need to move to other areas to take part in recreational opportunities. Once the treatment project is complete, the quality of recreation could be diminished for some recreational users, for the period of time it takes for the project area to recover.

Long-term beneficial impacts from vegetation management decisions on recreation would be improved health of vegetative communities. Improved vegetative communities would improve the recreational setting for many user groups, including hikers and campers. Forage conditions would be expected to improve in areas that are restored, which would attract wildlife and benefit hunters and wildlife viewing user groups.

Table 4-46 shows the total number of acreages proposed for fuels treatments in the proposed SRMAs and ERMAs by alternative. The same level of fuels treatments is proposed to take place within the proposed SRMAs and ERMAs under Alternatives B, C, and D. ~~Alternative E would result in a reduction in acres where fuels treatments would occur.~~ There are no SRMAs or ERMAs proposed under Alternative A; therefore, no fuels treatments would take place within the designated boundaries under this alternative.

Table 4-46: Proposed Fuels Treatments (Acres) within Proposed SRMAs and ERMAs, by Alternative

RMA Name	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Boca del Oso ERMA	0	96,700	96,700	96,700	~~0~~
Cimarron Mesa*	0	10,300	10,300	10,300	~~400~~
Continental Divide National Scenic Trail SRMA	0	9,000	9,000	9,000	~~0~~
Crest of Montezuma ERMA	0	900	900	900	~~0~~
Herrera ERMA	0	17,300	17,300	17,300	~~0~~
Endurance Trails SRMA*	0	14,000	14,000	14,000	~~14,000~~
Petaca Pinta ERMA	0	37,000	37,000	37,000	~~0~~
San Juan Basin Badlands ERMA	0	43,400	43,400	43,400	~~39,000~~
San Ysidro ERMA	0	1,100	1,100	1,100	~~0~~
San Ysidro Trials Area*	0	3,600	3,600	3,600	~~3,600~~
White Ridge Bike Trails*	0	1,700	1,700	1,700	~~1,700~~
RMA Total	**0**	**235,000**	**235,000**	**235,000**	~~**58,700**~~

Source: BLM GIS 2020

* In the Draft EIS, this was an ERMA zone (in Alternatives B, C, and D). Since the Draft EIS, this area was changed to an SRMA to reflect BLM policy (Handbook H-8320-1, Planning for Recreation and Visitor Services) that was issued in 2014 after the Draft EIS was published.

Table 4-47 shows the proposed forest product harvest areas by alternative. No specific treatments have been proposed in the RMP/EIS for riparian restoration or upland vegetation. Forest product harvest areas within SRMAs or ERMAs would be greatest under Alternative D and would account for 31 percent of the Decision Area. Alternative B would have the lowest acreage of forest product harvest areas within SRMAs or ERMAs.

Table 4-47: Proposed Forest Product Removal Areas (Acres) within Proposed SRMAs and ERMAs, by Alternative

SRMA or ERMA	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Boca del Oso ERMA	0	10,400	32,200	51,500	~~0~~
Cimarron Mesa*	0	1,900	18,300	18,300	~~1,700~~
Continental Divide National Scenic Trail SRMA	0	0	5,700	6,500	~~0~~
Crest of Montezuma ERMA	0	0	900	900	~~0~~
Herrera ERMA	0	500	17,900	18,400	~~0~~
Endurance Trails SRMA*	0	900	17,400	17,400	~~17,400~~
Petaca Pinta ERMA	0	2,800	22,500	50,800	~~0~~
San Juan Basin Badlands ERMA	0	3,800	47,700	53,700	~~47,700~~
San Ysidro ERMA	0	300	400	2,500	~~0~~
San Ysidro Trials Area*	0	3,200	4,400	4,400	~~4,400~~
White Ridge Bike Trails*	0	300	1,400	2,800	~~2,800~~
Total SRMA and ERMA Acreage	**0**	**24,100**	**168,800**	**227,200**	**~~74,000~~**
Percentage of the Decision Area	0	3%	23%	31%	~~10%~~

Source: BLM GIS 2020

* In the Draft EIS, this was an ERMA zone (in Alternatives B, C, and D). Since the Draft EIS, this area was changed to an SRMA to reflect BLM policy (Handbook H-8320-1, Planning for Recreation and Visitor Services) that was issued in 2014 after the Draft EIS was published.

4.2.12.1.11 Mineral Resources Decisions

Mineral resources management decisions would have adverse and beneficial impacts on recreation within the Decision Area. Mineral development activities would remove recreation potential on the lands being developed and could degrade the recreation experience for most users on adjacent lands for the duration of the mineral development. However, recreation may be enhanced after development of the site, depending on how reclamation of the site is implemented. Restrictions on mineral development are expected to have beneficial impacts on recreation.

According to the RFD for mineral resources, development of leasable, salable, and locatable mineral resources are expected to contribute to surface disturbance equating to 1.2 percent of the Decision Area over the next 20 years. It is anticipated that mineral extraction activities would be located in areas to avoid impacts on popular recreation areas. Site-specific NEPA analysis would be completed for applications for disturbance, thereby reducing opportunities for direct adverse impacts related to this disturbance.

The RPFO has proposed leasing stipulations for developed recreation areas with the goal of mitigating impacts on recreational experiences in high-use areas. **Appendix H**, **Table H-1**, identifies general fluid mineral leasing stipulations that would apply to recreation management areas under each alternative. To protect developed recreation areas and undeveloped recreation areas receiving concentrated public use, the following NSO stipulations would prohibit surface-disturbing activities within 0.25 mile~~s~~ of the following designated recreation areas:

Alternatives B and C:

Ignacio Chavez RMZ in the Boca del Oso ERMA, Continental Divide National Scenic Trail SRMA, and Torreon Fossil Fauna East and West RMZ in the San Juan Basin Badlands ERMA

~~Alternative E~~
~~Continental Divide National Scenic Trail~~
~~NSO stipulations are not proposed for specific recreation areas under Alternatives A and D. As a consequence, impacts on recreational users from potential mineral development would be greatest under these alternatives.~~

In addition to NSO stipulations, the following CSU stipulations would restrict surface-disturbing activities beyond what is required in standard terms and conditions at developed recreational sites:

Alternatives B and C:

All ERMAs and SRMAs, except the Ignacio Chavez RMZ in the Boca del Oso ERMA, the Continental Divide National Scenic Trail SRMA, and the Torreon Fossil Fauna East and West RMZ in the San Juan Basin Badlands ERMA

Alternative D:

All ERMAs and SRMAs

~~Alternative E~~
~~All ERMAs and SRMAs, except the Continental Divide National Scenic Trail Corridor~~

These restrictions may include, but are not limited to, designing developments in such a way that developed or designated recreational sites are not impacted directly or indirectly.

4.2.12.2 Cumulative Impacts

The Placitas Master Plan, proposed by the City of Albuquerque Open Space Division, could have a cumulative impact on recreation and visitor services within the Planning Area. The proposed project area for the Placitas Master Plan is 640 acres. The RPFO manages land near the community of Placitas and would likely see an increase in recreational activity within the Planning Area as a result of improved recreation infrastructure on City of Albuquerque open space lands.

Wildfire suppression would temporarily affect recreation use in or adjacent to areas where prescribed fire or other vegetation treatments are being conducted. The long-term cumulative effects would reduce fire risks to recreation areas and facilities within the Planning Area and on lands under other administrative agencies. Prescribed burning would temporarily degrade air quality (and scenic quality), but with the reduced risks of wildfire, there would be a cumulative decrease in smoke emissions.

The Northwest Loop Road could both beneficially and adversely impact recreation and visitor services within the Planning Area. The road would provide a faster connection from Interstate 40 to many of the popular recreational areas within the Decision Area, such as the San Ysidro Trials Area and the White Mesa Bike

Trails. The improved access could lead to increased recreational use of these areas. Increased visitation could lead to degradation of recreational resources, such as trail impairment and vegetation trampling. Increased visitation could also lead to additional SRP requests and increased recreation-based revenue for the RPFO.

The RPFO has reviewed the travel management plans for the neighboring Santa Fe and Cibola National Forests. The cumulative impacts of travel management decisions in these plans, as well as other jurisdictions, would have beneficial cumulative effects on recreational and visitor services when travel management decisions by other agencies support the proposed travel management decisions in this RMP/EIS, especially for shared roads. For example, if the Forest Service shares management of a road with the RPFO, and the travel management decisions for how to manage the road are the same (i.e., agencies manage a road as limited to existing), this would lead to beneficial impacts on recreation. In this case, recreation user groups would have consistent access to public lands. The Santa Fe National Forest ~~would~~ opened 186 miles of road that ~~is currently~~ was previously not open, ~~would~~ closed 2,469 miles of road to motorized use, and ~~would~~ added 23 miles of new routes. The Mt. Taylor Ranger District, within the Cibola National Forest, ~~would~~ opened 97~~98~~ miles of road that were previously~~are currently~~ closed or unauthorized and ~~would~~ closed 312~~465~~ miles of roads to public ~~motorized~~ use.

The cumulative effect on recreation resources would be enhanced in the long term by managing existing and proposed SRMAs and ERMAs in the Decision Area and in adjacent BLM field offices. The cumulative effect of managing the Decision Area to respond to the expected increase in visitation, changes in recreational demand, and the wide range of recreational activities would have beneficial effects on recreation.

4.2.13 Renewable Energy

The following analysis generally discusses likely reductions in land area available for wind and solar renewable energy[3] as a result of land use allocations. The future development and use of solar and wind resources in the Decision Area would be driven primarily by the cost-benefit ratio of development. Where development potential is economically viable, impacts on development on public lands are largely related to areas identified for avoidance and exclusion from renewable energy developments. Exclusion areas directly remove acreage available for development while avoidance areas may result in the loss of acreage if the development cannot be economically moved to an alternative location or otherwise accommodated. Additionally, the high potential areas from the Western Governors' Association were used to evaluate the avoidance and exclusion areas and the resultant management decisions.

4.2.13.1 Direct and Indirect Impacts

4.2.13.1.1 Renewable Energy Management Decisions

Chapter 2 provides a detailed list of exclusion and avoidance areas for wind and solar renewable energy developments in the Decision Area. Direct impacts on renewable energy include management actions permitting or prohibiting renewable energy development. Market demand would drive the development of renewable energy sources on Decision Area lands. Indirect beneficial impacts on renewable energy sources include management actions encouraging or facilitating renewable energy development. Indirect adverse impacts include management actions constraining renewable energy development. Resource management actions, other than those associated with the renewable energy program, that could affect renewable energy include vegetative resources, visual resources, cultural resources, special status species, wildlife and fisheries,

[3] The Renewable Energy section of the Draft EIS included geothermal resources. Geothermal resources are discussed under the Fluid Leasable Minerals section of the Final EIS for clarification purposes. Management allocations for geothermal resources in the Final EIS are the same as the Draft EIS. The Draft EIS analysis is unchanged.

and lands and realty. In general, managing these resources could constrain renewable energy development. Specifically, renewable energy development would be restricted to avoid habitat fragmentation.

Table 4-48 provides the number of acres in the Decision Area that would be avoided or excluded from consideration for solar energy projects by alternative. Solar energy developments, in particular, create a single use for a particular area; therefore, the BLM must consider the other possible uses of an area when considering a solar energy proposal. Readers should note that the quantities provided in **Table 4-48** should not be aggregated because many of the resource areas and special designations overlap.

Table 4-49 provides the number of acres in the Decision Area that would be avoided or excluded from consideration for wind energy projects by alternative. Readers should note that the quantities provided in **Table 4-49** should not be aggregated because many of the resource areas and special designations overlap.

2554 **Table 4-48: Exclusion or Avoidance Areas for Solar Energy Projects in the Decision Area, by Alternative**

Designation	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	~~Avoid~~	~~Exclude~~
100-year floodplains	0	0	0	20,000	1,000	19,000	2,000	18,000	~~0~~	~~19,000~~
ACECs	52,000	59,000	0	133,000	0	123,000	0	38,000	~~0~~	~~22,000~~
Cave/karst areas	12,000	49,000	0	179,000	0	179,000	123,000	49,000	~~15,000~~	~~29,000~~
Critical habitat for federally listed threatened and endangered species (designated and proposed)	0	0	None currently on BLM-administered lands							
Habitat for BLM sensitive plant and animal species (includes rare plants)	0	0	Data not available							
Habitat for federally listed/proposed threatened and endangered species for which critical habitat has not been designated	0	0	Data not available							
Habitat for federally listed candidate species	0	0	Data not available							
Habitat state listed as crucial/sensitive	0	0	0	0	0	0	0	0	~~0~~	~~0~~
Lands with wilderness characteristics managed to protect those characteristics	0	0	0	38,000	0	26,000	0	0*	~~0~~	~~0~~
National Scenic and Historic Trails	1,000	9,000	0	38,000	0	23,000	0	11,000	~~0~~	~~14,000~~
Soils, highly erodible (per sensitive soils definition)	15,700	26,100	14,900	134,600	32,700	116,700	96,700	50,600	~~12,100~~	~~35,900~~
TCPs**	0	0	37,400	0	37,400	0	37,400	0	~~0~~	~~37,400~~
VRM Class I	4,000	208,000	0	97,000	0	97,000	0	97,000	~~0~~	~~98,000~~
VRM Class II	76,000	6,000	0	304,000	0	68,000	3,000	16,000	~~5,000~~	~~12,000~~

Designation	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	~~Avoid~~	~~Exclude~~
Wetlands and riparian areas	0	0	0	1,400	0	1,400	0	1,400	~~0~~	~~1,400~~
Wilderness areas	0	0	0	11,000	0	11,000	0	11,000	~~0~~	~~11,000~~
WSAs	5,000	177,000	0	87,000	0	87,000	0	87,000	~~0~~	~~87,000~~

Source: BLM GIS 2020

* The Chamisa E lands with wilderness characteristics unit in Alternative D was changed from "protect" in the Draft EIS to "emphasize multiple use" in the Final EIS to correct a Draft EIS error. On-the-ground management and effects are the same as for Alternative A, so this change is within the range of alternatives considered in the Draft EIS. The Final EIS analysis was corrected.

** Mount Taylor is the only TCP quantified in this table due to data availability. Other TCPs are known to exist in the Decision Area, but data are not available for quantification at this time.

Table 4-49: Exclusion or Avoidance Areas for Wind Energy Projects in the Decision Area, by Alternative

Designation	Alternative A (No Action)		Alternative B		Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)		Alternative D		~~Alternative E (Proposed RMP)~~	
	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	Avoid	Exclude	~~Avoid~~	~~Exclude~~
100-year floodplains	2,000	3,000	0	20,000	9,000	11,000	10,000	10,000	~~10,000~~	~~10,000~~
ACECs	52,000	59,000	5,000	128,000	48,000	75,000	17,000	21,000	~~16,000~~	~~5,000~~
Cave/karst areas	5,000	20,000	0	179,000	112,000	67,000	128,000	51,000	~~21,000~~	~~23,000~~
Critical habitat for federally listed threatened and endangered species (designated and proposed)	0	0	None currently on BLM-administered lands							
Habitat for BLM sensitive plant and animal species (includes rare plants)	0	0	Data not available							
Habitat for federally listed/proposed threatened and endangered species for which critical habitat has not been designated	0	0	Data not available							
Habitat for federally listed candidate species	0	0	Data not available							
Habitat state listed as crucial/sensitive	0	0	Data not available							
Lands with wilderness characteristics managed to protect those characteristics	0	0	0	38,000	0	26,000	0	0*	~~4,000~~	~~0~~
National Scenic and Historic Trails	1,000	9,000	0	38,000	0	23,000	0	11,000	~~0~~	~~14,000~~
Soils, highly erodible (per sensitive soils definition)	15,700	26,100~~0~~	16,100	133,400	100,600	48,900	104,500	42,900	~~21,200~~	~~26,800~~
TCPs**	0	0	37,400	0	37,400	0	37,400	0	~~37,400~~	~~0~~
VRM Class I	4,000	208,000	0	97,000	0	97,000	0	97,000	~~0~~	~~98,000~~
VRM Class II	76,000	6,000	0	304,000	34,000	35,000	14,000	5,000	~~16,000~~	~~0~~
Wetlands and riparian areas	0	0	0	1,400	0	1,400	0	1,400	~~0~~	~~1,400~~
Wilderness areas	0	32,000	0	11,000	0	11,000	0	11,000	~~0~~	~~11,000~~
WSAs	0	87,000	0	87,000	0	87,000	0	87,000	~~0~~	~~87,000~~

Source: BLM GIS 2020

* The Chamisa E lands with wilderness characteristics unit in Alternative D was changed from "protect" in the Draft EIS to "emphasize multiple use" in the Final EIS to correct a Draft EIS error. On-the-ground management and effects are the same as for Alternative A, so this change is within the range of alternatives considered in the Draft EIS. The Final EIS analysis was corrected.

** Mount Taylor is the only TCP quantified in this table due to data availability. Other TCPs are known to exist in the Decision Area, but data are not available for quantification at this time.

4.2.13.2 Cumulative Impacts

The designation of wind and solar renewable energy development avoidance and exclusion areas on BLM-administered lands, along with similar restrictions on renewable energy development on adjacent lands, particularly National Forest lands, would have a cumulative impact of reducing the potential for renewable energy development within New Mexico. The 5,000-acre Red Mesa Wind Farm project would increase the amount of renewable energy projects within the Planning Area. A renewable energy transmission corridor within the Planning Area, if proposed by RETA, could also increase the demand for land to develop renewable energy projects due to the proximity of potential corridor(s).

4.2.14 Riparian Resources

An impact on riparian and wetland areas impacts the physical, chemical, or biological components of the ecosystem. Actions that contribute to the decline in abundance, distribution, or functionality of riparian and wetland communities are considered adverse impacts. Conversely, beneficial impacts on riparian and wetland communities are activities that protect or restore these habitat types in the Decision Area. Direct impacts on riparian and wetland communities result from disturbing vegetation or ground surface occurring in these communities. Indirect impacts on riparian and wetland communities result from actions within a watershed that cause a change in riparian and wetland functionality (e.g., increased rates of sediment loading or changes in hydrology), a change in water chemistry, and spread of noxious and invasive species.

Within the Planning Area, riparian areas are typically associated with perennial, intermittent, and ephemeral streams, as well as isolated springs and other water sources. Management decisions with the potential to impact riparian resource health, the functioning condition of streams, water resources necessary to riparian zone establishment and survival, or the physical environment on which riparian vegetation depends (e.g., stream stability) were the decisions evaluated in this analysis. Fire management, forests and woodlands, lands and realty, livestock grazing, mineral resources, recreation and visitor services, renewable energy, riparian resources, soil and water, lands with wilderness characteristics, travel management, special designations, special status species, and wildlife management decisions are expected to impact riparian resources in the Decision Area.

4.2.14.1 Analysis Assumptions

Estimates of projected surface disturbances are used as the primary metric for determining the relative level of potential indirect impact on riparian and wetland areas. The methods and assumptions used in this impact analysis include the following:

- Surface disturbances generally increase surface runoff to streams due to an increase in impervious surface, changes in water routing, and loss of vegetation.
- Surface disturbance, transportation networks, ungulate use, and recreation increase the likelihood of noxious/invasive species introduction and spread in an area.
- The greater the amount of surface disturbance in a watershed, the greater the probability that excess surface runoff and sediment will enter the stream and contribute to the loss of riparian and wetland functionality.
- Placing salt and mineral supplements outside of riparian and wetland communities is one tool that can reduce wildlife and livestock use of riparian and wetland areas.
- Surface runoff to streams generally increases as livestock stocking rates increase. This is not a linear relationship. For example, low stocking rates typically have no measurable impact on surface runoff, moderate stocking rates typically have a negligible impact on surface runoff, high stocking rates have a measurable impact on surface runoff, and consecutive years of high stocking rates have the highest potential for increasing surface runoff to streams.
- Livestock and wildlife use is typically disproportionately higher in riparian and wetland communities than in upland communities. Improper grazing can adversely impact these communities throughout

the year, but generally has greater impacts in the spring and early summer, when soils are wet and, therefore, more vulnerable to compaction, and streambanks are more vulnerable to sloughing. Livestock, especially cattle, tend to congregate in these communities during the hot season (mid- to late summer). While stocking rates for an allotment or pasture may be low to moderate, the utilization levels in riparian and wetland areas can be high.

- Livestock stocking rates in grazing allotments generally remain unchanged.
- Wildlife can adversely impact riparian and wetland areas, depending on how many, what type, and when the use occurs.
- Riparian and wetland areas possess the ability to recharge and rebound faster than other vegetative areas in the Decision Area.

4.2.14.2 Direct and Indirect Impacts

4.2.14.2.1 Fire Management Decisions

Direction and guidance approved by the decisions for the comprehensive Fire and Fuels Plan Amendment (BLM 2004c), the Updated Guidance for Implementation of Federal Wildland Fire Management Policy (BLM 2017), and the most recent RPFO Fire Management Plan (currently BLM 2011) have been incorporated into this RMP/EIS, which provides fire management direction common to all alternatives. This direction mandates the maintenance of existing healthy ecosystems and the protection of threatened, endangered, and special status species. Adherence to this direction would have beneficial impacts on riparian resources because it promotes the protection and restoration of healthy ecosystems; it emphasizes hazardous fuels reduction treatments to restore ecosystems and prevent the occurrence of catastrophic wildfires that have the potential to disrupt whole ecosystems.

Fuels management actions include fuels reduction treatments on up to 32,000 acres annually, of which 3,600 acres of treatment would occur within riparian and wetland areas (**Table 4-50**). These actions include mechanical and manual treatments, prescribed fire, chemical or biological vegetation control, and aerial and ground seeding. Fuels treatments may take place in riparian areas that have noxious and invasive species present and are functioning at-risk, in properly functioning condition, constitute suitable potential or actual southwestern willow flycatcher habitat, or constitute valuable breeding bird or other wildlife community habitat. The fuels treatments within riparian areas would likely have short-term adverse impacts (defined as impacts seen within 5 years of treatment) on riparian areas because treated areas would be more susceptible to soil erosion and introduction of nonnative species. However, the BLM would mitigate adverse impacts from these fuels treatments since the goal of the treatments would be to restore the native plant communities within riparian areas. Such mitigation could include timing of treatment to avoid sensitive periods, reseeding or replanting of riparian vegetation, and application of erosion control techniques such as turf reinforcement matting to encourage reestablishment of native vegetation, among other measures.

Many risks to riparian ecosystem function can be associated with mechanical, chemical, prescribed burn, and biological treatments. It is for this reason that prescriptions for these treatments in riparian areas should be developed using monitoring data specific to the treatment area as well as guidance from current peer-reviewed scientific literature. Risks associated with using biological control methods should be identified and analyzed carefully at the implementation level, and adequate conclusive scientific research should exist to support any biological control agent used for treatment of noxious and invasive weeds. Risks can include treatment of nontarget species and the possibility of the control agent moving to areas where treatment is not desired. If such risks are not accounted for at the implementation level, adverse impacts on species that depend on riparian habitats could include habitat loss and fragmentation. If risks are mitigated, such projects are expected to have beneficial impacts on riparian resources.

Table 4-50: Proposed Fuels Treatments (Acres) in Riparian and Wetland Areas, All Alternatives

Vegetation/Habitat Type	Proposed Fuels Treatments (acres)
Riparian/Wetland	3,600
Total (all vegetation/habitat types)	607,500

Source: BLM GIS 2020

Fire management decisions would have long-term beneficial impacts on riparian areas through restoration of native plant communities, reduction of nonnative species, and possible improvement in the local hydrology within the riparian areas. Beneficial impacts on riparian ecosystems are expected with the assumption that fire management actions, such as vegetation treatments, will be planned and carried out in accordance with riparian resource objectives as well as other associated objectives, such as special status species and wildlife management.

4.2.14.2.2 Forests and Woodlands Decisions

Under all alternatives, forest and woodland harvest activities would be prohibited in riparian areas, except where forest restoration would benefit riparian areas through activities such as removal of nonnative and invasive species (e.g., saltcedar or Russian olive eradication). In these cases, forest and woodland management decisions could have a beneficial impact on riparian areas. On certain occasions, the possibility exists for allowing forestry practices to be conducted for religious ceremonial purposes by tribal people. Harvesting of willows or cottonwoods could have an adverse impact on riparian areas because they stabilize soil and play an important role in dissipating flows and retaining water in riparian systems. Such impacts could be minimized and/or avoided by applying a prescription that specifies location and timing of the action.

4.2.14.2.3 Livestock Grazing Decisions

Livestock grazing management decisions would have both beneficial and adverse impacts on riparian resources. There are grazing allotments on approximately 87 percent of the Decision Area. The RPFO would remove grazing from riparian areas and 172 AUMs under Alternative B. Under Alternatives C and~~,~~ D~~, and E~~, grazing would be available within those riparian areas identified in the Riparian and Aquatic Habitat Management in the Albuquerque Field Office EIS BLM 2000, which is consistent with the New Mexico Standards and Guidelines (BLM 2001b).

Livestock grazing within riparian areas could have beneficial impacts on riparian areas, such as stimulation of vegetation growth, removal of standing dead vegetation, and seed distribution. These impacts could improve the condition of vegetation within riparian areas.

Livestock grazing within riparian areas could also produce adverse impacts on riparian resources. These adverse impacts could include decreased growth or loss of riparian vegetation and possible loss or degradation of riparian soils, water quality, streambed and bank structures, and habitat quality.

Unless otherwise stated in the EIS for Riparian and Aquatic Habitat Management in the Albuquerque Field Office (BLM 2000), livestock grazing would be unavailable in exclosures constructed within riparian areas using HSP funds.

4.2.14.2.4 Mineral Resources Decisions

Under Alternatives B and C, a stipulation is proposed for protection of riparian resources. Under Alternative B, fluid leasable mineral activities would be prohibited (NSO) within 200 meters (656 feet) of the channels of ephemeral, intermittent, and perennial streams, or within 200 meters (656 feet) of the outer margins of riparian and wetland areas. Under Alternative C, fluid leasable mineral activities would be subject to CSU

restrictions within 200 meters (656 feet) of the channels of ephemeral, intermittent, and perennial streams, or within 200 meters (656 feet) of the outer margins of riparian and wetland areas.

No stipulations are proposed for riparian resources under Alternatives A and, D~~, and E~~; therefore, mineral resources management decisions would impact riparian resources within the Decision Area under Alternatives A and, D~~, and E~~ more than under Alternatives B and C. Impacts would result from selection of Alternatives A or, D~~, or E~~ because there would be no stipulation in place to protect riparian areas from mineral development, which causes surface disturbance and therefore habitat loss and/or fragmentation. Beneficial impacts would result from Alternatives B and C because NSO and CSU restriction stipulations would protect riparian areas from being developed, and therefore prevent loss of riparian area vegetation.

4.2.14.2.5 Recreation and Visitor Services Decisions

Under all alternatives, dispersed camping would be prohibited within 46 meters (150 feet) of riparian areas. Designated campgrounds established in proximity to riparian areas would be designed or placed to ensure adequate spatial and visual restrictions that would allow sensitive wildlife to exist undisturbed. These decisions would have a beneficial impact on riparian resources because they would reduce the amount of vegetation disturbance and lessen the chance that campfires may harm or destroy riparian habitats. Under all alternatives, the RPFO would provide public information concerning the prevention of the spread of invasive and exotic weeds, as well as wildlife species and their habitat in riparian areas. This decision is expected to have a beneficial impact on riparian resources because it would generate greater public awareness about the sensitivity of riparian ecosystems and therefore a greater respect and sense of protection and preservation of the resource.

Under Alternatives C and, D~~, and E~~, new trails would be considered for the Endurance Trails SRMA Motorcycle Race. This decision would have no impacts on riparian habitat because newly proposed trails would avoid riparian areas. Under Alternative B, no new trails would be considered. Because of mitigation in place, Alternative B would have the same impacts as Alternatives C and, D~~, and E~~.

Under Alternative C, the San Ysidro Trials Area SRMA would be authorized for use of practice and events by the New Mexico Trials Association on authorized trails. This activity involves motorcycle use in an area where tinajas (natural stone water basins) exist and harbor riparian vegetation. This activity causes surface disturbance, but trials bikes are not ridden through riparian areas, and would not cause disturbance and destruction of riparian and aquatic habitat. Monitoring results have shown that unauthorized users of this area travel on designated trails, but also create new trails, which causes additional surface disturbance and no protection for riparian resources.

4.2.14.2.6 Renewable Energy Decisions

Renewable energy management decisions would beneficially impact riparian areas. Active floodplains and 100-year floodplains are identified as exclusion or avoidance areas for wind and solar projects under Alternatives B, C, and D~~, and E~~, whereas these areas are open to wind and solar projects under Alternative A. Wetlands and riparian areas are identified as exclusion areas for wind and solar projects under Alternatives B, C, and D, whereas these areas would be open under Alternative~~s~~ A ~~and E~~. There are 600 acres of riparian habitat in high potential renewable energy areas. In addition, Alternatives B and C also include a proposed surface disturbance restriction for riparian areas. Under Alternative B, surface-disturbing activities would be prohibited within 200 meters (656 feet) of the channels of ephemeral, intermittent, and perennial streams, or within 200 meters (656 feet) of the outer margins of riparian and wetland areas. Under Alternative C, surface-disturbing activities would be subject to restrictions within 200 meters (656 feet) of the channels of ephemeral, intermittent, and perennial streams, or within 200 meters (656 feet) of the outer margins of riparian and wetland areas.

These definitions may provide additional protection from surface disturbance in addition to the active floodplain and 100-year floodplain areas, depending on the characteristics of the riparian area. No surface disturbance restrictions are proposed for general riparian resources or floodplains under Alternatives A ~~or E~~; therefore, there would be no additional protection from renewable energy development for riparian areas under Alternatives A ~~and E~~. Wind and solar energy development all result in surface disturbance and the removal and loss of vegetation. The decisions to exclude wind and solar energy development in wetlands and riparian areas under all alternatives would have a beneficial impact on riparian resources because it would prevent adverse impacts from those types of actions and provide protection for riparian resources.

4.2.14.2.7 Riparian Resources Decisions

Riparian resources management decisions would have adverse and beneficial impacts on riparian resources in the Decision Area. Riparian decisions that are common to all alternatives would have beneficial impacts on riparian resources because they emphasize the following protections for riparian habitat:

- Manage for the protection and enhancement of southwestern willow flycatcher habitat, according to the Southwestern Willow Flycatcher Recovery Plan and current scientific literature on the subject.
- Implement actions to restore riparian areas to PFC or maintain them at PFC, or to achieve advanced ecological status.
- Address riparian habitat values for all surface- and vegetation-disturbing activities proposed in riparian and wetland areas, and apply mitigation to reduce impacts on floodplains and riparian areas, where impacts are expected.

Under Alternatives B and C, a surface disturbance restriction is proposed for protection of riparian resources. These restrictions are similar, but not the same as, the stipulations discussed under the Mineral Resources section (**Section 4.2.10.2.7**). Under Alternative B, surface-disturbing activities would be prohibited within 200 meters (656 feet) of the channels of ephemeral, intermittent, and perennial streams, or within 200 meters (656 feet) of the outer margins of riparian and wetland areas. Under Alternative C, surface-disturbing activities would be subject to restrictions within 200 meters (656 feet) of the channels of ephemeral, intermittent, and perennial streams, or within 200 meters (656 feet) of the outer margins of riparian and wetland areas. No surface disturbance restrictions are proposed for riparian resources under Alternatives A or, D~~, or E~~; therefore, there would be an adverse impact on riparian resources under these alternatives.

Alternatives B and C would have beneficial impacts on riparian resources because they would protect them from surface disturbance and removal of riparian vegetation as a result of multiple-use project implementation. Alternative B would have the most beneficial impact because it would prohibit surface disturbance in riparian areas altogether.

4.2.14.2.8 Special Status Species Decisions

Under all alternatives, no management action would be permitted on public lands that would jeopardize the continued existence of plant or animal species that are listed, officially proposed, or candidates for listing as threatened and endangered. The BLM would commit to current and future conservation agreements, management plans, and recovery plans specific to threatened and endangered species and BLM sensitive species, as described in the **Section 2.2.17**, Special Status Species. Specifically, the BLM would prioritize maintenance and improvement of riparian and wetland areas in protection of both special status species and migratory birds (which are discussed in the special status species section); minimize the spread of invasive, nonnative plants such as cheatgrass, saltcedar, and Russian olive; and strive for a dense understory of native species in riparian areas with improvement of cottonwood and willow regeneration.

Implementation of these decisions would have beneficial impacts on riparian resources. Additionally, the most prevalent threatened and endangered species in the RPFO is the southwestern willow flycatcher, a riparian-obligate species that is dependent on riparian ecosystems for almost its entire life cycle. A decision common to all alternatives is to implement the Southwestern Willow Flycatcher Recovery plan, which includes increasing and improving occupied, suitable, and potential breeding habitat for the species. Additionally, management for other special status species (such as the yellow-billed cuckoo) and migratory birds that utilize or depend on riparian habitats would have beneficial impacts on riparian resources because they would impose added protections for the habitats that support those species.

4.2.14.2.9 Soil and Water Decisions

Under all alternatives, soils and water management decisions would comply with New Mexico Standards and Guidelines (BLM 2001b). In addition, all floodplains and riparian areas and wetlands would be managed in accordance with Executive Orders 11988 and 11990, which would protect the quality of stream water and federally listed species habitat. Uses in the Decision Area would be managed to minimize and mitigate damage to soils, and activities located in areas with sensitive soils would be subject to site-specific NEPA analysis. These restrictions would decrease the number of acres in the Decision Area subject to the adverse impacts of surface-disturbing activities on riparian resources, including surface water contamination and sedimentation by runoff from disturbed soils, and would therefore constitute beneficial impacts.

Under Alternatives B and C, the RPFO would prohibit surface-disturbing activities within 200 meters (656 feet) of riparian areas and springs. Oil and gas leasing stipulations would implement CSU for 15 percent to 30 percent slopes and CSU for low reclamation soils. Alternatives B, C, and D~~, and E~~ would implement NSO for slopes over 30 percent. These actions would help to mitigate the adverse impacts of surface-disturbing activities on riparian resources. These management decisions would also help mitigate adverse impacts on fish and other aquatic species' habitat from increased overland flow associated with upland soil disturbance.

No surface disturbance restrictions are proposed for riparian resources under Alternative A, and no additional surface disturbance restrictions are proposed under Alternative~~s~~ D~~ and E~~; therefore, riparian resources within the Decision Area would be adversely impacted under Alternatives A and~~,~~ D~~, and E~~, more than under Alternatives B and C.

4.2.14.2.10 Special Designations Decisions

Riparian areas would receive indirect beneficial impacts from proposed special designations because surface restrictions would be implemented within the special designations. Two ACECs are proposed in the RMP/EIS that would protect riparian values in the Decision Area. Under all alternatives, the Bluewater Canyon ACEC and Espinazo Ridge ACEC would be designated to protect the riparian values in the areas. The size of these ACECs would be largest under Alternatives B and C and the smallest under Alternative D~~E~~. **Table 4-11** shows the proposed special designations in the Decision Area.

4.2.14.2.11 Lands with Wilderness Characteristics Decisions

In general, managing lands to protect their wilderness characteristics limits surface-disturbing activities, which would benefit riparian resources by reducing direct disturbance of riparian habitat. In terms of direct impacts of lands with wilderness characteristics decisions on riparian resources, Alternative B would have the most beneficial impact. Under Alternative B, 243 acres of riparian areas would be subject to the surface restrictions applied to lands with wilderness characteristics, including closures to vehicles and livestock grazing. Under Alternative C, 235 acres of riparian areas would be subject to surface restrictions, including limits on new rights-of-way.

In terms of indirect impacts, Alternative B would also produce a larger beneficial impact on riparian resources than Alternative C because 11,370 more acres of land would be managed to protect wilderness

characteristics. In addition, Alternative B includes more limitations on activities within lands with wilderness characteristics, such as prohibiting new rights-of-way and closing to livestock grazing. In contrast, 4,070 acres of lands with wilderness characteristics would be open to livestock grazing and new rights-of-way under Alternative C. Precluding surface-disturbing activities would prevent impacts and habitat disruption that could result from surface-disturbing activities in and adjacent to riparian areas. Limitations on travel and new rights-of-way would beneficially reduce disturbances associated with stream crossings and off-road travel, resulting in no damage to, or removal of, riparian vegetation.

Table 4-51 shows the acres of riparian areas located within lands proposed for protection or partial protection of wilderness characteristics. Alternatives A and, D~~, and E~~ would be the least protective of riparian resources since they would not manage the Decision Area to protect wilderness characteristics. Alternative B would be the most protective since 243 acres of riparian areas would be managed to protect wilderness characteristics, and it would be the most restrictive for surface-disturbing activities. Alternative C would manage 235 acres to partially protect wilderness characteristics, but it would allow for surface-disturbing activities on a case-by-case basis.

Riparian habitat is not present in Volcano Hill or Cimarron Mesa; therefore, there will be no impacts on riparian areas through designation of these areas to lands with wilderness characteristics, regardless of the alternative.

Table 4-51: Riparian Areas (Acres) Located within Lands Proposed for Management for Wilderness Characteristics

Lands with Wilderness Characteristics Management Category	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D*	~~Alternative E (Proposed RMP)~~
Riparian acres in lands with wilderness characteristics managed to protect wilderness characteristics	0	243	235	0	~~0~~
Riparian acres in lands with wilderness characteristics where wilderness characteristics would not be protected	0	0	8	243	~~243~~
Total	**0**	**243**	**243**	**243**	~~243~~

Source: BLM GIS 2020

* The Chamisa E lands with wilderness characteristics unit in Alternative D was changed from "protect" in the Draft EIS to "emphasize multiple use" in the Final EIS to correct a Draft EIS error. On-the-ground management and effects are the same as for Alternative A, so this change is within the range of alternatives considered in the Draft EIS. The Final EIS analysis was corrected.

4.2.14.2.12 Travel Management Decisions

Travel management decisions would have a beneficial impact on riparian resources because, under all alternatives, riparian areas would be closed to motorized travel. It is possible that certain existing roads within the field office have a significant impact on watershed stability. The decision to investigate road closures and establish criteria for closing roads based on erosion concerns would have a beneficial impact on riparian resources if it resulted in the closure and rehabilitation of roads that increase runoff and/or exacerbate erosion and sedimentation. Under Alternatives A, B, and C, BLM Road 1103 would be seasonally closed to motorized travel between July 1 and September 15, and from November 30 to April 15. Under

Alternative C, it would only be closed between November 30 and April 15. Under Alternatives D and E, it would not be seasonally closed. Wetland areas exist in the IC Grant area (the area BLM Road 1103 goes through), and Alternative B would provide the most protection from possible off-highway vehicle use during the wet times of the year, and it would prevent degradation of BLM Road 1103 by vehicular travel.

4.2.14.2.13 Vegetative Communities Decisions

The vegetative communities goals and decisions common to all alternatives emphasize actions that would benefit riparian resources, such as restoring and maintaining vegetative communities to desired states; managing vegetation for ecological diversity, stability, sustainability, and riparian function; controlling noxious and invasive plant species; maintaining, protecting, and enhancing special status species plant and animal habitats; not allowing livestock grazing in riparian areas; and following the EIS for Riparian and Aquatic Habitat Management in the Albuquerque Field Office (BLM 2000). These decisions would have long-term beneficial impacts on riparian resources because they promote protection, preservation, restoration, and enhancement of riparian plant communities, and improve ecological health of riparian ecosystems. Prescribed fire and other vegetation treatments would likely result in the temporary loss of habitat, but would have long-term beneficial impacts.

Under Alternative B, the BLM would not implement vegetation treatments. Under Alternative C, the BLM would implement vegetation treatments in areas not meeting the New Mexico Standards and Guidelines. Under Alternative D, the BLM would implement vegetation treatments that would increase harvest of all vegetative products. ~~Under Alternative E, the BLM would implement vegetation treatments as needed to meet management objectives.~~

The effects of implementing Alternative B would be both beneficial and adverse. Beneficial impacts would occur because vegetation treatments often are accompanied by the risk of introducing noxious and invasive species, the risk of not meeting the desired outcome, and the risk of overharvesting/over-treating an important ecosystem that could result in further deterioration of an already-degraded system. On the other hand, impacts of vegetation treatments have the potential to greatly benefit ecosystem health and speed recovery processes that otherwise might take longer to occur naturally. Faster recovery times would be the beneficial impacts of implementing Alternative C. The adverse impacts of Alternative C would include the realization of the aforementioned risks associated with vegetation treatments. However, with mitigation to lessen the chance of those risks occurring, adverse impacts can be lessened or avoided altogether. Alternatives D ~~and E~~ would result in the highest adverse impacts on riparian resources because ~~they~~ it would maximize vegetative product extraction in rare and sensitive ecosystems.

4.2.14.2.14 Wildlife and Fisheries Decisions

Wildlife and fisheries management decisions are expected to have beneficial impacts on riparian resources when projects are proposed to protect wildlife that utilizes riparian habitats. Riparian and wetland habitat on BLM-administered lands within the Decision Area provides habitat for game species, mammalian predators, small mammals, birds, wetland game birds, amphibians, fish, and reptiles. Management decisions proposed to enhance habitat for these wildlife species would beneficially impact riparian resources. It is a goal of the wildlife and fisheries program to manage for the biological integrity of terrestrial, riparian, and aquatic ecosystems with emphasis on ecosystem health and species biodiversity, and to manage crucial, high-value habitats as management priorities. These areas include riparian ecosystems.

Common goals of the riparian and wildlife and fisheries programs would benefit riparian resources because implementation of actions aimed at meeting those goals would be highly supported by this RMP. The decision common to all alternatives to prevent excessive use and degradation of riparian areas from livestock grazing using behavioral management, wildlife-friendly fencing, and/or upland water developments would beneficially impact riparian resources because overgrazing would be prevented. (This conclusion was determined with

the assumption that these and other livestock grazing management techniques are applied in the best interest of riparian ecosystem health, function, and biodiversity.)

Under Alternatives B, C, and D~~, and E~~, a general project disturbance mitigation measure would prohibit surface disturbance within up to 200 meters (656 feet) of existing or planned wildlife habitat improvement projects with the exception of large-scale vegetation manipulation projects. This decision would have beneficial impacts on riparian resources in areas where riparian projects have been conducted. These impacts are expected under the assumption that the objectives of any large-scale vegetation manipulation projects are consistent with the objectives of the existing or planned wildlife habitat improvement projects.

4.2.14.2.15 Lands and Realty Decisions

Lands and realty decisions would have both positive and negative impacts on riparian resources. Areas that are recommended for disposal would have a negative impact on riparian resources if the parcels contained riparian habitat and the future use of the parcel was uncertain. That is, if the parcel were developed in such a way that disturbed riparian habitat, the disposal would have an adverse impact. Conversely, areas recommended for acquisition that contain riparian habitat would create beneficial impacts through the consolidation of riparian resources on public lands. This would result in higher manageability.

Under all alternatives, riparian areas are designated as avoidance areas for rights-of-way, which would have a beneficial impact. This management decision allows the BLM to recommend relocation of new rights-of-way that could adversely impact riparian habitat. Adverse impacts on riparian habitat would only occur if no alternate location could be identified that avoids riparian areas.

4.2.14.3 Cumulative Impacts

Reasonably foreseeable future actions that would impact riparian areas include continuation of nonnative species treatment projects within the Planning Area. Multiple programs within New Mexico encourage the restoration of riparian areas and the removal of nonnative species, such as saltcedar and Russian olive, within riparian corridors. As both private and public land managers within the Planning Area implement nonnative species removal, the riparian areas within the Planning Area would benefit from improved ecosystem health and potentially increased stream flow. This assumes that removal of invasive species is followed up with measures to encourage reestablishment or reintroduction of native riparian plant species and discourage reestablishment of noxious and invasive species.

4.2.15 Social and Economic Conditions

This section presents an analysis of social and economic impacts of the management alternatives proposed in the RMP/EIS. This document discusses employment, labor income, and effects on sectors in the impact area economy that encompass the RPFO. Impacts on revenues received by states and counties, environmental justice, and communities within the Planning Area are also presented. Finally, the alternatives are discussed in light of forecasts for the area over the 20-year period of analysis.

The economic analysis focuses on changes in labor income and employment that would occur in the regional economy as a result of BLM planning actions. Estimated changes to the outputs from BLM resource programs, by alternative, are displayed in **Table 4-52**. The social analysis focuses on the interests and concerns of identified communities relative to the alternatives. Higher employment, subject to some qualifications, can be seen as a benefit to the local community. Other benefits are also present, although some are not easily measured or tied to economic activity. Examples of where effects are difficult to quantify are equity effects, impacts on social values, and nonmarket values. Regardless, these benefits are discussed despite the inability to measure them quantitatively.

Table 4-52: BLM Outputs, by Alternative

Output	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
General recreation (visits)[1]	531,775	531,775	531,775	531,775	~~531,775~~
Cattle (available AUMs)[2]	115,449	20,422	114,929	114,929	~~114,929~~
Forest product areas (acres)	12,200	120,600	547,800	633,700	~~633,700~~
Natural gas (thousand cubic feet)[3]	126,100	126,100	126,100	126,100	~~126,100~~
Oil (barrels)[3]	275,450	275,450	275,450	275,450	~~275,450~~
Construction sand and gravel (short tons)[4]	11,000,000	11,000,000	11,000,000	11,000,000	~~11,000,000~~
Dimension stone (short tons)[4]	50,000	50,000	50,000	50,000	~~50,000~~
Humate (short tons)[4]	200,000	200,000	200,000	200,000	~~200,000~~
Drilling oil and gas wells – dry holes[3]	3	3	3	3	~~3~~
Drilling oil and gas wells – producers[3]	5	5	5	5	~~5~~
Acres identified for disposal	~~54,900~~55,900	57,000	~~117,300~~131,900	~~120,400~~131,900	~~229,500~~

[1] Recreation visits are expected to increase by 1.5 percent per year as a result of observed rates of increase in BLM recreation data based on the Recreation Management Information System database (BLM RMIS ~~2019~~2020). The level of visits used for modeling represents an average of annual visits over the 20-year planning period.
[2] AUMs estimated here do not include suspended use.
[3] Based on the RDF for oil and gas development (Crocker and Glover 2019)
[4] Based on BLM Minerals specialist professional judgment

4.2.15.1 Analysis Methods and Assumptions

The following analysis methods and assumptions were used to complete the analysis for the social and economic impacts from the proposed management decisions:

- The Planning Area population would continue to increase and age as described in **Chapter 3**.
- The socioeconomic Study Area includes the following counties: Bernalillo, McKinley, Cibola, Sandoval, Valencia, and Torrance.
- The social groups are defined to facilitate the discussion of social impacts. These discussions simplify what are often quite complex and unique values and attitudes, and the groupings presented here are by no means mutually exclusive. For example, many ranchers also participate in recreation. It is also worth noting that attitudes, interests, and values often change over time. The social analysis covers the groups and individuals that are most likely to be affected by this plan.
- Regional economic impacts are estimated based on the assumption of full implementation of each alternative. The actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities that would be supported by each alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the impact on the economy would be different than estimated here.
- Resource specialists projected annual resource outputs that are based on the best available information and professional judgment. The purpose of the economic analysis is to compare the relative impacts of the alternatives and should not be viewed as absolute economic values.
- Projected recreation visits are distributed among different types of visitors, based on the results of the Forest Service's National Visitor Use Monitoring (NVUM) surveys conducted for the Cibola National Forest.
- Spending associated with recreation trips used to assess the impacts of the alternatives is based on national estimates developed through the Forest Service's NVUM program (Stynes 2005; White 2017).
- Baseline recreation demand is assumed to increase by 1.5 percent per year based on the observed increase of 14 percent in recreation demand from fiscal year 2010 to fiscal year 2019 (BLM RMIS 2020~~2019~~).
- Non salary-related expenditures made by the RPFO are assumed to be allocated to different economic sectors based on data compiled for the Cibola National Forest.
- Range revenues received by the BLM and benefits of BLM forage were calculated using the conservative AUM price for 2019 of $1.35 per AUM and the 2019 statewide average AUM price for private land of $5.60.
- Total available AUMs used in analysis include active AUMs only and not those where current use is suspended.
- Potential economic impacts are assessed using the Forest Economic Analysis Spreadsheet Tool (FEAST) developed by the Forest Service Inventory and Monitoring Institute in Fort Collins, Colorado. This tool uses a Microsoft Excel workbook as an interface between user inputs and data generated using Impact Analysis for Planning (IMPLAN), an input-output modeling system software (IMPLAN 2016, FEAST 2019).
- The Aphelia analysis assesses the economic impacts of the resource outputs projected under each alternative. Resource outputs in this context are the amount of a resource (e.g., forest products, AUMs, and recreation visits) that would be available for use under each alternative. Average annual resource outputs were projected by resource specialists for each alternative for a 20-year planning period based on the best available information and professional judgment.
- Employment and labor income estimates developed for this analysis include direct, indirect, and induced economic effects. Direct employment would, for example, be generated in the grazing sector. Additional employment would be generated as the affected livestock operators purchase

services and materials as inputs ("indirect" effects) and ranchers spend their earnings within the local economy ("induced" effects). Direct, indirect, and induced effects are combined in the discussion of effects below.

- Theoretically, expenditures associated with changes in final demand would be available and specific enough to allocate to each of the 440 sectors contained in the IMPLAN model. In the absence of primary data, national-level production functions are used. Expenditures should be delineated between local and nonlocal providers, as purchases out of the economic study region would have no local economic impact. IMPLAN's data contain information, called regional purchase coefficients, which describe the proportion of a given commodity that would be provided by local producers. Previous modeling experience has shown that the data contained in the IMPLAN modeling system for the various sectors are an accurate representation of impacts.
- Biomass opportunities may exist, but are not analyzed given a lack of understanding of obstacles to implementation and impracticalities of projecting future scenarios for implementation.
- Economic contributions from ecological restoration treatments are not included because such contributions would be minimal under all alternatives.
- Nonmarket values, including natural amenities, nonuse values, ecosystem services, and aspects of well-being and quality of life, are assessed in qualitative terms, as appropriate.
- The social analysis assesses the potential effects of different management actions on potentially affected social groups. These groups were identified based on the results of public scoping and comments received during the planning process. This analysis addresses the potential impacts of the alternatives based on the issues and concerns raised by these groups. The analysis draws upon ongoing discussions between the BLM and potentially affected publics, as well as discussions with subject matter experts involved in other parts of the analysis. The analysis is primarily qualitative with potential impacts ranked by alternative. Quantitative measures, such as acres in protected areas and recreation visitation, are used as appropriate.
- The environmental justice analysis presented assesses the potential for the proposed alternatives to have disproportionately high and adverse human health or environmental effects on minority and low-income populations. The fair treatment and meaningful involvement of people of all races, cultures, and incomes in this planning process is also considered.

4.2.15.2 Economic Direct/Indirect Impacts

Estimates of the economic contributions to the regional economy supported by the alternatives were determined based on projected resource outputs from BLM management actions (**Table 4-53**), as well as associated county payments and direct BLM expenditures and employment. Total estimated average annual employment and labor income are summarized below in **Table 4-53** and **Table 4-54**, respectively. The projected outputs and activities are discussed by resource in the following sections.

As a result of limited variation in the estimated resource outputs and expenditures by alternative, estimated employment and income supported by BLM management would have minimal variation across alternatives. Changes in income and employment are driven primarily by variation in authorized grazing, as well as variation in the acres selected for potential disposal out of federal ownership. None of the alternatives would be expected to reduce economic diversity (the number of economic sectors) or increase economic dependency, which occurs when the local economy is dominated by a limited number of industries. Shifts in emphasis could occur, but these would not result as a consequence of planning actions in this RMP/EIS. While the alternatives have the potential to affect local businesses and individuals, the relative contribution of BLM-related activities to the local economy (see **Chapter 3**) and the relative differences between the alternatives would not be large enough to have any measurable effect on economic diversity or dependency. For example, the dependency of the local economy on the livestock industry, forest products, mining, and recreation would not be affected by BLM resource management under this RMP/EIS.

Under all the alternatives, all BLM-related contributions (e.g., jobs and labor income) would continue to support less than 1 percent of totals within the impact area economy, but could be more important for smaller communities within the Planning Area.

Table 4-53: Average Annual Employment Contribution (Number of Jobs), by Sector and Alternative

Sector (Job Area Total)	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Accommodation & Food Services (37,515)	63	62	62	62	~~62~~
Admin, Waste Management & Rem Serv (36,695)	16	16	16	16	~~16~~
Agriculture (4,104)	187	142	186	186	~~186~~
Arts, Entertainment, and Rec (10,078)	11	11	11	11	~~11~~
Construction (34,431)	4	4	4	4	~~4~~
Educational Services (9,442)	7	7	7	7	~~7~~
Finance & Insurance (20,085)	13	13	13	13	~~13~~
Government (100,073)	74	74	72	74	~~72~~
Health Care & Social Assistance (59,378)	42	42	42	42	~~42~~
Information (11,708)	3	3	3	3	~~3~~
Manufacturing (20,947)	2	2	2	2	~~2~~
Mining (1,230)	62	62	62	62	~~62~~
Management of Companies (3,225)	2	2	2	2	~~2~~
Other Services (22,286)	21	21	21	21	~~21~~
Prof, Scientific, & Tech Services (45,297)	22	22	22	22	~~22~~
Real Estate & Rental & Leasing (27,428)	13	13	13	13	~~13~~
Retail Trade (52,171)	34	34	34	34	~~34~~
Transportation & Warehousing (11,308)	8	8	8	8	~~8~~
Utilities (1,277)	1	1	1	1	~~1~~
Wholesale Trade (15,389)	10	10	10	10	~~10~~
Total (524,067)	596	548	592	596	~~591~~

Source: FEAST 2019; IMPLAN 2016
Note: Totals may not add up exactly due to rounding of partial job contributions to whole numbers.

Table 4-54: Average Annual Labor Income Contribution (thousands of 2019 dollars), by Sector & Alternative

Sector (Area Total)	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Accommodation & Food Services ($833,447)	$1,510	$1,503	$1,505	$1,511	~~$1,505~~
Admin, Waste Management & Rem Serv ($1,187,349)	$591	$577	$583	$592	~~$582~~
Agriculture ($146,312)	$1,493	$1,128	$1,485	$1,485	~~$1,485~~
Arts, Entertainment, and Rec ($147,362)	$160	$159	$160	$160	~~$160~~
Construction ($1,639,435)	$194	$191	$190	$195	~~$190~~
Educational Services ($272,114)	$228	$227	$227	$228	~~$227~~
Finance & Insurance ($996,604)	$801	$775	$793	$802	~~$792~~
Government ($6,906,100)	$4,180	$4,185	$4,053	$4,205	~~$4,047~~
Health Care & Social Assistance ($2,825,886)	$2,291	$2,272	$2,279	$2,292	~~$2,279~~
Information ($625,124)	$186	$184	$185	$187	~~$184~~
Manufacturing ($1,448,831)	$87	$80	$86	$87	~~$86~~
Mining ($83,903)	$2,204	$2,201	$2,203	$2,204	~~$2,203~~
Mgmt of Companies ($265,286)	$122	$118	$121	$122	~~$121~~
Other Services ($820,726)	$885	$871	$879	$886	~~$879~~
Prof, Scientific, & Tech Services ($3,105,828)	$1,237	$1,217	$1,229	$1,238	~~$1,229~~
Real Estate & Rental & Leasing ($327,722)	$336	$326	$334	$336	~~$334~~
Retail Trade ($1,692,934)	$1,154	$1,143	$1,145	$1,155	~~$1,145~~
Transportation & Warehousing ($602,919)	$617	$551	$614	$616	~~$614~~
Utilities ($124,516)	$112	$108	$111	$113	~~$111~~
Wholesale Trade ($935,120)	$741	$660	$736	$739	~~$736~~
Total ($24,987,517)	$19,131	$18,475	$18,919	$19,155	~~$18,910~~

Source: FEAST 2019; IMPLAN 2016
Note: Totals may not add up exactly due to rounding.

As a result of Alternative B, about 548 jobs and $18.5 million in labor income would be generated in the impact area economy on an average annual basis; 8 percent less employment and 3 percent less income than

contributed under no action. This reduction is related to fewer jobs and income in the agriculture industry as a result of reduced grazing (see **Table 4-53** and **Table 4-54**).

Under Alternatives C and, D, ~~and E~~, the estimated total number of jobs and labor income associated with BLM-administered land and resource management would range from 591 to 596 jobs and $18.9 to $19.2 million in labor income, similar to no action.

4.2.15.2.1 Recreation and Visitor Services Decisions

While a change in recreation use as a result of the alternatives is not expected, the role of recreation in the local economy would continue to increase as cultural and historical interpretation, OHV use, and other forms of recreation continue to increase. Observed changes in recreation visitation within the Planning Area indicate an increase of 14 percent recreation demand from fiscal year 2010 to fiscal year 2019 (BLM RMIS 2020). Recreation visits are estimated at 56,357 general visits for fiscal year 2019, with an average of 65,671 visits per year based on the projected growth rate from 2010-2019.

Under all the alternatives, recreation ~~management~~ would continue to sustain opportunities important to the area economy and well-being. However, recreation expenditures by local area residents do not represent new money introduced into the economy. If BLM-related opportunities were not present, it is likely that residents would participate in other locally based recreation, and this money would still be retained in the local economy. Therefore, local recreation visits are not considered in the modeling of economic effects under the alternatives, and the analysis is focused on nonlocal visitors only. In addition, economic contributions are estimated based on trip spending ~~by BLM nonlocal recreational visitors~~, and do not account for equipment or supplies purchased at the area of residence. Effects from nonlocal use under the alternatives would account for 55 jobs and $1.5 million in labor income on an average annual basis (see **Table 4-53** and **Table 4-54**, above). While estimated contributions represent a small fraction of total employment in the region, it is recognized that the value of recreation at the local community level, particularly for rural communities, may be underestimated here.

The economic value of experience held by recreation users within the Planning Area is an important factor to consider given that the value of recreation experiences could thus change under the alternatives. For example, cultural interpretation or motorized use in the Planning Area could change as management actions are implemented. While estimates of the value of these recreation experiences are not available given the lack of data regarding visitor use levels for these activities, a qualitative discussion of changes in the perceived quality of these recreation experiences is provided in the Recreation and Visitor Services section (**Section 4.2.12**) of this RMP/EIS.

Under all alternatives, it can be assumed recreation use would continue to increase by 1.5 percent per year based on the observed increase of 14 percent in recreation demand from fiscal year 2010 to fiscal year 2019 (BLM RMIS 2020).

4.2.15.2.2 Livestock Grazing Decisions

The Planning Area's relatively low level of dependency on BLM forage would continue under all the alternatives. While employment and labor income associated with grazing would remain low, BLM forage would continue to provide a low cost and important complement to some livestock producers' grazing, forage, and hay production. For smaller communities within the impact area, dependency on BLM forage might also be greater. In addition to potential changes in projected employment and income as a result of changes in BLM forage offered, the value of BLM forage to area operators should also be considered. This value can be estimated as the difference between the competitive market price of an AUM and the BLM lease fee. This value is experienced above the price ranchers pay for AUM leases and can be considered a benefit. Payments to counties under the Taylor Grazing Act would continue under all the alternatives and are discussed below.

Alternative A could authorize average annual grazing of approximately 89,617 AUMs (see **Table 4-52**) and would support approximately 198 jobs and $2.7 million in labor income (see **Table 4-53** and **Table 4-54**). These contributions are based on active AUMs only and not those where current use is suspended. Forage conditions impacted by factors such as drought, financial limitations on operators and market conditions, and implementation of grazing practices to improve range conditions can also impact the levels of actual use, corresponding with changes to the level of billed use and related economic contributions.

Alternative B would have a smaller maximum potential permitted use than Alternative A. Moreover, with voluntary relinquishment of permits, Alternative B could authorize less grazing and thus support fewer average annual AUM contributions compared with Alternative A (see **Table 4-52**). On an average annual basis, the potential active grazing use would support 149 jobs and $2.0 million in labor income within the impact area economy. As noted above, these employment and labor income impacts are contingent on market conditions, operator demand for BLM AUMs, and forage conditions.

Potential increases in other values as a result of grazing actions could occur under this alternative. For example, voluntarily relinquished allotments would then be available for other resource benefits, and a total of 18 Section 15 allotments with acreages less than 100 total acres would be unavailable for livestock grazing and would be devoted to a public purpose that precludes livestock grazing.

Alternative C would have a slightly lower level of permitted use than Alternative A (see **Table 4-52**). On an average annual basis, active AUMs would support 197 jobs and $5.1 million in labor income. These employment and labor income impacts depict an increase from what is currently contributed from grazing and are contingent on market conditions, operator demand for BLM AUMs, and forage conditions. BLM grazing-related jobs would continue to remain below 5 percent of overall agricultural employment and labor income for the area.

Potential increases in efficiency may accrue to individual operators under this alternative. The low cost of BLM forage relative to private forage also represents a value to permittees despite the relatively small employment and labor income impacts. Based on estimated values detailed in the assumptions section, costs savings due to use of public forage is approximately $486,000.

Employment and labor income impacts associated with Alternative~~s~~ D ~~and E~~ would be the same as those described above under Alternative C (see **Table 4-56** and **Table 4-57** in **Section 4.2.15.2.6**, below). With the potential benefit of low-cost BLM forage, costs for permittees would be below comparable public AUM costs as described above under Alternative C. Efficiency gains would be experienced on an individual basis or by the BLM as conflicts are reduced and grazing arrangements are made.

4.2.15.2.3 Forests and Woodlands Decisions

Under Alternative A, forest products would continue to be made available to communities in the Planning Area (see **Table 4-52**). Compared with the action alternatives, this alternative would continue to maintain the current accessibility of permit-issuing stations and forest product collection areas that communities are accustomed to; the potential for increased costs with increased travel time and increased use of substitute heat sources would be avoided. Consequently, the potential for disparate effects on minority and low-income populations would be avoided.

Alternative B would continue to provide forest product harvest areas to communities in the Planning Area (see **Table 4-52**). While the potential acreage of forest product harvest areas under this alternative is higher than under Alternative A, the distribution of those areas relative to communities could change as a result of designations that do not allow forest product removal. As a result, the potential for increased costs with increased travel time to permitting stations and collection areas could occur.

While some forest product users could experience increased costs associated with a greater distance required to travel for forest products, others would choose not to travel or to travel to collect forest products less often. As a result, these communities could experience increased heating costs associated with consumption of substitute sources of heat, such as propane and natural gas.

Alternatives C and, D, ~~and E~~ would continue to provide forest products to communities in the Planning Area with greater acres open to collection compared with Alternatives A and B (see **Table 4-52**). While the potential acreage of forest product harvest areas under this alternative is higher than under Alternative A, the distribution of those areas relative to communities could change as a result of designations that do not allow forest product removal, resulting in site-specific impacts as described above.

4.2.15.2.4 Fire Management Decisions

Potential wildfire-related costs (such as property loss, lost revenues, and suppression costs) cannot be projected. It is commonly accepted that fire suppression costs and the risk to life and property should be less when wildfires occur where hazardous fuels have been treated compared with areas where fuels have not been treated. For example, fires generally burn hotter and flame lengths are higher in non-treated areas (USDI 2007). Under management common to all alternatives, approximately 32,000 acres would be targeted for fuels treatment dependent on budgetary and time constraints. If treatment targets were met, risk and associated costs would be reduced under all Action Alternatives.

4.2.15.2.5 Mineral Resources Decisions

Under all the alternatives, current levels of leasable, locatable, and salable mineral production would continue to be provided by the BLM in the Planning Area (see **Table 4-52**). While current mineral development activities are not a direct result of new planning actions in this RMP/EIS, management under this plan will allow and determine the nature of these activities in the future. Regardless of these changes, it is estimated that production and associated employment and labor income would support approximately 90 jobs and $3.5 million in labor income under all the alternatives (see **Table 4-56** and **Table 4-57** in **Section 4.2.15.2.6**, below). This level of contributions is based on projected development and production levels in the RFD (Crocker and Glover 2019) and 2019 annual average oil and natural gas prices. The actual level of economic contributions would vary based on factors outside of BLM jurisdiction, including market conditions and site-specific costs of operations for the minerals at the time of development. A portion of royalties from oil and gas are distributed back to the state and local governments under the 1902 Reclamation Act and the 1920 Mineral Leasing Act, as amended. These payments are discussed below.

County and state governments operate under free use permits to remove crushed stone, sand, and gravel, such that no revenues or lease fees are received by the BLM and consequently no payments to counties are made, thereby creating a cost savings to taxpayers.

4.2.15.2.6 Impacts on Counties

Costs to local governments would remain unchanged as a result of planning actions (i.e., demand for services and infrastructure would not change as a result of BLM planning actions). Payments to counties associated with payments in lieu of taxes (PILT), as discussed in **Chapter 3,** would occur. In addition, a portion of grazing revenue collected would be distributed to local counties. These activities would support at least 41 jobs and $1.95 million in labor income in the impact area economy (see **Table 4-56** and **Table 4-57**). Additional contributions would be provided from mineral development. Federal mineral royalty revenue is collected for leasable and salable minerals, and approximately 50 percent of this revenue is distributed to the states. The state is responsible for further distributing a portion of those revenues to the county of origin. Further revenue to the county is also provided from ad valorem taxes on property and equipment.

Under Alternative A, annual payments to counties in the Planning Area would be approximately $825,690 (see **Table 4-55**). These payments would support about 41 jobs and $2.16 million in labor income (see **Table 4-56** and **Table 4-57**).

Under Alternative B, annual payments to counties would be approximately $837,247 (see **Table 4-55**). Payments to counties and related economic contributions under this alternative are slightly lower than those under Alternative A since the level of grazing is based on the established permitted use for AUMs, which is slightly lower under this alternative.

Under Alternative C, annual payments to counties in the Planning Area would be approximately $755,477 (see **Table 4-55**Error! Reference source not found.), reducing related economic contributions (see **Table 4-56** and **Table 4-57**). This is due to a reduction in forecasted PILT following management direction for a greater number of acres identified for disposal out of federal ownership.

Commented [AA36]: To be updated with revised disposal data

Alternative D would provide the largest payments to the counties, $844,196 (see **Table 4-55**). These payments would support about 42 jobs and $2.2 million in labor income (see **Table 4-56** and **Table 4-57**). This is due to increased PILT as a result of fewer lands identified for disposal and continued distributions of fees from grazing permits.

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Table 4-55: Payments to Counties (2019 Dollars), by Alternative

Commented [AA38]: To be updated with revised disposal data

Output	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMPDraft RMP/EIS Preferred)	Alternative D	~~Alternative E (Proposed RMP)~~
PILT	$807,227	$809,430	$730,306	$818,803	~~$726,186~~
Range revenue*	$23,864	$18,772	$23,864	$23,867	~~$23,864~~
Total	$825,690	$837,247	$755,477	$844,196	~~$751,579~~

Source: Acres based on BLM GIS 2020. PILT calculations based on average land value per acre. Range revenue calculated based on the number of AUMs authorized under Section 15 and Section 3 of the Taylor Grazing Act and the percentage of fees returned to counties as defined in the act.
*Based on active AUMs

Under Alternatives C and ~~D~~E, 131,900~~126,400~~ acres would be identified as potentially available for disposal, the most of any alternative. This would support the lowest level of economic contributions of all alternatives, at least ~~41~~ 42 jobs and $2.2~~$1.95~~ million in labor income in the impact area economy (see **Table 4-56** and **Table 4-57**). Further site-specific NEPA processes not covered under this plan would evaluate the availability of this land for disposal, if proposed. If this land is disposed, it would no longer count toward the entitlement acreage used in PILT; thus, possible decreases under this alternative suggest that all other alternatives would maintain PILT contributions to a greater degree. However, predicting county payments based on entitlement acreage alone is impractical due to changes in the population ceiling, ~~Congressionally~~congressionally approved annual appropriation acts, and other factors discussed in **Chapter 3**.

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Table 4-56: Average Annual Employment[1] by Program (Full- and Part-time Jobs), by Alternative

Commented [AA40]: To be updated with revised disposal data

Resource	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMPDraft RMP/EIS Preferred)	Alternative D	~~Alternative E (Proposed RMP)~~
Recreation[2]	55	55	55	55	~~55~~

Resource	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Livestock grazing	198	149	197	197	~~197~~
Mineral resources	90	90	90	90	~~90~~
County payments	41	42	38	42	~~37~~
BLM expenditures	212	212	212	212	~~212~~
Total	596	548	592	596	~~591~~

Source: FEAST 2019; IMPLAN 2016

[1] Average annual values are based on projected impacts over the 20-year analysis period. Source: Potential employment and labor income impacts are based on the estimated resource outputs summarized by alternative in **Table 4-52**. Potential impacts were estimated using the IMPLAN model and FEAST (FEAST 2019).

[2] As discussed in **Chapter 3**, these recreation estimates do not include visits from local use since their expenditures do not represent new money into the economy.

Table 4-57: Average Annual Labor Income (Thousands of 2019 Dollars), by Program and Alternative

Resource	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Recreation	$1,496	$1,496	$1,496	$1,496	~~$1,496~~
Livestock grazing	$2,738	$2,065	$2,722	$2,722	~~$2,722~~
Mineral resources	$3,517	$3,517	$3,517	$3,517	~~$3,517~~
County payments	$2,159	$2,176	$1,963	$2,198	~~$1,953~~
BLM expenditures	$9,221	$9,222	$9,222	$9,222	~~$9,222~~
Total	$19,131	$18,475	$18,919	$19,155	~~$18,910~~

Source: FEAST 2019; IMPLAN 2016

Note: Totals may not add up exactly due to rounding.

Nonetheless, if BLM-administered land is disposed of, it would be subject to property taxes, whereas before disposal it was not. PILT are designed to help offset losses in property taxes due to the nontaxable status of federal lands within state or county boundaries. Therefore, county property taxes could offset losses from the qualifying entitlement acreage for PILT. It should be noted that PILT are estimated based on the average value of lands, and the specific value of parcels identified for disposal may vary and would impact the change in PILT contributions at the time of plan implementation.

4.2.15.2.7 BLM Expenditures and Employment

Levels of expenditures and employment at the RPFO are not expected to vary as a result of the alternatives. While different alternatives may cost more or less to implement, management priorities are likely to determine how funds are allocated to actions outlined in the plan. Thus, a constant budget over the life of the plan is assumed. Under all the alternatives, it is estimated that average annual BLM expenditures would continue to support around 211 jobs and $9.2 million in labor income in the regional economy (see **Table 4-56** and **Table 4-57**).

4.2.15.2.8 Renewable Energy Decisions

While all land in the Planning Area without surface occupancy or leasing restrictions would potentially be available for wind and solar development (given further site-specific review), not all land can be considered

suitable for development. Developable land depends on the resource and transmission line availability and capacity. Decisions to invest in wind and solar energy are also dependent on the cost of alternative sources of energy, as well as the regulatory environment and other costs to society. Therefore, natural gas, oil, and coal prices also determine the level of energy investment. The viability of commercial wind power projects also depends on the pricing agreements between power producers and purchasers.

All these components are difficult to predict, which makes speculation on possible development impractical. In addition, costs associated with development on public land (i.e., site-specific planning) could limit project development. In the future, with changes in energy markets, technology, or development saturation on available private land, development in the Decision Area may become more likely. If wind energy development were to occur on BLM-administered lands in the impact area, employment and labor contributions would result. Per 1.5-megawatt turbine, seven full-time-equivalent jobs would result during construction (US Department of Energy 2020).

4.2.15.2.9 Role of Amenities, Migration, and Nonmarket Values

The economic analysis assesses the economic effects of the direct use of resources in terms of jobs and income. This type of analysis does not include other types of economic value, often referred to as nonmarket values, which are discussed in **Chapter 3**. Nonmarket values are important to the well-being of visitors, area residents, and others outside the Planning Area. These values include natural amenities, quality of life factors, recreational opportunities, ecosystem services, and nonuse values such as existence, option, and bequest values. Nonmarket values are difficult to quantify because these values are not directly reflected in market prices, and insufficient data exist to assess the effects of management actions. Thus, quantification of nonmarket values must be determined based on subjective estimates of the value that individuals and communities would place on particular outcomes. However, the fact that no monetary value is assigned to these values does not lessen their importance in the decision-making process.

In addition, helpful inferences can be made. While there is a general consensus that nonuse values exist, the methodologies for measuring these values are controversial and difficult to apply. Wilderness has been the subject of numerous nonuse studies, usually conducted for specific natural areas; however, no attempt has been made to directly elicit potential nonuse values associated with the alternatives under this RMP/EIS. The alternatives establish areas to be managed for wilderness characteristics and changes to ACECs and other special designations, such as VRM classes. These designations would further maintain and perhaps enhance nonmarket values associated with natural amenities protected on these lands.

Additionally, these ACECs, lands to be managed for wilderness characteristics, and VRM acres may attract new residents and tourists to the area, which would then contribute to area economic activity. Natural amenities and quality of life have been increasingly recognized as important factors in the economic prospects of many rural communities in the West (Rudzitis and Johnson 2000). In addition, nonlabor income is intimately tied to natural amenities, as discussed in **Chapter 3**. A rural county population change, the development of rural recreation, and retirement-destination areas are all related to natural amenities (McGranahan 1999). Thus, designations that maintain and protect natural amenities may similarly contribute to area economic well-being.

These designations would further maintain and perhaps enhance nonmarket values associated with natural amenities protected on these lands. Under Alternative A, less land would be managed under these special designations than under Alternatives B and C; however, more would be managed than under Alternatives D ~~and E~~. Alternative B would ensure the highest acreage of protected areas (**Table 4-58**). Consequently, well-being associated with nonmarket values and the potential contributions from new residents and tourists attracted by natural amenities would be greatest under Alternative B.

Table 4-58: ACECs, Lands Managed to Protect Wilderness Characteristics, and VRM Class I and Class II Areas (Acres), by Alternative

Designation	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
ACECs	46,000	133,290	122,990	38,290	~~21,690~~
Lands managed to protect wilderness characteristics	~~37,410~~0	37,410	~~30,110~~26,040	0	~~0~~
VRM Class I	97,800~~96,600~~	97,800~~97,400~~	97,800~~97,500~~	97,800~~97,500~~	~~97,800~~
VRM Class II	55,200	306,000	68,400	21,400	~~16,600~~
Total protected areas	199,000~~235,210~~	574,500~~574,100~~	315,230~~319,000~~	157,490~~157,200~~	~~136,100~~

4.2.15.3 Social Direct/Indirect Impacts

The social analysis focuses on changes to social and economic well-being as it relates to the quality of life of those communities of interest identified in **Chapter 3**. While many of the potential changes in quality of life can only be discussed qualitatively, several indicators provide an approach to discuss the magnitude of effects on these communities. **Table 4-59** lists these indicators and provides a comparison among the alternatives for communities.[4] As social indicators, Alternative~~s~~ D ~~and E have~~ has the largest acres for forest products, and Alternative B has the largest acres of protected areas. Communities identified within specific areas that were identified as connected to the BLM in the Planning Area include pueblos and land grants. These communities are described in **Chapter 3**, while effects on these communities are discussed below.

The following social analysis assesses the potential effects of management actions on communities of interest identified in **Chapter 3**. Higher employment, subject to some qualifications, can be seen as a benefit to the local community. Other benefits are also present, although some are not easily measured or tied to economic activity. An example of where effects are difficult to quantify are equity effects or impacts on well-being. Regardless, these benefits are discussed despite the inability to quantify them.

Table 4-59: Social Indicators, by Alternative

Social Indicator	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Cattle forage (available AUMs)	115,449	20,422	114,929	114,929	~~114,929~~
Forest products (acres)	12,200	117,100	544,300	633,700	~~633,700~~
Fuel treatments (acres)	32,000	32,000	32,000	32,000	~~32,000~~
Protected areas* (acres)	235,210	574,100	319,000	194,600	~~173,500~~

[4] Changes in indicators do not imply the same change in quality of life for all communities since marginal changes in quality of life relative to the indicators cannot be considered equal among communities. For example, the change in quality of life associated with more access for communities interested in traditional uses is different than the change in access for those interested in ranching.

* These areas include ACECs, VRM Class I, VRM Class II, and lands with wilderness characteristics managed to protect wilderness character. Based on the proposed management decisions in this RMP/EIS, these areas would typically have fewer surface-disturbing activities within their boundaries, compared with other locations in the Planning Area.

4.2.15.3.1 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. The executive order further stipulates that agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.

As discussed in the Affected Environment section, CEQ states the following criteria which identify environmental justice populations for further analysis:

- A minority population area is so defined if either the aggregate population of all minority groups combined exceeds 50 percent of the total population in the area or the percentage of the population in the area comprising all minority groups is meaningfully greater than the minority population percentage in the broader region (i.e., the state of New Mexico). For this analysis "meaningfully greater" is defined as 5 percentage points or more above the state population.
- Although these guidelines are only specified for minority populations, the same formula will be applied to identify populations in poverty for further environmental justice analysis (i.e., more than 50 percent of the population in poverty, or a population 5 percentage points or more above the state of New Mexico poverty level).

Based on these criteria, all populations examined for this analysis in **Chapter 3** were identified for further environmental justice analysis as minority populations, with the exception of Torrance County (see **Chapter 3**, **Table 3-31**). In addition, McKinley County, Cibola County, Torrance County, Jemez Pueblo, San Felipe Pueblo, Sandia Pueblo, Santa Clara Pueblo, Santo Domingo Pueblo, Zia Pueblo, and the Navajo Nation and Zuni Tribes would meet the criteria to be further analyzed as a low-income environmental justice population (see **Chapter 3**, **Table 3-30**).

All alternatives could result in increases in employment and labor income relative to current conditions over the next decade, from which minority and low-income populations may benefit.

Access to subsistence uses, traditional materials, and cultural sites would be accommodated to varying degrees under the alternatives. Access to these materials and sites would continue to provide valuable resources to communities in the area, sustaining lifestyles, traditions, ceremonies, and the heritage that remain an important part of area communities' lifestyle and well-being. As discussed above, the removal of forest product collection areas adjacent to communities in the Planning Area could disparately impact minority and low-income populations that depend on these sources of forest products.

The BLM recognizes the presence of multiple minority and low-income populations within the Study Area, including federally recognized tribes and pueblos. While the potential exists for disproportionate adverse impacts on minority and low-income environmental populations of concern in the Planning Area resulting from management decisions, the level to which those populations would experience such impacts would depend on the nature of implementation. These impacts would be determined at a site-specific level of analysis for the specific implementation of projects.

4.2.15.3.2 Impacts on Communities of Interest

Under Alternative A, forest products would continue to be made available to communities in the Planning Area. Compared with the action alternatives, this alternative would continue to maintain the current

accessibility of permit-issuing stations and forest products collection areas that area communities are accustomed to and depend on. Individuals and groups who give a high priority to resource use, traditional uses, and other communities would not experience decreased social well-being associated with reduced access to permits and forest product harvest areas.

Under all action alternatives, the distribution of areas for collection and harvest of forest resources relative to communities of interest could change as a result of special designations that do not allow forest product removal. Consequently, individuals and groups who give a high priority to collection of forest products as a resource use or a traditional use could experience decreases in well-being with less access to this important resource. Changes in access to forest product harvest areas has the potential to disparately affect minority and low-income populations by limiting sources of forest products used for home heating and cooking. Communities that could be most affected could include Cuba and the surrounding area, including eastern Navajo chapters such as Ojo Encino and Torreon. Jemez Pueblo may also be affected by increased distances required to access forest products and increased fuelwood costs. In the western portion of the Planning Area, the Ramah Navajo reservation would have less opportunity to harvest forest products under Alternatives B, C, and D, ~~and E,~~ as would communities in the Grants/Milan area and some Navajo chapters south of Gallup.

Communities for which livestock grazing has cultural or historic importance would continue to have this use supported under all alternatives. Alternative B would reduce active grazing and has the greatest potential for impacts at the community level. Under all alternatives, BLM forage would continue to represent a minor portion of available forage in the area and support less than 5 percent of area agricultural employment.

Under all alternatives, the RPFO would implement a leasing stipulation that would apply an NSO to cultural resources at Azabache Station, Big Bead Mesa NHL, and Cabezon Peak and Jones Canyon ACECs. This would minimize impacts on resources with cultural and historic important for tribes in these areas. Impacts on cultural resources are described in **Section 4.2.3**.

4.2.15.3.3 Impacts on Counties

The BLM assumes that mineral development would continue, and entitlement acreage determining the BLM portion of PILT would not change. Employment and income levels in mineral development may vary due to market conditions for fossil fuels, but PILT distributions should remain predictable. Thus, county programs and infrastructure supported by these payments would not be affected by the alternatives. Consequently, the economic well-being and quality of life of those dependent on these contributions would likely remain the same under the alternatives.

4.2.15.3.4 BLM Expenditures and Employment

Under all the alternatives, it is assumed the level of expenditures and employment at the RPFO would not vary by alternative, so the employment and income supported do not vary among the alternatives. Thus, the economic well-being and quality of life of those dependent on these contributions would likely remain the same under the alternatives.

4.2.15.3.5 Nonmarket Values

As noted in **Chapter 3**, unique and sensitive natural and cultural resources on public lands, including Native American traditional uses and the special spiritual contribution and foundations public lands provide to Native American cultures, contribute to the current and future social and economic well-being of tribal communities and other groups interested in resource conservation. These nonmarket values enhance the quality of life and enjoyment of place, thereby improving regional and local economic conditions. Concerns such as the negative impacts from damaged visual quality, invasive species, and maintenance of special area designations are held by communities interested in resource protection and traditional uses. Relative to the

other alternatives, Alternative B would result in the largest contribution to the quality of life of communities interested in resource protection.

4.2.15.4 Cumulative Impacts

Reasonably foreseeable future actions in the Planning Area and on federal, state, private, and other lands within and adjacent to the Planning Area could affect social and economic resources. The regional economy can be affected by a variety of factors, including population growth, locations of new industries, recession, growth of new sectors, and tax policy. Within the larger context of these factors, management actions under this RMP/EIS have relatively small contributions to the regional economy.

Alternative B provides the least amount of available AUMs. Impacts on livestock grazing under this alternative could contribute to cumulative effects of decreasing trends in AUM utilization as, over time, there continues to be a loss of agricultural lands to development and urban sprawl within the Planning Area. Current levels of grazing could be supported under Alternatives A, C, and D~~, and E~~ with cooperation of favorable market conditions and willing permittees.

Current levels of leasable, locatable, and salable mineral production would continue to be provided by the BLM in the Planning Area (see **Table 4-52**). Consequently, any cumulative effects on local social and economic conditions from mineral resource uses on BLM-administered lands would be the same among the alternatives.

Decisions to invest in energy development and infrastructure on BLM-administered lands are dependent on factors determined by regional and world markets. Speculation beyond current rates of development is unrealistic since decisions to invest are dependent on these factors outside the scope of BLM management. In addition, costs associated with development on public land (e.g., site-specific planning) could hamper development. In the future, with changes in energy markets, technology, or development saturation on available private land, development Decision Area may become more likely, and the exclusion of areas on BLM-administered lands may limit development if substitute locations are not available. However, it can be reasonably assumed that the availability of rights-of-way and land for energy development on BLM-administered lands would accommodate development interests in the future.

Under all the alternatives, it is assumed the level of expenditures and employment at the RPFO would not vary by alternative; thus, the employment and income supported do not vary among the alternatives.

As discussed under direct and indirect impacts above, exclusion areas and limitations on leasing in the Decision Area could increase development and rights-of-way on private, state, or other federal lands. However, decisions to invest in energy development and infrastructure are dependent on factors determined by regional and world markets.

Population increases anticipated over the 20-year planning period within the Planning Area would result in increased use of BLM-administered lands. Projected employment changes in the area suggest economic contributions from BLM management would be small. However, the role the BLM plays may increase along with the population since the lands administered by the BLM sustain area well-being and would continue to do so under all alternatives. This occurs largely through the provision of natural amenities and recreational opportunities that attract tourists and businesses and maintain quality of life.

None of the alternatives would alter the trends outlined above, but they would sustain aspects of quality of life, such as employment, recreation, education, and cultural development. While the provision of these resources varies by alternative, these opportunities would be available for a variety of demographic groups, area residents, tourists, and others who value the area. Consequently, any cumulative economic effects on those dependent on these contributions would remain the same under the alternatives.

4.2.16 Soil and Water Resources

Most allowable uses have the potential to affect soil resources to some degree. Surface-disturbing actions would result in removal of vegetative cover, soil compaction, reduced infiltration, changes in physical and biological properties, and reduction in organic matter content. These direct impacts on soils tend to increase the potential for accelerated erosion by exposing soil particles to wind and water. There also would be a loss of soil productivity through disruption of natural soil horizons and removal of vegetated acreage for use by roads, well pads, and other facilities. Surface uses that may not result in direct surface disturbance, but may affect soil stability through changes in vegetative cover or soil infiltration rates, include grazing by livestock and wildlife (if improper grazing damages vegetative cover), vegetative treatments, and fire and fuels management. A combination of bare soil surface caused by vegetation removal or changes in community structure, erodible soils, and slope leads to the greatest potential for soil erosion from water.

Actions that disturb or compact soil, remove or reduce vegetative cover, or reduce soil productivity are considered adverse impacts. Conversely, beneficial impacts on soil include actions that stabilize soil or increase soil productivity. In addition, those actions that avoid or minimize soil compaction or erosion are beneficial.

Short-term impacts on soils are those that result during initial surface disturbance prior to completion of revegetation or installing other practices that minimize wind and water erosion. The amount of bare ground predicted under each alternative after successful reclamation of disturbed areas is important to consider when evaluating long-term impacts on soils. Areas not reclaimed leaving bare soil include roads and areas around facilities that sustain concentrated surface uses by equipment or animals, which preclude the reestablishment of vegetation. Long-term impacts due to accelerated erosion would occur in locations where bare soils are allowed to remain exposed to wind and water for more than 5 years or where the loss of productivity results from significantly altering the soil profile.

Surface disturbance can affect surface water quality mainly by increasing sediment delivery to drainages, which is ultimately transported to streams during runoff events. Surface disturbance of highly erodible soils is the most likely disturbance to increase sedimentation in streams. Impacts on water resources also would occur when activities or projects take place within riparian areas and floodplains, or when an upstream increase in runoff or erosion results in damaging levels of stream energy or sedimentation within stream/riparian/floodplain areas. Differences between alternatives are based on acreage allocations that would increase activities associated with soil loss, soil exposure, and riparian/floodplain areas. Impacts on soil and water are expected to occur from vegetation management, livestock grazing, mineral resources, renewable energy management, travel management, and soil and water management.

4.2.16.1 Analysis Assumptions

A variety of multi-level regulatory (e.g., water quality protection permitting) and nonregulatory (e.g., employing standard BMPs) processes exist to ensure that erosion and pollutant levels do not increase above identified thresholds and/or water quality standards. It is assumed that land uses would be carried out in compliance with existing policies and regulations at both the state and federal levels. It is further assumed that all surface-disturbing and runoff-increasing activities would be designed and implemented to minimize runoff, erosion, and sedimentation by installing and maintaining erosion controls and other mitigation measures.

The following specific factors were considered for the impacts analysis related to soil and water resources:

- The "sensitive soils" designation refers to highly erodible soils and soils with a poor chance of successful reclamation after disturbance to the soil profile.
- There are soils in the Planning Area that are likely to have limited reclamation success when these areas are reclaimed after disturbance such as oil and gas field development, temporary roads, or

similar activities. Soils identified with a US Department of Agriculture-NRCS rating of "poor" means that revegetation and stabilization are expected to be difficult and costly. Soils identified as "not rated" were included in the low reclamation potential soils because this category represents the badland soils in the Planning Area.

Infrastructure development and soil disturbance on steeper slopes generally increases the downslope water erosion potential because of higher runoff volumes and rates. This typically would be expected with permanent surface installations such as wind farms, solar arrays, pipelines, roads, communication sites, transmission lines, and oil and gas facilities (**Appendix H.2.3**). The appurtenant access roads required for most of these would be a part of the increased runoff and erosion potential. Therefore, slope steepness may be an important consideration for protecting soil stability when authorizing land uses on these slopes would increase runoff and erosion potential.

Active floodplains, defined as the low-lying land surface adjacent to a stream that is flooded at least once or twice (on average) every 3 years (Prichard 1999, 1998), are associated with nearly all identifiable streams, such as those depicted in the National Hydrologic Dataset (US Geological Survey 2019). Both 100-year floodplains and active floodplains are important considerations for protecting property and natural riparian/floodplain functions when authorizing land uses in these areas, including rights-of-way and potential sites for renewable energy facilities.

Surface water and groundwater impacts from BLM-authorized activities in the Decision Area originate primarily from surface-disturbing activities and changes in vegetation or land uses that affect downstream water resources. Specific mechanisms that result in major waterway impacts are consumption withdrawals, alterations or water chemistry from pollutant discharges, and the removal of protective vegetation and surface disturbance that increase sedimentation and erosion.

Fluid mineral development under all alternatives and ROW development have the potential to contribute to water quality and quantity impacts in the Decision Area through erosion and sediment production, fuel spills, chemicals, hydraulic fracturing fluids, produced water, or produced oil and gas. Stream crossings, particularly low water crossings, associated with these development activities across alternatives can contribute large amounts and sediments to streams.

Groundwater impacts result from consumptive withdrawals or those activities that modify recharge rates, thereby affecting groundwater quantity. Groundwater impacts also result from activities that alter groundwater quality and primarily include oil and gas development, mining, recreation across all alternatives.

Groundwater in the Decision Area ranges from local unconsolidated aquifers to extensive bedrock (consolidated) aquifers, with most groundwater occurring in alluvial fill. Major groundwater features in the Decision Area are alluvial aquifers along major waterways. The number of wells drilled (including water supply, water disposal, and oil and natural gas wells), the number of springs developed, groundwater diversions, and water conservation projects influence groundwater quantity. Wells that extract groundwater or disposal wells that inject water into the groundwater systems also influence groundwater quantity.

4.2.16.2 Direct and Indirect Impacts

4.2.16.2.1 Vegetation Management Decisions

Vegetation management, as defined for this section, includes any management decisions that are associated with vegetation manipulation: fire management, vegetative communities, riparian resources, and forest and woodland resources. Vegetation management resource decisions would have short-term adverse and beneficial impacts on soil and water resources immediately after vegetation treatments. Exposed and disturbed soils from mechanical treatments would be more susceptible to erosion immediately after the vegetation treatment occurs. Beneficial short-term and long-term impacts would occur when forest thinning

and fuels management projects include lop and scatter treatments. These leave behind slash to protect soils from erosion and improve soil temperature and moisture conditions favorable to establishing and sustaining desirable vegetative communities. Burning of slash would negate these beneficial impacts and could have negative effects on soil productivity due to increased soil erosion and temperature, and reduced soil moisture.

The vegetation management decisions would work to restore the native vegetative communities on Decision Area lands that best protect both soil and water resources. Long-term beneficial impacts from vegetation management decisions on soil and water resources would be improved land health, as defined by the New Mexico Standards and Guidelines (BLM 2001b). Fuel treatments are prioritized for 607,500 acres rated as FRCC 2 and 3. Of these areas, 397,100 acres contain highly erodible soils. No specific treatments have been proposed in the RMP/EIS for riparian restoration or upland vegetation.

Under Alternative D~~E~~, the largest amount of acreage for forest harvest products would be open within highly erodible soils (425,400 acres), while under Alternative B, the least number of acres in highly erodible soils would open to forest product harvest (2,700 acres). Twelve thousand acres of forest harvest products would be open within highly erodible soils under Alternative A, so Alternative D~~E~~ would have the greatest impacts on highly erodible soils from forest harvesting.

4.2.16.2.2 Livestock Grazing Decisions

Livestock grazing management decisions would have both adverse and beneficial impacts on soil and water resources on Decision Area lands. In general, making areas unavailable for grazing could provide long-term protection to soil and water resources because it would limit the loss of vegetative cover and the disturbance of sensitive soils by livestock. Areas available for livestock grazing would potentially be adversely affected from decreased growth or loss of riparian and other vegetation by the removal of the aboveground portion of palatable plant species.

Under all alternatives, livestock grazing would be managed in order to achieve and maintain the New Mexico Standards and Guidelines (BLM 2001b). Under these guidelines, the PFC of wetlands and riparian areas would be achieved, the use and perpetuation of native species would be emphasized, noxious and invasive plant establishment and spread would be minimized, and adjustments would be made to grazing practices when the New Mexico Standards and Guidelines are not being met.

Under Alternative B, a total of 108,800 acres of BLM-administered land would be made unavailable to grazing due to restrictions identified under special designations. As a result, under Alternative B, fewer adverse impacts would be expected to occur to soil and water resources. Under Alternatives C and~~,~~ D~~, and E~~, Decision Area lands would be available to livestock grazing. Up to 410,800 acres of highly erodible soils on Decision Area lands would be available to livestock grazing under Alternatives C~~,~~ and D~~, and E~~, which is the same as under Alternative A. The New Mexico Standards and Guidelines and allotment-specific management would mitigate the impacts of livestock grazing on soil and water resources, but the potential for impacts is the same as under Alternative A.

4.2.16.2.3 Mineral Resources Decisions

Management decisions to allow mineral development would have short- and long-term impacts on soil and water resources. In the short term, loss of vegetation associated with surface disturbances for well pads, access roads, and minerals infrastructure would increase runoff, erosion, and sedimentation; however, mitigative measures would be taken to minimize these impacts.

The typically slow regrowth of vegetation within the Planning Area would cause surface disturbance to have long-term, indirect, adverse impacts of increased runoff, erosion, and sedimentation, especially when mineral development takes place on low reclamation potential soils. Fluid mineral leasing stipulations for steep slopes

and low reclamation potential soils are proposed under Alternatives B, C, and D ~~and E~~. Alternatives B and C would implement CSU on steep slopes between 15 percent and 30 percent, NSO on slopes over 30 percent, and CSU on soils with low reclamation potential. Alternative~~s~~ D ~~and E~~ would implement NSO on steep slopes over 30 percent. The proposed leasing stipulations would protect soils from adverse impacts from leasable mineral resource developments more than under Alternative A.

Fluid mineral leasing stipulations for riparian areas are proposed under Alternatives B and C. No surface occupancy within 402 meters (1,320 feet) of channels of ephemeral, intermittent, and perennial streams of within the outer margins of riparian/wetland areas would be implemented under Alternative B. This stipulation would change to CSU within the same areas under Alternative C. These stipulations would provide some protection to floodplains when leasable mineral resource developments are proposed. No Decision Area-wide leasing stipulations for riparian areas are proposed under Alternatives A~~,~~ and D~~, and E~~. ~~Alternative E would not provide additional protection of floodplains when liable mineral resource development are proposed, however impacts would be the same as under Alternative A.~~

A leasing stipulation for biological soil crusts is proposed under Alternatives B and C. This stipulation would implement NSO for surface-disturbing activities in areas managed for biological soil crust resources in the San Miguel Dome area. No leasing stipulations for biological crusts are proposed under Alternatives A and~~,~~ D~~, and E~~. ~~Alternative E would not provide additional protection of biological crusts when liable mineral resource development are proposed, however impacts would be the same as under Alternative A.~~

Water depletions for oil and gas hydraulic fracturing would likely continue to occur over the long term under all alternatives, which could result in depletion and degradation of water resources. For federal mineral ownership, the BLM estimates that 100 wells would be vertically drilled and 29 wells would be horizontally drilled in the Decision Area over the life of the plan (Crocker and Glover 2019). Based on this, the BLM estimates a volume of 218.56 acre-feet of water for oil and gas development would be used for hydraulic fracturing over the life of the plan (Crocker and Glover 2019). Impacts are most likely to occur where lands within the Decision Area are open to oil and gas leasing. ~~Approximately 25,500 fewer acres of BLM-administered minerals would be open to fluid mineral leasing under Alternative E than under Alternative A, so impacts on water resources would be slightly less than under Alternative A.~~

Indirect impacts on water resources from fluid minerals development could also occur through wastewater disposal in the Decision Area associated with hydraulic fracturing. Wastewater from hydraulic fracturing is disposed of in the following ways: underground injection, treatment, and disposal to surface waterbodies or recycling (with or without treatment) for use in future hydraulic fracturing operations.

Potential impacts on water resources from fluid mineral development wastewater disposal include contaminants reaching drinking water. This would be due to surface water discharge or inadequate treatment of wastewater and byproducts formed at drinking water treatment facilities by hydraulic fracturing contaminants reacting with disinfectants.

Impacts from underground wastewater injection would be from the following (EPA 2016b):

- Groundwater contamination due to inadequate well construction
- Fracturing fluids moving from the target formation to drinking water aquifers through human-made or natural features
- Wastewater fluid with natural underground substances, such as metals or radioactive materials mobilized during hydraulic fracturing, moving into drinking water aquifers

There would be ~~201,600~~205,300 fewer acres open to fluid mineral leasing under Alternative B than under Alternative A; therefore, impacts on water resources from hydraulic fracturing would be fewer than under Alternative A. The number of acres that would be open to fluid mineral leasing under Alternative C would

be ~~196,100~~199,700 fewer than under Alternative A; therefore, impacts on water resources from hydraulic fracturing would be fewer than under Alternative A. There would be ~~187,700~~187,800 fewer acres that would be open to fluid mineral leasing under Alternative D than under Alternative A; therefore, impacts on water resources from hydraulic fracturing would be fewer than under Alternative A. ~~There would be 25,500 fewer acres open to fluid mineral leasing under Alternative E than under Alternative A; therefore, impacts on water resources would be slightly fewer than under Alternative A.~~

4.2.16.2.4 Renewable Energy Decisions

Renewable energy management decisions would have short-term impacts and long-term adverse impacts on soil and water resources. Loss of vegetation associated with surface disturbances for renewable energy infrastructure would increase runoff, erosion, and sedimentation both during construction and over the life of the renewable energy project.

Exclusion and avoidance areas were identified in **Chapter 2** for areas where renewable energy developments are not suitable. Sensitive soils are identified as avoidance areas for wind and solar projects under Alternatives B, C, and D. Alternative~~s~~ A ~~and E~~ would allow for renewable energy developments in areas with sensitive soils; therefore, adverse impacts could occur, as identified above.

Wetland and riparian areas are identified as exclusion areas for wind and solar projects under Alternatives B, C, and D. Alternative~~s~~ A ~~and E~~ would allow for renewable energy developments in wetland and riparian areas; therefore, adverse impacts could occur, as identified above. Active floodplains are identified as exclusion areas for wind and solar projects under Alternatives B, C and ~~through~~ D~~E~~; therefore, active floodplains would be protected more than under Alternative A. ~~One hundred-year floodplains are identified as open areas for wind and solar projects under Alternative A and as avoidance areas for wind projects and exclusion areas for solar projects under Alternative E; therefore, active floodplains would be protected more under Alternative E than under Alternative A.~~

4.2.16.2.5 Soil and Water Decisions

Implementation of the soil and water decisions (**Section 2.2.15**, Soil and Water Resources, Goals, Objectives, and Management Common to All Alternatives) would result in short- and long-term beneficial impacts for the RPFO-administered land by limiting certain uses, employing standard best management practices, and implementing projects with the specific objectives of watershed stabilization, improvement, and restoration. Site-specific NEPA analysis would be applied prior to land use activities, to avoid adverse impacts on soil and water resources.

Alternative B would afford the most protection due to the restrictions in grazing and improvement potential for biological soil crusts at San Miguel dome. Less protection is offered under Alternatives C and D as grazing and mineral entry would be allowed. Alternative~~s~~ D ~~and E~~ would likely result in long-term adverse impacts on stability with the fewest restrictions on livestock, foot traffic, and potential mineral entry.

4.2.16.2.6 Travel Management Decisions

Travel management decisions would have both adverse and beneficial impacts on soil and water resources. In those areas where roads are closed, vegetation communities could become reestablished on roadbeds and improve soil conditions. Management decisions that propose open travel could result in vegetation loss, rutting, increased soil erosion, and impacts on water quality. These impacts would be similar, but of small magnitude for the limited to existing or designated roads, primitive roads, and trails travel designation.

Chapter 2 shows the proposed travel management decisions by alternative. Under Alternatives C and D, the RPFO proposes to manage 13,700 acres containing sensitive soils in Cimarron Mesa as open to OHV use; therefore, erosion is expected to occur from OHV use under Alternatives C and D, which is the same

as under Alternative A. ~~Alternative E would manage 1,500 acres of sensitive soils as open OHV use in Cimarron Mesa, which would decrease impacts as opposed to Alternative A.~~

4.2.16.3 Cumulative Impacts

Reasonably foreseeable future actions in the Planning Area and on federal, state, private, and other lands within and adjacent to the Planning Area that would affect soils and water resources are mineral development, renewable energy projects, and other surface-disturbing projects. Soil disturbance within or adjacent to the Planning Area would likely contribute additional sediment to ephemeral and intermittent streams. Beneficial impacts on soil and water resources would result from other federal, state, tribal, and local planning and watershed restoration/improvement. This would reduce negative impacts on soil and water resources on adjacent public and private lands. **Table 4-3** provides a summary of proposed surface-disturbing projects that are expected to take place within or near the Planning Area in the future. These projects, where specific project areas are known, account for approximately 500,000 acres of surface disturbance, which are likely to cumulatively affect soil and water resources within the Planning Area.

For federal and nonfederal mineral ownership, the BLM estimates that 160 wells would be vertically drilled and 40 wells would be horizontally drilled in the Decision Area over the life of the plan (Crocker and Glover 2019). Based on this, the BLM estimates a volume of 307.39 acre-feet of water for oil and gas development would be used for hydraulic fracturing over the life of the plan (Crocker and Glover 2019). Mining, which includes oil and gas development, comprised about 2 percent of San Juan Basin total water withdrawals in 2015 (BLM 2019a). The largest user of water in the San Juan Basin was irrigation, comprising 79 percent of all water use in the San Juan Basin, followed by public water supply at 8 percent and thermoelectric power at 7 percent. Therefore, the additive cumulative impacts from federal mineral development on overall water use is less than irrigation, public water supply, and thermoelectric power.

As stated above, impacts on water resources can occur from hydraulic fracturing wastewater disposal. The foreseeable development of federal minerals, in addition to minerals on private and state lands, could increase impacts on water resources in the cumulative area over the life of the plan; however, management prescriptions would reduce these impacts on a case-by-case basis.

4.2.17 Special Designations

There are four types of special designations relevant to impacts analysis in this chapter: WSAs and the Ojito Wilderness Area (**Table 4-11**), ACECs (**Table 4-11**), and eligible or suitable Wild and Scenic Rivers (100 acres under Alternatives A, B, and C~~, and E~~). Eight WSAs are carried forward from the 1986 RMP to the alternatives herein. The RPFO must bring forward the WSAs because Congress has not released the WSAs from wilderness consideration. The RPFO would manage WSAs for maintaining the management of these areas, as provided in the IMP for Lands under Wilderness Review (BLM 1995), and managing in accordance with the "non-impairment criteria." The Ojito Wilderness Area would be managed consistent with the Wilderness Act.

Four ACECs correspond with five WSAs and the Ojito Wilderness Area (**Table 4-11**). If Congress were to release the five WSAs from Wilderness consideration, then these areas would be managed under the prescriptions of the ACECs. Three WSAs do not correspond with an associated ACEC; therefore, if they were to be released from consideration, there would be no additional protection for those areas.

In order to appropriately quantify the impacts from special designations, the impacts analysis in this chapter considers only the ACEC special designation for those WSAs and the Ojito Wilderness Area that have a corresponding ACEC. For the three WSAs that do not have corresponding ACECs, the WSA special designation is analyzed. This approach is intended to reduce potential duplication of impacts analysis from two special designations (WSAs and ACECs) located within the same acreage (**Table 4-60**).

Table 4-60: Wilderness Areas or WSAs and Overlapping ACECs, by Alternative

Existing WSAs and Wilderness Areas (Acres)	Overlapping ACECs (Acres)				
	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Cabezon WSA (8,200)	5,000	6,000	6,000	5,200	~~5,000~~
Chamisa WSA (14,500)	0	39,500	39,500	0	~~0~~
Ignacio Chavez WSA (32,200)					
Petaca Pinta WSA (11,700)	0	11,500	11,500	11,500	~~0~~
Ojito WSA (100) and Ojito Wilderness Area (11,000)	9,800	9,800	0	0	~~0~~
Empedrado WSA (9,000)	0	0	0	0	~~0~~
Le Lena WSA (10,200)	0	0	0	0	~~0~~
Manzano WSA (900)	0	0	0	0	~~0~~

Source: BLM GIS 2020

4.2.17.1 Wilderness and Wilderness Study Areas

Three Wilderness areas and eleven WSAs fall within the RPFO management boundaries. The El Malpais Wilderness Area has been excluded from Decision Area lands because it is associated with other planning documents. The Ojito Wilderness Area is included within the acres of Decision Area lands. This section describes the impacts on Wilderness areas and WSAs from the management decisions proposed in the RMP/EIS.

The only difference among alternatives for WSAs involves livestock grazing within the areas (**Table 4-61**). Under Alternative B, the BLM would make grazing unavailable in the Wilderness area and all WSAs. Alternatives A, C, and D~~, and E~~ would make grazing available in the Wilderness area and all WSAs. Alternative D would also reinstate any suspended AUMs within WSAs.

Table 4-61: Areas (Acres) Available to Livestock Grazing within Wilderness Areas and WSAs, by Alternative

Wilderness Areas and WSAs	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Cabezon WSA (8,000 acres)	8,000	0	8,000	8,000	~~8,000~~
Chamisa WSA (14,500 acres)	14,500	0	14,500	14,500	~~14,500~~
Empedrado WSA (9,000 acres)	9,000	0	9,000	9,000	~~9,000~~
Ignacio Chavez WSA (32,200 acres)	32,200	0	32,200	32,200	~~32,200~~
La Lena WSA (10,200 acres)	10,200	0	10,200	10,200	~~10,200~~
Manzano WSA (900 acres)	900	0	900	900	~~900~~
Ojito WSA (100 acres)	100	0	100	100	~~100~~
Ojito Wilderness (11,000 acres)	11,000	0	11,000	11,000	~~11,000~~
Petaca Pinta WSA (11,700 acres)	11,700	0	11,700	11,700	~~11,700~~
Total (97,800 acres)	**97,800**	**0**	**97,800**	**97,800**	~~**97,800**~~

Source: BLM GIS 2020

4.2.17.2 Congressionally Designated Trails

Table 4-62 summarizes impacts on the CDNST.

Table 4-62: Summary of Impacts on the CDNST

CDNST Management	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
CDNST size (acres)	14,400~~11,500~~	~~38,200~~34,400	14,400~~23,200~~	14,400~~11,500~~	~~14,400~~
Open to salable mineral extraction (acres)	6,800	19,000	18,400	7,000	~~9,800~~
Closed to salable mineral extraction (acres)	4,400	19,000	4,600	4,400	~~4,500~~
Open to forest product removal (acres)	0	0	17,800	7,000	~~10,000~~
Closed to forest product removal (acres)	11,500	38,200	5,400	4,500	~~4,400~~
Motorized vehicle use: limited (acres)	7,000	0	18,800	7,000	~~10,000~~
Motorized vehicle use: closed (acres)	4,400	38,200	4,400	4,400	~~4,500~~
Open to fluid leasable minerals with no constraints (acres)	6,800	19,100	12,000	500	~~0~~
Open to fluid leasable minerals with major constraints (NSO) (acres)	100	7,600	6,500	6,400	~~9,800~~
Open to fluid leasable minerals with moderate constraints (CSU) (acres)	0	0	100	0	~~0~~
Closed to fluid leasable minerals (acres)	1,900	4,700	1,900	1,900	~~1,900~~
VRM class (acres)	I: 4,400 II: 300 IV: 6,700	I: 10,700 II: 27,500	I: 4,400 II: 900 III: 2,000 IV: 15,900	I: 4,400 II: 200 IV: 6,900	~~I: 4,500~~ ~~II: 300~~ ~~IV: 9,700~~

Source: BLM GIS 2020

Commented [AA41]: To be updated with revised Alt B leasable minerals open data and Alt D leasable minerals open & CSU data

To be updated with revised data for Alts B & C closed to salable minerals

To be updated with revised trail alignment data for Alts A-D

4.2.17.3 Direct and Indirect Impacts

4.2.17.3.1 Visual Resources Decisions

VRM decisions may have adverse impacts on special designation areas. The only lands identified under all alternatives to be designated VRM Class I are lands within WSAs and Wilderness areas. Lands surrounding WSAs and Wilderness areas may be managed to a standard less than VRM Class I. When this occurs and the VRM Class II, III, or IV lands are visible from within a WSA or Wilderness area, wilderness values, such as naturalness, would be compromised. Individuals would be more likely to see development activities from within a Wilderness area or WSA when the VRM class surrounding the area is Class III or IV.

4.2.17.3.2 Lands and Realty Decisions

Similar to VRM, lands and realty management decisions related to lands adjacent to special designation areas may adversely affect wilderness characteristics when adjacent lands are disposed from the BLM's management. When land disposal takes place adjacent to special designation areas, those disposed lands may be managed in a way that compromises wilderness and recreational or conservation opportunities. Development may occur on the disposed parcel that is visible and/or audible from the special designation area. Site-specific NEPA analysis would be applied prior to disposals of BLM-administered land, and during this time impacts on the special designated area would be disclosed.

4.2.17.3.3 Surface Disturbance Decisions

Impacts from renewable energy, mineral development, and travel have been grouped in this section under the heading Surface Disturbance. Resource management decisions associated with these resource uses would result in similar surface-disturbing impacts on special designated areas. Motorized travel, renewable energy developments, and mineral extraction would be prohibited within WSAs and Wilderness areas subject to the Mining Law of 1872, valid existing rights, and any applicable regulations; they would be limited in other special designated areas. However, these activities may be allowed to occur adjacent to WSAs and Wilderness areas. When these activities take place adjacent to WSAs and Wilderness areas, wilderness values would likely be compromised, although, through the use of BMPs, these impacts would be minimized. Surface-disturbing activities may be visible and/or audible from within the special designated area.

4.2.17.3.4 Livestock Grazing Decisions

Livestock grazing is a permitted use as defined by the Wilderness Act of 1964. Interaction with livestock could compromise wilderness values, such as opportunities for solitude and naturalness, for some recreational users and not for others. As a result, livestock grazing management decisions could have perceived adverse impacts on WSAs and Wilderness areas under Alternatives A, C, and D~~, and E~~ for some recreational users. This is because livestock grazing would be allowed to take place within areas designated to protect Wilderness values. The permitted livestock grazing activities would be required to meet the New Mexico Standards and Guidelines, thereby avoiding impacts on Wilderness areas. Alternative B would not allow livestock grazing to occur within WSAs or Wilderness areas.

4.2.17.4 Cumulative Impacts

The analysis of cumulative impacts for special designation areas includes all BLM-administered lands in New Mexico that are currently being managed for wilderness characteristics to protect those values. The statewide total of BLM-administered lands where wilderness characteristics are protected by law or administrative decision is 1,125,409 acres. Under all alternatives, the RPFO would continue to manage special designation areas in conformance with the Wilderness Act, Wild and Scenic Rivers Act, ACEC prescribed management decisions, and applicable restrictions of this RMP.

Special designation areas would be cumulatively affected by projects that compromise the characteristics that define each specific area. For example, projects that affect visual resources and solitude may adversely affect Wilderness areas. Short-term adverse impacts on Wilderness areas may occur from fire and fuels treatments near the Wilderness areas conducted by other agencies.

The BLM estimates that federal and state agencies would treat up to 206,800 acres with prescribed fire over the next 20 years. If these treatments were made next to special designation areas, then fire operations, such as aircraft flights and fire line construction, would temporarily degrade the natural landscape and character of the special designation area. The noise and presence of the people, equipment, and operations would also temporarily diminish opportunities for solitude and primitive forms of recreation or the specific activity associated with the special designation.

4.2.18 Special Status Species

Actions that could occur through implementing each alternative could affect special status wildlife species. Resources and activities that could affect special status species on Decision Area lands are caves and karsts, cultural resources, fire management, forests and woodlands, lands and realty, livestock grazing, minerals, recreation and visitor services, renewable energy, riparian resources, soil and water, lands with wilderness characteristics, travel management, special designations, special status species, visual resource management, and wildlife management decisions. The adverse and beneficial impacts are described below for each resource.

Because of the large number of special status species—threatened, endangered, and BLM sensitive species—the BLM determined that the most effective way to disclose impacts at the programmatic level would be to analyze those on the habitat cover types used by these species (see **Chapter 3** for species and habitat descriptions). Accordingly, for the purposes of analysis, the special status species described in **Chapter 3** are grouped here by habitat type, as shown in **Table 4-63**, below. In some areas, based on the limited impact and varying by species type, impacts are discussed by alternative to give a more overall description of the impacts resulting from the management action.

Table 4-63: Primary Habitat Types Associated with Special Status Species

Vegetation/Habitat Type	BLM Sensitive Species	Federally Listed Species
Aquatic (431 acres)	Wildlife Northern leopard frog	Wildlife Rio Grande silvery minnow, Zuni bluehead sucker
Ponderosa Pine (3,598 acres)	Wildlife Mexican whip-poor-will, pinyon jay, Townsend's big-eared bat, spotted bat Plants Acoma fleabane	Wildlife Mexican spotted owl, Jemez Mountains salamander Plants Zuni fleabane
Piñon-Juniper (177,843 acres)	Wildlife Mexican Whip-poor-will, pinyon jay, Virginia's warbler, Townsend's big-eared bat, spotted bat Plants Acoma fleabane, Knight's milkvetch, tufted sand verbena	Plants Zuni fleabane
Riparian/Wetland (3,513 acres)	Wildlife Northern leopard frog, Townsend's big-eared bat, spotted bat Plants Parish's alkaligrass	Wildlife Southwestern willow flycatcher, New Mexican jumping mouse, yellow-billed cuckoo Plants Pecos sunflower
Shrub, steppe, scrub (334,235 acres)	Wildlife Monarch butterfly, western burrowing owl, piñon jay, Bendire's thrasher, Townsend's big-eared bat, spotted bat Plants Acoma fleabane, gypsum Townsend daisy, Knight's milkvetch, Todilto stickleaf, tufted sand verbena, Yeso twinpod	Wildlife Black-footed ferret Plants Zuni fleabane
Grassland (152,539 acres)	Wildlife Monarch butterfly, desert massasauga, western burrowing owl, Bendire's thrasher, Gunnison's prairie dog Townsend's big-eared bat, spotted bat Plants None	Wildlife Aplomado falcon, black-footed ferret Plants None
Other (59,440 acres)	N/A	N/A
Total (731,599 acres)	N/A	N/A

Direct impacts on special status wildlife result from the direct loss of critical habitat or a key habitat feature, such as a nest site or lek area, or from the immediate loss of life. Special status wildlife can also be directly disturbed by human activities, potentially causing them to abandon a nest, lek, or home range. It has been widely documented that disturbance during sensitive periods, such as winter and nesting, leads to lower recruitment rates and higher mortalities, which adversely impact special status species wildlife.

Habitat loss and fragmentation are well documented to adversely impact many special status wildlife species. Habitat loss generally is a direct impact; that is, the individual or population is immediately affected. The impacts of habitat fragmentation can also operate indirectly through such mechanisms as population isolation (Saunders et al. 1991); edge impacts, such as increased nest predation and parasitism (Paton 1994; Robinson et al. 1995); encroachment of noxious/invasive weeds; and disruption of migration patterns.

Indirect impacts on special status wildlife occur by changing habitat characteristics or quality, which can ultimately result in changes in migration patterns, habitat use, carrying capacity, and long-term population viability. Indirect impacts on habitats for special status wildlife also could occur when specific actions change the habitat in a way that makes it unsuitable for future habitation.

Disturbance impacts could range from short-term displacement and shifts in activities to long-term abandonment of home range (Miller 1998; Yarmaloy et al. 1988; Connelly et al. 2000). For the purpose of this analysis, short-term impacts (up to 5 years) on special status wildlife are those activities that an individual or species respond to immediately, but do not impact the population viability of the species. Long-term impacts (more than 5 years) are those that cause an individual or species to permanently abandon an area or that impact the population viability and survival of the species.

Allowable uses and management actions that contribute to the decline in abundance or distribution of special status plants are considered adverse. Conversely, beneficial impacts on special status plants consist of activities that protect habitat or reduce the risk of harm to these species in the Decision Area. An increase in special status plant numbers over time in response to an enhanced habitat or the increased viability of a species is considered a beneficial impact.

While direct impacts on special status plant species could be beneficial, they are defined, for this analysis, as actions resulting in damage to or loss of individual special status plants, fragmentation of habitat, loss of habitat quality, loss of pollinators, an increase in exotic species, and loss of soil seed banks. Surface-disturbing activities, herbivory, trampling, fire, recreation (such as mountain biking), and herbicide application are considered the primary means by which direct impacts on special status plants could occur. Activities that create or increase competition between special status plants are also considered direct impacts. Plant collection and OHV use also could directly impact special status plant populations. Indirect impacts on special status plant species are defined as actions that aid or compromise the protection of special status plants.

The loss or degradation of suitable habitat for special status plant species is considered a direct impact. Indirect impacts on potential habitats for special status plants also could occur when actions change the habitats in a way that makes them unsuitable for future colonization.

4.2.18.1 Analysis Assumptions

The following assumptions were used to analyze impacts on special status species from other proposed resource management decisions:

- Implementation of all of the alternatives are in accordance with existing laws, regulations, and standard management guidelines.
- Impacts on special status wildlife species are based primarily on potential impacts on habitats administered by the BLM.

- Precise quantitative estimates of impacts generally are not possible because the exact locations of future actions are unknown, population data for special status wildlife species are often lacking, or habitat types affected by surface-disturbing activities cannot be predicted.
- Actions affecting one species have similar impacts on other species using the same habitats or areas. Measures to protect one species generally will result in long-term benefits to other species occurring within that habitat. Where resources overlap, management actions associated with protecting wildlife habitats and cultural resources directly benefit special status plant species.
- The more acreage of habitat protected, the greater the benefit to the targeted species.
- Prescribed fire is used to manage vegetative communities and can result in short-term adverse impacts with long-term beneficial impacts on wildlife and wildlife habitats.
- Because of the migratory nature and relative mobility of some special status wildlife species (e.g., waterfowl, neotropical migrants, and raptors), these species are affected by actions on non-BLM-administered land more so than other species. In the case of migratory species, impacts on winter and migration habitats could adversely impact the viability of some species. Winter and migration habitats are assumed to be at least as important to long-term viability of these species as breeding and nesting habitats.
- New oil and gas leases have special leasing stipulations for protection of special status plant species.
- The total amount of new surface disturbance allowed by an alternative is a good index of potential impacts on special status plants. Success of reclamation measures prescribed as a condition of development is unknown and could underestimate the potential impact of surface disturbance on special status plant populations.
- The existing provisions in place (e.g., presence/absence surveys conducted prior to proposed actions) to protect special status species are carried out and conditional monitoring is conducted (e.g., grazing and surface disturbance reclamation) to ensure special status species are not jeopardized.

4.2.18.2 Direct and Indirect Impacts

4.2.18.2.1 Cave and Karst Resources Decisions

Cave and karst resource decisions would provide beneficial impacts on special status species, especially the two special status bat species that are known to occur on Decision Area lands. The Pronoun Cave Complex is the only known cave system on Decision Area lands. A bat survey conducted in 1998 found 13 species of bats in the Decision Area, five of which were documented in or near the cave complex (Gannon 1998). The Pronoun Cave Complex would be protected through an ACEC designation under Alternatives A, B, and C; therefore, the bat species and other special status species that use the caves would have the greatest protection under these alternatives. Site-specific NEPA analysis would be completed for proposed actions that occur within or near the Pronoun Cave Complex. As a result, future impacts on the special status species would be considered regardless of the proposed Pronoun Cave Complex ACEC status.

4.2.18.2.2 Cultural Resources Decisions

Cultural resources management decisions may have beneficial impacts on special status species because of restrictions on surface-disturbing activities that directly protect cultural resources and could indirectly protect special status species habitat and critical habitat. There are four cultural resource areas, Big Bead Mesa, Headcut Prehistoric Community, Azabache Station, and Fort Site and Ojo Pueblo, which have proposed surface restrictions under various alternatives. The surface restrictions, which vary by alternative and are described in **Chapter 2**, could include NSO or CSU for fluid leasable minerals, closed to salable mineral extraction, and/or recommended for withdrawal from locatable mineral entry. Motorized travel is also generally limited to existing or designated primitive roads and trails for these areas. The restrictions would result in additional beneficial impacts on special status species because surface disturbance would be

limited, thereby protecting special status species habitat. **Table 4-64** shows the number of acres for each cultural resource site that would have surface restrictions applied by alternative.

Table 4-64: Proposed Cultural Resource Areas with Surface Restrictions (Acres), by Alternative

Cultural Resource Area	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Azabache Station	80	80	80	80	~~80~~
Big Bead Mesa	300	300	300	300	~~300~~
Ojo Pueblo and Fort Site	0	1,200	1,200	0	~~0~~
Headcut Prehistoric Community	900	1,300	1,300	900	~~900~~
Total	1,280~~1280~~	**2,880**	**2,880**	1,280~~1280~~	~~1280~~

Source: BLM GIS 2020

4.2.18.2.3 Fire Management Decisions

Direction and guidance approved by the decisions for the comprehensive Fire and Fuels Plan Amendment (BLM 2004c), Updated Guidance for Implementation of Federal Wildland Fire Management Policy (BLM 2017), and the most recent RPFO Fire Management Plan (currently BLM 2011) have been incorporated into this RMP/EIS. It provides fire management direction common to all alternatives.

Fuels management actions include fuels reduction treatments on up to 32,000 acres annually. These actions include mechanical and manual treatments, prescribed fire, chemical or biological vegetation control, and aerial/ground seeding. These fuels management decisions would likely have a beneficial long-term impact on special status species populations by helping to restore the natural fire regime, which would improve habitat health (Lewis and Harshbarger 1976), forage, nesting opportunities, and cover. Restoring the natural fire regime would also reduce the chance of catastrophic fire and the subsequent loss of major ecosystem components.

Long-term adverse impacts could include the transition in vegetation to early seral stages, which could cause special status species to seek new and more suitable habitat and could cause mortality for special status plant species. In the short term, vegetation treatments could result in trampling or removal of special status species forage and/or habitat, human-caused wildfire disturbance, and direct mortality of special status plant species. **Table 4-65** displays the number of acres proposed for fire management treatments within each habitat type.

Table 4-65: Proposed Fire Management Treatments (Acres) on Decision Area Lands, by Habitat Type

Vegetation/Habitat Type	Proposed Fire Management Treatments (acres)
Aquatic	100
Grassland	143,800
Other	19,500
Piñon-Juniper	161,900
Ponderosa Pine	3,600
Riparian/Wetland	3,400
Shrub, Steppe, Scrub	275,100
Total	**607,500**

Source: BLM GIS 2020

4.2.18.2.4 Forests and Woodlands Decisions

Forests and woodlands management decisions could impact special status species because habitat would be open to forest product removal under each alternative. Adverse impacts on special status species from forest product removal would include direct habitat loss, habitat degradation, and habitat fragmentation. Indirect, adverse impacts of wood gathering on special status species and their habitats include trampling and removal of native vegetation. This would result in habitat degradation that can include reduced prey species, forage species, and cover. Indirect, adverse impacts of wood gathering on special status bird species would also include reduced reproductive opportunity due to removal of trees, causing a decrease in nesting substrate.

Forest and woodland decisions could also have beneficial impact on special status species. The goals and objectives of the forests and woodlands program not only focus on harvesting of forest products, but also on managing forested areas for ecosystem health. This includes habitat, watershed processes, and riparian restoration and enhancement.

Vegetative treatment would result in improvements to habitat that may benefit many wildlife species. Studies have shown that where dense stands of piñon-juniper have been thinned, understory vegetation increased dramatically on the heaviest thinned plots and the number of vegetation species present also increased significantly. Forest restoration projects could be designed to improve habitat by favoring certain vegetation types over others, reducing tree densities, altering spatial distribution of trees, or reducing erosion and increase herbaceous ground cover through lop and scatter of slash.

Under all alternatives, the RPFO would consider BMPs as specified in **Chapter 2**, **Section 2.2.5.3**, which would consider mitigating adverse impacts on special status species known to occur in the particular area.

Table 4-66 shows the proposed forest product harvest areas that would be available on Decision Area lands, by habitat type and alternative. Under Alternative~~s~~ D ~~and E~~, the largest percent of habitat types within Decision Area lands would be open to forest product harvest, and under Alternative A, the smallest percentage of habitat types would be open to forest product harvest.

Table 4-66: Proposed Forest Product Harvest Areas (Acres) within Habitat Types on Decision Area Lands, by Alternative

Vegetation/Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Aquatic	0	300	400	400	~~400~~
Grassland	900	29,100	119,700	136,800	~~136,800~~
Other	200	5,800	35,500	53,900	~~53,900~~
Piñon-Juniper	5,500	23,700	133,400	146,800	~~146,800~~
Ponderosa Pine	400	100	600	1,300	~~1,300~~
Riparian/Wetland	200	400	2,200	2,600	~~2,600~~
Shrub, Steppe, Scrub	5,000	61,200	256,000	291,700	~~291,800~~
Total	**12,200**	**120,600**	**547,800**	**633,600**	~~**633,700**~~
Percent of Decision Area lands	2%	16%	75%	87%	~~87%~~

Source: BLM GIS 2020

4.2.18.2.5 Lands and Realty Decisions

Lands and realty management decisions that have the potential to have adverse impacts on special status species and their habitat would result from authorizations of right-of-way grants and the expansion or development of utility corridors. These actions would create surface disturbances of various magnitudes, depending on the size and location of the project. Surface impacts from construction of communication facilities and other developments requiring a right-of-way would be disclosed in site-specific NEPA documentation. There would also be potential for the introduction of noxious or invasive plant species via construction equipment, vehicles, and personnel; however, the adverse impacts would be mitigated through BMPs, noxious weed controls, and restoration and rehabilitation measures outlined in management common to all alternatives for lands and realty and vegetation communities in **Chapter 2**.

Rights-of-way are authorized for uses such as pipelines, roads, sites and transmission. Implementation of all these actions results in large amounts of surface disturbance. These impacts are adverse and are difficult to mitigate because facilities often require the creation and maintenance of new roads for long-term use. If such disturbance occurs in special status species habitat, it would adversely affect special status species because it would cause loss and/or fragmentation of contiguous habitat.

The facilities themselves can also have adverse effects on special status species. For example, power lines can have severe adverse impacts on special status birds and migratory bird species because they cause electrocution and are flight impediments that cause mortality by collision. To mitigate these effects, power line construction should follow the Suggested Practices for Avian Protection on Power Lines (Avian Power Line Interaction Committee 2006). Mitigation includes such actions as covering conductors and spacing transmission lines apart certain distances to prevent large birds from getting tangled between lines. If these and other mitigation measures are applied at the time of implementation, adverse impacts can be reduced.

Lands and realty decisions would also adversely impact special status species by those decisions to dispose of BLM-administered lands. Disposal of lands could result in fragmentation of otherwise contiguous habitat, depending on land use and ownership patterns. By transferring lands to private ownership, development, and human activities, including introducing domestic pets or livestock, could disturb special status species or degrade adjacent habitat quality. Indirect impacts from land disposals could include disturbance to special status species and degradation of habitat on those lands that remain in public ownership adjacent to the associated disposed lands. Land disposals surrounding urban areas could result in the elimination of a buffer zone protecting special status species and their habitat. **Table 4-67** displays the number of acres proposed for land disposal by alternative.

Table 4-67: Proposed Land Disposals (Acres), by Alternative and Vegetation Type

Commented [AA42]: To be updated with revised disposal data

Vegetation/Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Aquatic	300	300	300	300	~~600~~
Grassland	14,300	14,400	30,200	31,300	~~34,700~~
Other	4,000	4,300	15,500	15,600	~~15,700~~
Piñon-Juniper	24,800	26,000	35,400	35,400	~~40,200~~
Ponderosa Pine	~~10,800~~ 200	~~10,900~~ 500	~~34,400~~ 500	~~36,300~~ 500	~~200~~
Riparian/Wetland	~~200~~ 700	~~500~~ 700	~~500~~ 1,000	~~500~~ 1,000	~~1,200~~
Shrub, Steppe, Scrub	~~700~~ 10,800	~~700~~ 10,900	~~1,000~~ 34,400	36,300 ~~1,000~~	~~36,900~~
Total	**54,900**	**57,000**	**117,300**	**120,400**	~~**129,500**~~

Source: BLM GIS 2020

Beneficial impacts could result from land acquisitions and the identification of exclusion and avoidance areas for rights-of-way. Land acquisitions could result in the protection of special status species habitat that may not otherwise occur if the land in question were managed by a private entity. Rights-of-way exclusion areas would offer greater protection for special status species habitat than avoidance areas. This is because they would completely preclude surface-disturbing activities.

4.2.18.2.6 Livestock Grazing Decisions

Livestock grazing can have both adverse and beneficial impacts on special status species. Livestock grazing allotments occupy 637,535 acres (87 percent) of Decision Area lands. Adverse impacts could occur as a result of livestock grazing where special status plant species occur but have not yet been identified. These adverse impacts could occur through trampling of special status plants and consumption of species that are palatable to livestock.

In areas where the location of special status plant species is known, adverse impacts would be prevented through mitigation. Mitigation could include excluding grazing from special status plant population areas by fencing or placing water developments and mineral supplements away from sensitive plant habitats. Livestock grazing management decisions, including the continuing implementation of the New Mexico Standards and Guidelines (BLM 2001b), can benefit some special status species habitat by promoting regrowth of forage species, reducing the prevalence of some invasive plants, and creating openings and disturbed areas used by some species.

Other beneficial impacts from livestock grazing for special status species and their habitat would occur when range improvements are implemented in the Decision Area. Special status species may use range improvements, such as watering tanks, when placed within or near their habitat.

4.2.18.2.7 Mineral Resources Decisions

Impacts from minerals decisions on special status species and their habitats could include habitat loss and degradation resulting from the removal of vegetation (surface disturbance), and subsequent occupation of areas for oil and gas well pads, open pit mines, and associated roads and infrastructure. Species avoidance of disturbed and occupied areas would reduce their value as habitat. Many species avoid areas with high or inconsistent levels of noise, roads with frequent vehicle traffic, areas that are heavily lit at night, and areas surrounding structures.

Adverse impacts of minerals decisions on special status species would be reduced by the implementation of leasing stipulations and BMPs. Under all alternatives, the RPFO would complete, as required, ESA Section 7 consultation with the USFWS for leasing activities. Alternatives B, C, and D~~, and E~~ also include a proposed CSU stipulation that could delay a surface-disturbing or disruptive activity for 90 days and could control or exclude the activity within 0.25 mile~~s~~ of identified habitat or nests.

The amount of land that is open to oil and gas leasing or other mineral development is not necessarily indicative of the number of acres that would be directly disturbed. Areas managed under standard or TL and/or CSU stipulations allow mineral development, but not all of those acres would be subjected to surface disturbance.

Habitat quality may be preserved by the implementation of seasonal restrictions and spatial buffers that protect crucial habitats. For example, habitat areas for special status plant species that are located in low reclamation opportunity soils would be closed to oil and gas leasing under Alternative B. Areas categorized as NSO or closed preclude all surface-disturbing mineral development and therefore improve the quality and condition of wildlife habitats.

Table 4-68 shows the number of acres that would be managed as NSO or CSU or closed to oil and gas leasing, by alternative and habitat type. **Table 4-69** shows the number of acres closed to salable mineral

extraction, and **Table 4-70** shows the number of acres that would be recommended for withdrawal from locatable mineral entry, by alternative and habitat type.

Table 4-68: Habitat Type (Acres) Proposed as NSO, CSU, or Closed to Fluid Minerals Leasing, by Alternative

Vegetation/Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Aquatic	0	0	100	100	~~0~~
Grassland	Closed: 13,400 NSO: 1,600 CSU: 2,600	Closed: 22,500 NSO: 8,100 CSU: 31,000	Closed: 15,400 NSO: 6,300 CSU: 37,800	Closed: 12,400 NSO: 900 CSU: 43,300	~~Closed: 12,300~~ ~~NSO: 4,600~~
Other	Closed: 3,100 NSO: 500 CSU: 500	Closed: 12,100 NSO: 4,400 CSU: 5,900	Closed: 8,100 NSO: 2,100 CSU: 9,700	Closed: 2,700 NSO: 700 CSU: 17,600	~~Closed: 2,700~~ ~~NSO: 8,100~~
Piñon-Juniper	Closed: 8,600 NSO: 800 CSU: 7,800	Closed: 15,700 NSO: 8,200 CSU: 5,900	Closed: 15,200 NSO: 3,500 CSU: 26,700	Closed: 8,600 NSO: 2,700 CSU: 32,700	~~Closed: 8,600~~ ~~NSO: 17,400~~
Ponderosa Pine	0	NSO: 3,900	NSO: 3,900	CSU: 3,000	~~NSO:700~~
Shrub, Steppe, Scrub	Closed: 34,300 NSO: 3,600 CSU: 7,700	Closed: 48,000 NSO: 14,700 CSU: 4,300	Closed: 40,200 NSO: 15,300 CSU: 101,800	Closed: 33,400 NSO: 3,300 CSU: 115,600	~~Closed: 33,200~~ ~~NSO: 9,800~~
Riparian/Wetland	Closed: 100 NSO: 0 CSU: 100	Closed: 100 NSO: 200 CSU: 200	Closed: 100 NSO: 100 CSU: 300	Closed: 100 NSO: 100 CSU: 300	~~Closed: 100~~ ~~NSO: 200~~

Source: BLM GIS 2020

Table 4-69: Habitat Type (Acres) Proposed as Closed to Salable Mineral Extraction, by Alternative

Vegetation/Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Aquatic	0	0	0	0	~~0~~
Grassland	17,200	36,900	24,700	16,000	~~16,800~~
Other	4,200	17,400	10.900	4,100	~~4,000~~
Piñon-Juniper	35,400	47,000	39,700	35,900	~~35,400~~
Ponderosa Pine	2,300	3,200	3,200	2,300	~~2,300~~
Riparian/Wetland	900	1,300	1,2000	900	~~900~~
Shrub, Steppe, Scrub	46,000	84,300	61,200	45,400	~~45,000~~
Total	**106,000**	**190,200**	**140,900**	**105,600**	~~**104,400**~~

Source: BLM GIS 2020

Commented [AA43]: To be updated with revised Alt D CSU data

Commented [AA44]: To be updated with revised data for Alt B closed to salable minerals

Commented [AA45]: To be updated with revised data for Alt C closed to salable minerals

Table 4-70: Habitat Type (Acres) Recommended for Withdrawal from Locatable Mineral Entry, by Alternative

Vegetation/Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Aquatic	0	100	100	0	~~0~~
Grassland	1,300	51,900	45,400	3,330	~~900~~
Other	600	20,700	19,300	2,000	~~400~~
Piñon-Juniper	600	37,800	37,800	2,700	~~600~~
Ponderosa Pine	0	300	300	0	~~0~~
Riparian/Wetland	100	400	400	100	~~100~~
Shrub, Steppe, Scrub	2,700	128,100	120,700	6,000	~~1,800~~
Total	**5,400**	~~239,200~~239,300	**224,000**	**14,200**	~~3,800~~

Source: BLM GIS 2020, Ojito Wilderness is withdrawn from mineral entry.

Commented [AA46]: To be updated with revised data for Alt B recommended for withdrawal from locatable minerals

4.2.18.2.8 Recreation and Visitor Services Decisions

In general, special status species can be adversely affected by recreation caused by human interactions, including higher noise levels, litter, and wildlife harassment and/or degradation of habitat (Knight and Gutzwiller 1995). While camping tends to be more concentrated along riparian areas, such as Bluewater Creek, locally there can be major impacts on vegetation and streambank stability.

Collection of firewood for campfires has the potential to adversely impact special status species with removal of live, dead, and downed material. This material provides shelter for various species, including birds, small mammals, bats, reptiles, and amphibians. OHV use and other disturbances to soils from unauthorized travel increase soil loss from wind and water erosion, which can further degrade habitat quality. Where this occurs repeatedly, impacts on species, vegetation, and soils could be an issue at the site, but minor at the landscape level.

Increased development of trails, climbing routes, and other recreation pursuits throughout the Decision Area could increase habitat fragmentation and adversely impact special status species (Rost and Bailey 1979; Wisdom et al. 2005). Under Alternatives B, C, and D~~, and E~~, SRMAs and ERMAs are proposed on Decision Area lands. These areas could facilitate an increase of visitors. This is because they are managed to provide specific recreation opportunities. Increased visitation by recreational user groups could result in an increase in human disturbance to wildlife. **Table 4-71** shows the habitat types that SRMAs and ERMAs would encompass.

Table 4-71: Vegetation/Habitat Types (Acres) within Proposed SRMAs and ERMAs, by Alternative

Vegetation/Habitat Type	Alternative A (No Action)	Alternatives B, C (Proposed RMP~~Draft RMP/EIS Preferred~~), and D	~~Alternative E (Proposed RMP)~~
Aquatic	0	100	~~0~~
Grassland	0	56,500	~~8,000~~

Vegetation/Habitat Type	Alternative A (No Action)	Alternatives B, C (Proposed RMP~~Draft RMP/EIS Preferred~~), and D	~~Alternative E (Proposed RMP)~~
Other	0	32,500	~~3,300~~
Piñon-Juniper	0	53,100	~~15,100~~
Ponderosa Pine	0	3,100	~~0~~
Riparian/Wetland	0	1,100	~~0~~
Shrub, Steppe, Scrub	0	140,400	~~47,600~~
Total	**0**	**286,800**	~~**74,000**~~
Percentage of Decision Area lands	0%	39%	~~10%~~

Source: BLM GIS 2020

4.2.18.2.9 Renewable Energy Decisions

Renewable energy management decisions that have the potential to have adverse impacts on special status species and their habitat could result from authorizations for development of renewable energy projects. Renewable energy projects would create surface disturbances of various magnitudes depending on the size and location of the project. Solar and wind energy development projects would directly remove vegetation and would result in habitat fragmentation. Additionally, wind farms are known to cause high rates of mortality in bats and birds, and would have severe adverse impacts on those species. These and other impacts from wind and solar energy development would be disclosed in site-specific NEPA analyses.

There would also be high potential for the introduction of noxious or invasive plant species via construction equipment, vehicles, and personnel. Although the adverse impacts would be mitigated through BMPs, noxious weed controls, and restoration and rehabilitation measures, special status species habitats affected by all renewable energy development projects would be adversely affected directly, in the short term, and in the long term due to the longevity of such projects.

Beneficial impacts would result from the identification of exclusion and avoidance areas for renewable energy projects. Exclusion areas would offer greater protection for special status species habitat than avoidance areas. This is because they would completely preclude surface-disturbing activities.

4.2.18.2.10 Riparian Resources Decisions

There are many goals shared by the riparian and special status species programs, the main one being the protection, restoration, and enhancement of riparian ecosystems and biodiversity. Many special status species are riparian obligate or facultative species that heavily rely on riparian habitat for parts or all of their life cycle. Due to this close association, riparian resources management decisions would have beneficial impacts on special status species in the Decision Area. The riparian/wetland areas within the Decision Area support 28 special status species, including the endangered southwestern willow flycatcher. Under Alternatives B and C, a leasing stipulation is proposed for protection of riparian resources (NSO under Alternative B and CSU under Alternative C). No leasing stipulations are proposed for riparian resources under Alternatives A or, D~~, or E~~. Alternatives B and C would have beneficial impacts on riparian resources because they would protect riparian habitat from surface-disturbing activities.

4.2.18.2.11 Special Status Species Decisions

Under all alternatives, no management action would be permitted on public lands that would jeopardize the continued existence of plant or animal species that are listed, officially proposed, or candidates for listing as threatened and endangered. The BLM would commit to current and future conservation agreements, management plans, and recovery plans specific to threatened and endangered species and BLM sensitive species, as described in **Section 2.2.17**, Special Status Species.

To support future black-footed ferret reintroductions, Gunnison's prairie dogs would be protected under Alternatives B, C, and D~~, and E~~. Under Alternative B, the RPFO would protect prairie dogs on BLM-administered land by restricting shooting of prairie dogs in identified augmented prairie dog sites year-round. Under Alternative C, the RPFO would protect prairie dogs on BLM-administered land during the breeding season (March 15–June 15) by restricting shooting in identified augmented prairie dog areas. Under all alternatives, the BLM would coordinate with internal and external stakeholders and agencies prior to implementing any restrictions on prairie dog shooting. If recreational shooting is determined to be a significant threat to a BLM-managed prairie dog colony, the BLM would consider managing recreational shooting.

In addition, activities determined to adversely impact prairie dogs and/or associated species or habitat would be strictly controlled within 0.5 mile~~s~~ of (Alternative B), within 0.25 mile~~s~~ of (Alternative C), and only within (Alternative~~s~~ D ~~and E~~) prairie dog towns if an activity would adversely impact prairie dogs and/or associated species. Selection of any of these alternatives would have beneficial impacts on prairie dogs and indirectly may benefit black-footed ferrets in the long term; however, Alternative B would have the most beneficial impacts.

Under management common to all alternatives for the southwestern willow flycatcher, the BLM would implement the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002). It also would engage in active riparian restoration and enhancement projects aimed at increasing and improving occupied, suitable, and potential breeding habitat. The BLM would also prioritize the treatment of noxious and invasive species within potential southwestern willow flycatcher habitat.

Treatment of saltcedar in known or potential nesting flycatcher habitat would have adverse impacts on nesting flycatchers. This is because the species is now known to nest in saltcedar successfully. Contrary to previous notions, saltcedar actually does provide adequate and optimal nesting substrate for the species, and nesting flycatchers have been observed in sites occupied by both saltcedar and willows.

To protect special status plants, the BLM would design placement of water developments and salt and mineral supplements for livestock at 0.25 mile~~s~~ (Alternative B), 500 feet (Alternative C), or 300 feet (Alternative~~s~~ D ~~and E~~) away from known locations of special status plants. The beneficial impacts of these actions include deterring livestock from congregating on special status plant populations and/or habitat. The farther away water developments and mineral supplements are away from these sensitive populations, the less likely these populations are to be trampled by livestock. The BLM would consider the impacts of a concentration of browsing/grazing animals on known locations of special status plants.

4.2.18.2.12 Soil and Water Decisions

Under all alternatives, soils and water management decisions would comply with New Mexico Standards and Guidelines (BLM 2001b). In addition, all floodplains and riparian/wetlands would be managed in accordance with Executive Orders 11988 and 11990, which would protect the quality of stream water and federally listed species habitat. Uses on Decision Area lands would be managed to minimize and mitigate damage to soils, and activities in areas with sensitive soils would be subject to site-specific NEPA analysis. These restrictions would decrease the number of acres on Decision Area lands subject to the adverse impacts of surface-disturbing activities on wildlife habitats, including surface water contamination and sedimentation by runoff from disturbed soils.

Under Alternatives B and C, the RPFO would prohibit surface-disturbing activities within 200 meters (656 feet) of riparian areas and springs. Fluid mineral leasing stipulations would implement CSU for 15 percent to 30 percent slopes (Alternatives B and C), NSO for slopes over 30 percent (Alternatives B, C, and D~~, and E~~), and CSU for low reclamation soils (Alternatives B and C). These actions would help mitigate the adverse impacts of surface-disturbing activities on special status species and their habitats.

4.2.18.2.13 Special Designations Decisions

Special designation areas, such as ACECs, would generally have long-term positive impacts on special status species that occur within their boundaries by limiting or preventing surface disturbance, human activities, and associated habitat degradation and fragmentation. Impacts on special status species vary among alternatives, primarily according to the proposed acreage of these specifically designated areas.

Four ACECs are proposed for designation in order to protect rare plants. The Cabezon Peak, Espinazo Ridge, and Torreon Fossil Fauna ACECs would be designated under all alternatives. The Ojito ACEC would be designated under Alternatives A, B, and C. **Table 4-72** provides the size of proposed ACECs for special status species, specifically rare plants, by alternative. Alternative B would provide the greatest number of acres of special designations for special status species, and Alternative D would provide the smallest number of acres.

Table 4-72: Proposed ACECs (Acres) for the Protection of Special Status Species, by Alternative

Proposed ACEC	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Cabezon Peak	5,100	14,600	14,600	6,200	~~5,100~~
Espinazo Ridge (formerly Ball Ranch)	1,500	7,200	7,200	1,500	~~1,500~~
Ojito	13,700	13,700	3,900	0	~~0~~
Torreon Fossil Fauna	5,900	5,900	5,900	5,900	~~5,900~~
Total	**26,200**	**41,400**	**31,600**	**13,600**	~~**12,500**~~

Source: BLM GIS 2020

ACEC designations would indirectly benefit special status species by limiting human and surface disturbance, preserving habitat, or preventing noise. Where established, ACECs would be avoidance areas for rights-of-way and renewable energy developments, including wind and solar energy sites. Prohibiting these uses within ACECs would prevent adverse impacts on special status species and migratory birds from these developments and their implications for surface disturbance and habitat loss/fragmentation.

The designation of ACECs could increase recreational use in those areas, resulting in increased impacts on special status species and their habitat. Increased interpretation, monitoring, maintenance, and enforcement along proposed ACECs by the BLM and interested partners would strive to minimize existing or additional impacts on special status species from recreation; however, these impacts would be carefully considered in greater detail at the implementation level, based on the type of recreation that is expected to occur and the sensitivity level of the special status species or habitat in question to that specific recreation type.

ACECs are not designated for recreation but, because of their unique nature, have a higher probability of becoming points of interest to recreational users. Disclosing information about sensitive areas to the public can be a risk, due to the possible heightened interest and consequential increase of recreational interest and visitation to those areas.

Table 4-73 shows the proposed ACECs designations by habitat type on Decision Area lands.

4.2.18.2.14 Lands with Wilderness Characteristics Decisions

Alternatives B proposes to manage 37,410 acres to protect wilderness characteristics, while Alternative C would manage 26,040 acres to protect wilderness characteristics and 4,070 acres of lands to partially protect

wilderness characteristics. These alternatives would generally benefit special status species by reducing habitat degradation and fragmentation. Alternative B would have a more beneficial impact because more acres would be protected from surface-disturbing activities.

Table 4-73: Proposed ACECs (Acres) on Decision Area Lands, by Habitat Type and Alternative

Vegetation/ Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Aquatic	0	0	0	0	~~4,700~~
Grassland	11,300	22,000	19,600	6,600	~~1,100~~
Other	2,100	11,800	11,600	4,900	~~6,400~~
Piñon-Juniper	7,100	42,100	42,000	11,700	~~0~~
Ponderosa Pine	0	3,000	3,000	0	~~0~~
Riparian/Wetland	100	1,200	1,200	200	~~9,500~~
Shrub, Steppe, Scrub	25,500	53,200	45,700	15,000	~~4,700~~
Total ACEC acres	**46,000**	**133,300**	**123,000**	**38,300**	~~**21,700**~~
Percent of Decision Area lands	6%	18%	17%	5%	~~3%~~

Source: BLM GIS 2020

Protection of lands with wilderness characteristics under Alternatives B and C includes limiting vehicle access and excluding or avoiding new rights-of-way and renewable energy developments. **Table 4-74** displays the proposed lands that would be managed to protect or partially protect wilderness characteristics, by habitat type.

Table 4-74: Lands with Wilderness Characteristics (Acres) Managed to Protect or Minimize Impacts on Those Characteristics, by Habitat Type and Alternative

Vegetation/Habitat Type	Alternatives A (No Action)~~, and D, and E (Proposed RMP)~~	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)
Aquatic	0	0	0
Grassland	0	5,800	5,300
Other	0	17,100	11,600
Piñon-Juniper	0	3,000	2,400
Ponderosa Pine	0	600	600
Riparian/Wetland	0	200	200
Shrub, Steppe, Scrub	0	10,700	10,100
Total	**0**	**37,500**	**30,200**
Percent Decision Area lands	0%	5%	4%

Source: BLM GIS 2020

Volcano Hill and Cimarron Mesa are mostly composed of short to medium shrubby grasslands. There are small sections within Cimarron Mesa that are piñon-juniper woodlands, lightly to moderately dense. Neither of these habitat types is suitable for either area's two known threatened and endangered species with critical habitat requirements, the Pecos sunflower and the Mexican spotted owl. Due to the lack of suitable habitat

in either Volcano Hill or Cimarron Mesa, it is not expected that there will be any impacts on threatened and endangered species.

Some BLM sensitive plant species are known to occur in these habitat types and would be adversely affected under Alternative A, due to the open travel area at Cimarron Mesa. This use would have adverse impacts on rare plants, due to direct disturbance of vegetation by vehicular travel.

4.2.18.2.15 Travel Management Decisions

The impacts of travel decisions on special status species would primarily depend on the number of acres open and closed to motorized travel use under each alternative. Motorized travel use can damage vegetation used as wildlife forage and cover, as well as cause noise disturbance. OHV use therefore generally has adverse impacts on special status species, especially birds, in the Decision Area (Reijnen and Foppen 1994; Gelbard and Belnap 2003). Areas closed to OHV use would include some WSAs.

OHV use also contributes to habitat fragmentation and habitat degradation, including the spread of noxious weeds. Habitat fragmentation may be less obvious than direct impacts, such as vehicle collisions with species or vegetation removal, but often carries considerable consequences for long-term population and reproductive success. In general, the fewer routes available for motorized travel, the less habitat loss and/or fragmentation that would occur. **Table 4-75** shows the proposed acreages closed to travel on Decision Area lands.

Table 4-75: Closed Travel Management Areas (Acres) of Decision Area Lands, by Alternative

Vegetation/ Habitat Type	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Aquatic	0	0	0	0	~~0~~
Grassland	16,800	28,700	19,800	15,700	~~15,700~~
Other	5,700	24,300	17,000	5,500	~~5,500~~
Piñon-Juniper	31,700	44,900	33,200	30,900	~~31,000~~
Ponderosa Pine	2,300	3,200	2,900	2,300	~~2,300~~
Riparian/Wetland	900	1,200	1,100	800	~~800~~
Shrub, Steppe, Scrub	44,600	74,100	50,000	42,500	~~42,400~~
Total	**102,100**	**176,600**	**124,000**	**97,800**	~~**97,800**~~
Percent of Decision Area lands	14%	24%	17%	13%	~~13%~~

Source: BLM GIS 2020

4.2.18.2.16 Vegetative Communities Decisions

Vegetative treatment could result in improvements to habitat that may benefit special status species, with the assumption that such treatments are carefully prescribed and carried out with specific special status species objectives in mind. Sagebrush thinning treatments that provide minimal disturbance to soils, including the use of prescribed fire, chemical treatments, or mechanical blading (shaving), could increase vegetative diversity, providing greater habitat choices to a variety of species; however, special status species dependent on or utilizing sagebrush ecosystems would suffer from eradication of sagebrush in areas treated by the aerial application of chemical herbicides. Piñon-juniper thinning, either through prescribed fire or mechanical means, would allow more sunlight and water to reach the understory for grass and forb growth and increased vegetative diversity and structure, which provide additional habitat for more species of animals.

Type conversion Over-thinning of piñon-juniper woodlands to grasslands would have an adverse impact to piñon-juniper obligate species.

Vegetative treatments to reduce noxious or invasive species, such as saltcedar, cheatgrass, thistles, or knapweeds, would be beneficial to special status species habitat because treatments restore native plant communities and improve ecological health of the area. This determination relies on the assumption that treatments to control or eradicate noxious or invasive species are followed by actions that encourage reestablishment or reintroduction of native desired plant species, and reestablishment of noxious/invasive species is discouraged or prevented.

Vegetative treatments of saltcedar could result in short-term adverse impacts on nesting special status bird species. For example, southwestern willow flycatchers are known to nest in saltcedar. Under all alternatives, projects involving treatment of saltcedar in known southwestern willow flycatcher habitat would require consultation with the USFWS. Prescribed fire would likely result in the temporary loss of habitat but would have beneficial impacts in the long term.

All alternatives could benefit special status species habitat by using prescribed burning, planting native seed when possible and where beneficial to the habitat, and establishing natural disturbance regimes across the landscape to increase biodiversity and structure diversity. This would add long-term benefits to habitat for as many species as possible.

4.2.18.2.17 Wildlife and Fisheries Decisions

Wildlife and fisheries improvement projects would have beneficial impacts on special status species if planned and conducted consistently with special status species habitat improvement objectives. Accessible watering sites and wildlife-adapted fences would improve the mobility of special status species. Conversely, it is possible that wildlife improvements, such as vegetation treatments, for one particular species would adversely impact another species. Site-specific NEPA documentation would be completed before habitat improvement projects are approved by the RPFO, and impacts on special status species from other wildlife improvement projects would be analyzed at that time.

Many decisions common to all alternatives that are aimed at protection of wildlife and fisheries would have beneficial impacts on special status species. They include, but are not limited to, the following:

- The BLM would design all range and watershed improvements to achieve range, watershed, and wildlife objectives for maintaining, improving, or enhancing habitats.
- The BLM would install wildlife escape ramps in all new and existing water tanks or troughs.
- The BLM would require all new power lines to be built to "electrocution-proof" specifications for protection of migratory birds, using the Suggested Practices for Avian Protection on Power Lines (Avian Power Line Interaction Committee 2006).

4.2.18.2.18 Visual Resource Management Decisions

The BLM would implement prairie dog augmentation in support of the black-footed ferret recovery plan, but that would support other special status species that depend on or utilize prairie dog ecosystems or populations for all or a part of their life cycle.

The impacts on special status species from visual resources decisions are primarily associated with limitations on surface disturbance intended to reduce impacts on areas with high visual resource values. VRM Class I and II designations are the most restrictive of fluid mineral development and other surface-disturbing activities and would therefore be the most beneficial to special status species and their habitats. In areas designated as VRM Class I or II, surface-disturbing activities are generally prohibited or limited.

Chapter 2 shows the proposed VRM classes in acres. ~~The most a~~Acres of VRM Class I ~~are~~ would be the same ~~proposed~~ under all alternatives~~Alternative E, with Alternatives B, C, and D almost as high, while slightly fewer acres are VRM Class I under Alternative A~~. Under Alternative B, vastly more acres of VRM Class I are proposed than under the other alternatives, followed by Alternatives C, A, and D~~, and E~~.

4.2.18.3 Cumulative Impacts

Reasonably foreseeable projects that could adversely impact special status species include developments that would result in habitat loss or fragmentation. Mineral developments, new road projects, transmission lines, growth of urban areas, renewable energy projects, and other surface-disturbing activities that occur on public, private, or tribal lands near the Planning Area could remove species habitat. These projects, where specific project areas are known, account for approximately 6,000 acres of habitat disturbance.

Beneficial cumulative impacts on special status species would occur from such restoration projects as the Southwest Jemez Mountains Restoration Project, statewide fuel treatments, and riparian restoration projects. These projects would lead to restored native ecosystems that could support special status species and provide improved habitat areas for seasonal migrations. The planning area for these projects accounts for approximately 500,000 acres of forest restoration within and near the RPFO RMP Planning Area.

The BLM estimates that federal and state agencies would treat up to 206,800 acres with prescribed fire, 35,900 acres with mechanical treatments, and 10,000 acres with chemical treatments over 20 years (BLM 2004c, 2017). The Southwest Jemez Mountains Restoration Project is in the planning phases; the specific treatment areas are unknown at this time. The planning area for the project is approximately 210,000 acres in the southwest Jemez Mountains.

4.2.19 Travel Management

Travel management affects a variety of travel modes and opportunities for access to public lands. The alternatives vary in providing motorized and nonmotorized access. Motorized access would be managed under four possible categories, based on BLM-administered land use planning decisions and considering natural resource protection, route utility, and public safety: 1) open, which allows for unlimited travel, including cross country; 2) limited, which restricts use to specific routes and/or specific vehicle or types of uses or time of year; and 3) closed to OHV use.

The indicators for analyzing impacts on travel are as follows:

- Efficacy of road and trail densities to support goals related to conservation of scenic quality or sensitive habitat management or to accommodate certain uses
- Whether the road provides access to an important destination; provides access to private, state, or other federal lands; or is critical for recreation and resource use activities
- The number of acres designated as open, closed, or limited to existing or designated routes for recreation opportunities and access

4.2.19.1 Direct and Indirect Impacts

4.2.19.1.1 Travel Designations Decisions

Travel areas classified as open or limited to existing or designated roads, primitive roads, and trails would allow all forms of travel (i.e., motorized, mountain biking, and nonmechanized hiking and equestrian), which would have beneficial impacts on travel by providing opportunities for a wide range of travel modes. Areas closed to motorized travel would adversely affect travel because of the reduced opportunities for motorized access to areas on Decision Area lands. The number of acres designated as open, limited, or closed to OHV travel are shown in **Table 4-76**.

Table 4-76: Proposed Travel Management Categories (Acres), by Alternative

Category	Alternative A (No Action)	Alternative B	Alternative C (Proposed RMP~~Draft RMP/EIS Preferred~~)	Alternative D	~~Alternative E (Proposed RMP)~~
Open	301,900	4,600	18,300	19,500	~~18,300~~
Limited	327,600	550,500	589,300	614,300	~~615,500~~
Closed	102,100	176,600	124,000	97,800	~~97,800~~
Total	731,600	731,600	731,600	731,600	~~731,600~~

Source: BLM GIS 2020

Under Alternative B, the most acres would be closed to motorized travel, thereby providing the most adverse impact on travel. Alternative A proposed the greatest amount of acres open to motorized travel providing for the greatest beneficial impact on travel. ~~Under~~ Alternative~~s~~ D ~~and E~~proposes~~,~~ the least number of acres ~~would be~~ closed to motorized travel and~~.~~ ~~Alternative E (The Proposed RMP) proposes~~ the greatest number of acres of motorized travel limited to existing or designated roads and trails.

4.2.19.2 Impacts Common to All Action Alternatives

After approval of the RMP, if the BLM Authorizing Officer determines that OHV travel use would cause or have the potential to cause adverse impacts, then an area could be closed to travel or travel restrictions would be imposed. This would potentially have long-term, adverse impacts on travel because opportunities would be reduced.

Once ~~Travel~~ travel allocations are established in the RMP, designated routes could be established during travel management planning, and modified or adjusted at the implementation and project-planning level. The route adjustments would be done through a collaborative process involving local governments and the public. The impacts on travel management would be beneficial in the long term because potential travel-related resource use conflicts would be identified and satisfactorily resolved since the route modification process would include interested and/or concerned stakeholders.

4.2.19.3 Alternatives Impacts

Management decisions from the following resources would have negligible impacts on travel management and are not analyzed further in this section; they would not change designated travel routes and OHV travel within the RPFO: fire management, health and human safety, lands and realty, livestock grazing, paleontology, recreation, riparian, soils/watershed, special status species, visual resources, wildlife and fisheries, and woodlands. The impacts would be negligible because reducing the risks of wildland fire; protecting public safety around AML sites and reducing the risks of hazardous materials spills; designating ROWs, lands acquisition, exchange, or sales; establishing livestock utilization levels and applying rangeland grazing standards and guidelines; managing recreational areas and user groups; protecting riparian areas, sensitive soils, and water resources; protecting federally listed species and other non-listed wildlife and fish species; protecting scenic quality; and permitting woodland harvesting.

4.2.19.4 Air Quality Decisions

Air quality management common to all of the alternatives would require compliance with NMED air quality regulations. BLM policy requires monitoring and managing exhaust emissions and fugitive dust to prevent deterioration of air quality within potentially affected national park Class I areas near the RPFO. The impacts on travel would be minor, based on compliance with NMED air quality regulations.

4.2.19.5 Cultural Resource Decisions

Under all of the action alternatives cultural sites could be closed to visitation if it were determined that travel-related activity threatens cultural site integrity. If sites were closed, then travel opportunities could be adversely affected in the short term or long term, depending on RPFO decisions to protect a threatened site. Compared with Alternative A, the action alternatives, including ~~and~~ Alternative C (the Proposed RMP), would potentially have more long-term, adverse impacts on travel opportunities because access would be reduced to protect cultural and other resources.

4.2.19.6 Minerals Decisions

Minerals-related access roads would be constructed under all of the alternatives and would be generally available for use by the public, but the RPFO-predicted level of mineral resource development would result in a relatively small number of additional access roads (i.e., spur roads to drilling sites), when compared with the existing or designated routes within the RPFO. Minerals decisions that permit oil and gas exploration and development would have beneficial but minor impacts on travel access and opportunities because minerals-related access roads would increase opportunities.

4.2.19.7 Lands with Wilderness Characteristics Decisions

Under Alternatives B and C, where lands with wilderness characteristics would be managed to protect wilderness characteristics, those units would be closed to travel. This would adversely impact those recreationists who engage in motorized activities by removing those acres of available OHV routes; however, this would provide a beneficial impact on those recreationists seeking a more primitive experience. No similar impact would occur under Alternatives A or, D~~, or E~~.

4.2.19.8 Special Designations Decisions

Under all alternatives, the following would be limited to routes designated under prescriptions to protect resource values in these areas or under the Transportation Travel Plan: OHVs, mountain biking, and travel within ACECs. Under Alternatives A, B, and C, ~~and E~~, non-mechanized recreational travel and access opportunities within the Bluewater Creek WSR segment would be limited to routes either designated under prescriptions to protect resource values in these areas or under the Transportation Travel Plan. These limitations would have negligible to minor impacts on travel opportunities because travel routes into these areas would be allowed under all alternatives; however, no areas would be designated as open to cross-country OHV travel within special designations. This would have long-term, adverse impacts on this form of travel because cross-country travel opportunities within these areas would be prohibited.

For WSA and Wilderness areas, the impacts on travel opportunities would continue to be adverse in the long term within these areas, as access and travel opportunities would not be available to OHVs.

4.2.19.9 Vegetation Decisions

For all of the action alternatives, prescriptions for managing drought conditions under the proposed adaptive drought management plan could adversely restrict travel or reduce travel opportunities in the short term by closing areas to public entry. This would potentially have more adverse impacts on travel than under Alternative A because closing areas to public entry under the drought plan would restrict travel opportunities; however, these impacts would be minor because they would likely be short term and would be imposed only under exceptional conditions.

4.2.19.10 Cumulative Impacts

Reasonably foreseeable future actions affecting travel management include the addition of routes for fire and fuels management to reduce the risks of wildfire, new minerals exploration and development routes, increased recreational demand and visitation by adding new routes, and other changes in travel management. The Northwest Loop Road would impact travel management within the Planning Area. The Northwest Loop

Road, approximately 39 miles, would beneficially impact travel within the Planning Area. The public would have decreased travel times within the project vicinity. It is anticipated that at least 45 to 60 minutes of travel time between Interstate 40 and US Highway 550 could be saved by the proposed Northwest Loop Road.

Transportation and road networks adjacent to BLM-administered lands include routes shared with other federal agencies, the SLO, tribes, and private landowners. Cumulative impacts on transportation and access would occur primarily from actions that facilitate, restrict, or preclude motorized access. Management actions that restrict OHV use would limit the degree of travel opportunities and the ability to access certain portions of the Planning Area. The continued maintenance of federal and state highways would provide arterial connections to BLM-administered roads. County-maintained routes that connect federal and state highways to BLM system routes would maintain and improve access to resources in the Planning Area.

The RPFO has reviewed the travel management plans for the neighboring Santa Fe and Cibola National Forests. The cumulative impacts of travel management decisions in these plans, as well as those of other jurisdictions, would have beneficial cumulative effects on recreational and visitor services. This would come about when travel management decisions by other agencies support the proposed travel management decisions in this RMP/EIS, especially for shared roads. For example, if the Forest Service shares management of a road with the RPFO, and the travel management decisions for how to manage the road are the same (i.e., agencies manage a road as limited to existing). This would lead to beneficial impacts on recreation. In this case, recreation user groups would have consistent access to public lands.

The Santa Fe National Forest ~~would~~ opened 186 miles of road that were previously ~~are currently~~ not open, ~~would~~ closed 2,469 miles of road to motorized use, and ~~would~~ added 23 miles of new routes. The Mt. Taylor Ranger District, within the Cibola National Forest, ~~would~~ opened 9798 miles of road that were previously~~are currently~~ closed or unauthorized and ~~would~~ closed 312~~465~~ miles of roads to public~~motorized~~ use.

4.2.20 Vegetative Communities

For the purposes of this Proposed RMP/EIS, the primary indicator of impacts on vegetation is the acres of surface disturbance caused by management decisions regarding other resources. Such surface disturbance would impact vegetation resources to varying degrees, depending on the amount, location, and type of surface disturbance and the disturbed vegetation's characteristics or ability to withstand surface disturbance. Surface-disturbing activities that currently occur and that are expected to continue include livestock grazing, lands and realty (granting of rights-of-way), fire and fuels management, special designations, minerals development, travel management, and recreation and visitor services. These activities would be required to follow the BMPs outlined in **Appendix G**.

4.2.20.1 Direct and Indirect Impacts

4.2.20.1.1 Livestock Grazing Decisions

Livestock grazing management decisions would have both adverse and beneficial impacts on vegetative communities within the Decision Area. In general, making areas unavailable for grazing would provide long-term protection and enhancement of vegetation because it would limit the loss of vegetative cover and the trampling of species. Areas available for livestock grazing generally suffer some short-term adverse impacts from decreased growth or loss of riparian and other vegetation. Livestock grazing could provide beneficial impacts on vegetative communities by controlling the spread of noxious and invasive weeds when the appropriate timing and intensity of grazing is applied in the spring.

Under all alternatives, livestock grazing would be managed in order to achieve and maintain the New Mexico Standards and Guidelines (BLM 2001b). Under these guidelines, the PFC of wetlands and riparian areas would be promoted, the use and perpetuation of native species would be emphasized, noxious weed establishment and spread would be minimized, and adjustments would be made to grazing practices when standards are not being met. The New Mexico Standards and Guidelines would mitigate the impacts of livestock grazing

to vegetation resources; however, the potential for impacts still exists and would be greater under alternatives with a higher percentage of lands available for grazing.

4.2.20.1.2 Lands and Realty Decisions

Lands and realty management decisions that have the potential to have adverse impacts on vegetation would result from authorizations of right-of-way grants and the expansion or development of utility corridors. These actions would create surface disturbances of various magnitudes, depending on the size and location of the project. Surface impacts from construction of communication facilities, transmission lines, pipelines, and roads would be disclosed in site-specific NEPA documentation. There would also be potential for the introduction of noxious or invasive plant species via construction equipment, vehicles, and personnel; however, the adverse impacts would be mitigated through BMPs, noxious weed controls, and restoration and rehabilitation measures. Lands and realty decisions that would also adversely impact vegetative communities would be those decisions to dispose of BLM-administered lands, thus removing the vegetative communities from BLM administration and protective measures.

Beneficial impacts would result from identification of exclusion and avoidance areas for rights-of-way and mineral withdrawals. Exclusion areas would offer greater protections for vegetation than avoidance areas because they would completely preclude surface-disturbing activities.

4.2.20.1.3 Fire Management Decisions

Direction and guidance approved by the decisions for the comprehensive Fire and Fuels Plan Amendment (BLM 2004c), Updated Guidance for Implementation of Federal Wildland Fire Management Policy (BLM 2017), and the most recent RPFO Fire Management Plan (currently BLM 2011) have been incorporated into this RMP/EIS. It provides fire management direction common to all alternatives.

As discussed in **Section 4.2.4**, Fire Management, the RPFO would treat approximately 32,000 acres annually (approximately 4 percent of the Decision Area), depending on budgetary and time constraints. Management of wildfires to meet resource objectives would not be authorized in areas that are known to be highly susceptible to post-fire weed invasion, areas with important terrestrial and aquatic habitats, and non-fire-adapted vegetation communities unless reasonable resource protection measures are in place. These actions would have long-term beneficial impacts on vegetation by reducing the opportunities for the spread of weeds and exotic, invasive species into native vegetation communities.

Vegetation treatments, such as mechanical and manual treatments, prescribed fire, chemical or biological vegetation control, and aerial/ground seeding, would have both beneficial and adverse impacts on vegetation communities in fire-treated areas. Long-term beneficial impacts on vegetation would occur in treated areas once invasive species competition is eliminated or reduced, assuming that a diverse native community has the potential to establish in the area. The short-term adverse impacts of fuels management actions on vegetation would include the unavoidable potential trampling and disturbance of native species and the thinning and removal of ecologically desirable species.

These actions could result in a short-term adverse reduction of native species diversity; however, these treatments would improve vegetation communities in the long term once natives are reestablished. These beneficial impacts would include more diverse species and habitat structure, multiple age classes, and openings for forbs and woody species recruitment.

4.2.20.1.4 Special Designations Decisions

Special designations would have a beneficial impact on vegetative communities because of management restrictions that are applied within the boundaries of the particular designation. Travel and mineral resource management decisions are the two major surface-disturbing activities that would be restricted within special designations and that also indirectly protect vegetative communities. ACECs and National Scenic Trails are

the two special designations that are proposed. The only National Scenic Trail on Decision Area lands is the CDNST.

Table 4-11 provides the proposed number and acres of special designations by alternative. Under Alternative B, the most acres would be proposed for special designations. Under Alternative DE, the least number of acres would be proposed for special designations.

4.2.20.1.5 Mineral Resources Decisions

Management decisions to allow mineral development would have short- and long-term adverse impacts on vegetative communities. In the short term, loss of vegetation associated with surface disturbances for well pads, access roads, and minerals infrastructure would increase the potential for invasion of undesirable plant species. It would cause a potentially irretrievable loss of vegetation productivity during the period of disturbance; however, all disturbed areas would be fully reclaimed prior to release of reclamation bonds.

According to the RFD for mineral resources, development of leasable, salable, and locatable mineral resources would contribute to surface disturbance. This would equate to 1.2 percent of Decision Area lands over the next 20 years. The typically slow regrowth of vegetation within the Decision Area would cause surface disturbance to have long-term, indirect, adverse impacts on vegetation resources. Initial establishment of native species following seeding is estimated to take 3 to 4 years, depending on the successful deferment or exclusion of livestock grazing and the prevention of the establishment of weedy annuals from the site during this time (Monsen et al. 2004). Revegetation is especially difficult in desert shrub habitat because soils are shallow and highly saline, and moisture availability is relatively low (Monsen et al. 2004).

Three leasing stipulations are proposed under Alternatives B and C that would protect vegetative communities. The lease reclamation stipulation would require leases containing well pads, roads, and/or facilities that are not plugged and/or reclaimed to current standards must be either put to beneficial uses or reclaimed within 2 years of lease issuance.

Under Alternatives B and C, the RPFO would also implement an NSO leasing stipulation that would prohibit the removal of ponderosa pine trees for authorized surface-disturbing activities. Under Alternatives B and C, oil and gas leasing stipulations would implement CSU for low reclamation soils. This stipulation would have a beneficial impact on vegetative communities. This is because it would help preserve communities that are difficult to re-create by restricting oil and gas development in low reclamation potential areas. In addition, under Alternative B, habitat areas for special status plant species that are located in low reclamation potential soils would be closed to oil and gas leasing. Invasive and noxious weed BMPs in **Appendix G** would also be applied under all alternatives as conditions of approval at the development stage, which would help mitigate weeds.

4.2.20.1.6 Travel Management Decisions

Travel management decisions would have both beneficial and adverse impacts on vegetative communities. Areas closed to motorized travel would reduce trampling activities on the closed BLM-administered roads and trails, thereby encouraging revegetation of the roadways. Areas open to travel have the potential to adversely impact vegetative communities by allowing off-road travel, which could introduce invasive and noxious weeds to these areas. Areas limiting travel to existing roads and trails would provide access to Decision Area lands, while minimizing adverse impacts on vegetative communities.

Chapter 2 shows the proposed travel management decisions, by alternative, within the Decision Area. Under Alternative B, the largest number of acres would be closed to motorized travel, and no areas would be open to motorized travel. Under Alternatives C and D, the most acres would be open to motorized travel.

4.2.20.1.7 Recreation and Visitor Services Decisions

In general, impacts from recreation activities on vegetative communities would be limited to isolated surface disturbances, where such activities as dispersed camping and cross-country hiking occur. Where recreation is managed using a SRMA or ERMA, BLM rules and guidelines would limit or control activities through specialized management tools, such as designated campsites, permits, area closures, and limitations on number of users and duration of use. Adverse impacts from recreation activities on vegetative communities could occur if visitors engage in unauthorized plant harvesting, such as the removal of rare plants, cacti, or penstemon plants. In addition, efforts would be made to educate public land visitors and users about the ethics of responsible use.

4.2.20.1.8 Renewable Energy

Lands and realty management decisions that have the potential to have adverse impacts on vegetation would result from authorizations of renewable energy projects. These actions would create surface disturbances of various magnitudes, depending on the size and location of the project. Surface impacts from construction for renewable energy development would be disclosed in site-specific NEPA documentation. There would also be potential for the introduction of noxious or invasive plant species via construction equipment, vehicles, and personnel; however, the adverse impacts would be mitigated through BMPs, noxious weed controls, and restoration and rehabilitation measures.

Beneficial impacts would result from identification of exclusion and avoidance areas for renewable energy projects. Exclusion areas would offer greater protections for vegetation than avoidance areas because they would completely preclude surface-disturbing activities.

4.2.20.2 Cumulative Impacts

Any reasonably foreseeable future activity that involves surface disturbance would have a short-term cumulative impact on vegetative communities within the Planning Area. Mineral developments, new road projects, urban growth, renewable energy projects, and other surface-disturbing activities that occur on public, private, or tribal lands within the Planning Area could introduce or spread noxious weeds. Changes in land use could result in habitat loss for some vegetative species. New transmission corridors, the proposed N55 Road Improvement Project, new mines, and the Northwest Loop Road could result in habitat fragmentation and habitat loss for vegetative species, including rare plants.

The planning area for these projects accounts for approximately 500,000 acres of forest restoration within and near the RPFO RMP Planning Area. The BLM estimates that federal and state agencies would treat up to 206,800 acres with prescribed fire, 35,900 acres with mechanical treatments, and 10,000 acres with chemical treatments over 20 years (BLM 2004c, 2017). The Southwest Jemez Mountains Restoration Project is currently in the planning phases; the specific treatment areas are unknown at this time. The planning area for the project is approximately 210,000 acres in the southwest Jemez Mountains.

The proposed fire and fuels management projects, described in **Table 4-2**, would have short-term adverse and long-term beneficial impacts on vegetative communities. Short-term impacts include the risk of prescribed fires getting out of control and moving across the landscape into RPFO-administered areas. In the long term, the fire and fuels treatment projects would restore the native vegetative communities across the state, which would reduce the threat of high-intensity wildfires from moving into the Planning Area. Similarly, the Southwest Jemez Mountains Restoration Project would reduce the threat of high-intensity wildfires and would reduce the potential spread of nonnative species across jurisdictional boundaries.

4.2.21 Visual Resources

4.2.21.1 Analysis Assumptions

The visual resource impacts analysis throughout this chapter is broad scale and uses the number of acres proposed for each VRM class objective and the respective level of visual intrusions or surface disturbances permitted under each objective.

The assumptions for analyzing the impacts on visual resources in the Decision Area are as follows:

- The greater the size and/or severity of surface disturbance and/or degree of air quality degradation, the greater the impact would be on scenic quality.
- All Decision Area resources with management actions that permit surface disturbances or degrade air quality would have adverse impacts on visual resources to some degree.
- Surface disturbances would introduce new visual elements onto the landscape or would intensify existing visual elements, altering the line, form, color, and/or texture that characterize the existing landscape.
- Changes in air quality, either from smoke, dust, haze, or other pollutants, could reduce or degrade scenic quality by obscuring distant views in the short and long term.

4.2.21.2 Direct and Indirect Impacts

4.2.21.2.1 Visual Resource Decisions

VRM decisions would have either an adverse or beneficial impact on visual resources within the Decision Area, depending on the variation between the visual resource inventory (VRI) class and VRM management class for a particular area. **Chapter 2** shows the proposed VRM management classes (in acres), by alternative. Note that the VRM inventory and assigned management classes under the 1986 RMP and Alternative A did not include all Decision Area lands.

Acres of VRM Class I would be the same under all alternatives. ~~The most acres of VRM Class I are proposed under Alternative E, with Alternatives B, C, and D almost as high, while slightly fewer acres are VRM Class I under Alternative A.~~ Under Alternative B, vastly more acres of VRM Class II are proposed than under the other alternatives, followed by Alternatives C, A, and D~~, and E~~.

Impacts from Management Specific to Alternative A

Under Alternative A, nearly all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. With regard to VRI Class II lands, 92 percent would be in VRM Class II, allowing a low level of change, while 6 percent would be in VRM Class IV, potentially resulting in a high level of change to those acres. **Table 4-77** shows how much of each VRI class would be managed under each VRM class under Alternative A.

Table 4-77: Alternative A VRM Decisions by VRI (Acres and Percent)

Alternative A VRM	Acres	VRI Class I		VRI Class II		VRI Class III		VRI Class IV	
		Acres	% of VRI I	Acres	% of VRI II	Acres	% of VRI III	Acres	% of VRI IV
VRM I	96,600	95,900	99	0	0	100	<1	600	<1
VRM II	55,200	400	<1	18,900	92	1,100	5	34,800	6
VRM III	58,300	100	<1	0	0	0	0	58,200	10
VRM IV	152,600	0	0	300	<1	2,500	11	149,800	25
VRM undesignated	368,900	100	<1	1,300	6	19,100	84	348,400	59
Sum	**731,600**	**96,500**	**100**	**20,500**	**100**	**22,800**	**100**	**591,800**	**100**

Source: BLM GIS 2020

Impacts from Management Specific to Alternative B

Similar to Alternative A, under Alternative B, all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. With regard to VRI Class II lands, 71 percent would be in VRM Class II, allowing a low level of change. The remaining 29 percent of VRI Class II lands would be in VRM Class IV, potentially resulting in a high level of change to those acres. **Table 4-78** shows how much of each VRI class would be managed under each VRM class under Alternative B.

Table 4-78: Alternative B VRM Decisions by VRI (Acres and Percent)

Alternative B VRM	Acres	VRI Class I		VRI Class II		VRI Class III		VRI Class IV	
		Acres	% of VRI I	Acres	% of VRI II	Acres	% of VRI III	Acres	% of VRI IV
VRM I	97,400	96,400	100	0	0	0	0	1,000	<1
VRM II	306,000	0	0	14,500	71	19,900	87	271,600	46
VRM III	27,900	0	0	0	0	600	3	27,200	5
VRM IV	300,300	0	0	5,900	29	2,300	10	292,100	49
Sum	**731,600**	**96,400**	**100**	**20,400**	**100**	**22,800**	**100**	**591,900**	**100**

Source: BLM GIS 2020

Impacts from Management Specific to Alternative C

Similar to Alternative A, under Alternative C, all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. With regard to VRI Class II lands, two-thirds would be in VRM Class II, allowing a low level of change; however, one-third would be in VRM Class IV, potentially resulting in a high level of change to those acres. **Table 4-79** shows how much of each VRI class would be managed under each VRM class under Alternative C.

Table 4-79: Alternative C VRM Decisions by VRI (Acres and Percent)

Alternative C VRM	Acres	VRI Class I		VRI Class II		VRI Class III		VRI Class IV	
		Acres	% of VRI I	Acres	% of VRI II	Acres	% of VRI III	Acres	% of VRI IV
VRM I	97,500	96,400	100	0	0	0	0	1,000	<1
VRM II	68,400	0	0	13,300	65	6,200	27	48,800	8
VRM III	69,900	0	0	0	0	0	0	69,900	12
VRM IV	495,900	0	0	7,100	35	16,600	73	472,300	80
Sum	**731,600**	**96,400**	**100**	**20,400**	**100**	**22,800**	**100**	**592,000**	**100**

Source: BLM GIS 2020

Impacts from Management Specific to Alternative D

Similar to Alternative A, under Alternative D, all VRI Class I acres would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Impacts on VRI Class II lands would be the same as those described under Alternative C. **Table 4-80** shows how much of each VRI class would be managed under each VRM class under Alternative D.

Table 4-80: Alternative D VRM Decisions by VRI (Acres and Percent)

Alternative D VRM	Acres	Acres	% of VRI I	Acres	% of VRI II	Acres	% of VRI III	Acres	% of VRI IV
VRM I	97,500	96,400	100	0	0	0	0	1,000	<1
VRM II	21,400	0	0	13,100	64	400	2	7,900	1
VRM III	83,200	0	0	0	0	12,300	54	70,900	12
VRM IV	529,500	0	0	7,300	36	10,000	44	512,100	86
Sum	**731,600**	**96,400**	**100**	**20,400**	**100**	**22,700**	**100**	**591,900**	**100**

Source: BLM GIS 2020

Impacts from Management Specific to Alternative E

Similar to Alternative A, under Alternative E, all but 100 acres of VRI Class I areas would be in VRM Class I, resulting in preservation of the existing visual character of those lands. Half of VRI Class II lands would be in VRM Class II, allowing a low level of change; however, 34 percent would be in VRM Class IV, potentially resulting in a high level of change to those acres. **Table 4-81** shows how much of each VRI class would be managed under each VRM class under Alternative E.

Table 4-81: Alternative E VRM Decisions by VRI (Acres and Percent)

Alternative E VRM	Acres	VRI Class I		VRI Class II		VRI Class III		VRI Class IV	
		Acres	% of VRI I	Acres	% of VRI II	Acres	% of VRI III	Acres	% of VRI IV
VRM I	97,800	96,300	99.9	0	0	0	0	1,600	<1
VRM II	16,600	0	0	10,500	51	1,100	5	5,000	1
VRM III	74,800	0	0	3,100	15	14,400	63	57,300	10
VRM IV	542,400	100	<1	6,900	34	7,300	32	528,100	89
Sum	**731,600**	**96,400**	**100**	**20,500**	**100**	**22,800**	**100**	**592,000**	**100**

Source: BLM GIS 2020

4.2.21.2.2 Fire Management Decisions

Short-term, direct impacts of prescribed burning would result in the obvious visual contrasts created in treated or burned over areas. Generally, the use of prescribed fire would have a long-term benefit on visual resources by decreasing the frequency, size, and probability of uncharacteristically severe wildfires. This would increase the opportunity to maintain various mosaics of live vegetation, which would, overall, tend to increase more desirable and naturally occurring visual contrasts.

4.2.21.2.3 Land and Realty Decisions

Impacts from land use authorizations and realty management decisions would include both short- and long-term visual impacts. These effects would include, but are not limited to, the short-term effects of construction activities, such as fugitive dust and temporary placement of construction equipment and vehicles; and the undesirable, long-term visual contrasts created by clearings, removal of vegetation, and installation of facilities, such as new roads, water tanks, and power transmission lines. Areas identified for ROW avoidance and exclusion would reduce or prohibit related activities/disturbances, resulting in the long-term protection of visual and scenic resources.

Mineral development would have direct and indirect adverse impacts on visual quality, both short and long term. The effects on visual quality would include, but not be limited to, visual contrasts created with the construction of well pads, access roads, drilling rigs, pipelines, and processing and support facilities. Indirect impacts on visual quality would result from soil erosion on disturbed areas, fugitive dust created during construction, and/or haze from compressor and generator emissions that can obscure or degrade scenic vistas. Areas withdrawn or excluded from oil and gas leasing would eliminate the associated impacts of mineral development, resulting in the long-term protection of visual and scenic resources.

4.2.21.2.4 Travel Management Decisions

Continued recreational OHV use would tend to cause both long- and short-term adverse impacts on visual quality under all alternatives. Direct, long-term impacts from motorized use would result from visual contrasts caused by pioneering of new routes, soil erosion, and widening of trails and the short-term or temporary impacts resulting from vehicles generating localized dust.

4.2.21.3 Cumulative Impacts

Mineral development, including oil and natural gas well drilling, is expected to increase at a low level over the next 20 years. VRM classes and associated mitigation would likely limit the impacts on viewsheds with high scenic quality in the Planning Area and in the adjacent national forests. The Red Mesa Wind Farm would also have long-term impacts on visual resources within the central portion of the Planning Area near Mount Taylor.

4.2.22 Wildlife and Fisheries Resources

Actions that remove, degrade, or fragment wildlife habitats are considered adverse. Beneficial impacts include actions that conserve or improve habitats, such as big game crucial winter range, nest sites, or leks.

Direct impacts on wildlife could result from the loss of habitats or key habitat features, such as a nest site or lek area, or from the immediate loss of life. Wildlife also can be directly disturbed by human activities, potentially causing wildlife to abandon a nest, lek, or home range. Disturbance during sensitive periods, such as winter and nesting, is known to adversely impact wildlife. Human activities, such as OHV use, recreation, and noise from equipment associated with development and surface-disturbing activities impact some wildlife species. These activities are considered to be particularly detrimental to nesting and lekking grouse, nesting raptors, and wintering big game. Disturbance impacts range from short-term displacement and shifts in activities to long-term abandonment of home range (Yarmaloy et al. 1988; Miller et al. 1998; Connelly et al. 2000).

Habitats can be lost and fragmented by such activities as vegetation treatments, fire management and ecology, mineral exploration and extraction, construction and maintenance of roads and trails, and development of wind energy facilities.

Indirect impacts on wildlife can occur by changing habitat characteristics or quality. Habitat quality can be affected by various surface-disturbing activities and other actions that remove vegetation and disturb soil. Indirect impacts on potential habitats for wildlife also could occur.

Activities on public lands could result in adverse impacts on wildlife and fisheries include, but are not limited to, direct or indirect harm, harassment, or loss of an individual animal, regardless of how long the impact may occur; as follows:

- Toxic contamination of wildlife or the loss of habitat for populations to reestablish caused by toxic material either on the surface or below ground
- Short- or long-term loss or degradation of wildlife abundance, diversity, or habitat from impacts on key wildlife habitat areas
- Impacts from inadvertent violations of federal, state, or local plans, regulations, laws, and statutes for the protection of wildlife, regardless of how long the infraction may occur
- Loss or degradation of wildlife habitat from introduction of invasive, nonnative, or exotic flora or fauna

Avoidance is the preferred method to prevent loss or degradation to wildlife or habitat. If a measure to prevent the loss of habitat is not available, then an action (mitigation) would be designed to minimize impacts on all affected areas. This includes the consideration of off-site mitigation and studies to determine the magnitude of impacts for adaptive resource management techniques, which would adjust management accordingly.

Potential impacts expected to affect wildlife and fisheries in the Decision Area are from cave and karst resources, cultural resources, fire management, forests and woodlands, lands and realty, livestock grazing, mineral resources, recreation and visitor services, renewable energy, riparian resources, soil and water,

lands with wilderness characteristics, travel management, special designations, special status species, visual resource management, and wildlife management decisions. The adverse and beneficial impacts are described below for each resource.

4.2.22.1 Analysis Assumptions

Table 4-81, below, summarizes the habitat types utilized by the representative wildlife species found on Decision Area lands. These representative species were chosen for their high public interest, such as deer or elk, or because they represent an important ecological group, such as neotropical birds. Most of the quantitative analyses in this section report impacts by habitat type, since there are too many wildlife species to address each one individually.

Table 4-81: Grouping of Wildlife Species by Habitat Type and Habitat Availability on Decision Area Lands

Vegetation/ Habitat Type	Acres	Wildlife Associations
Aquatic	431	Amphibians, fish
Grassland	152,539	Pronghorn, bobcat, coyote, small mammals, raptors, upland game birds, neotropical birds, reptiles, amphibians
Other	59,440	N/A
Piñon-Juniper	177,843	Mule deer, elk, pronghorn, coyote, small mammals, neotropical birds, raptors, upland game birds, reptiles
Ponderosa Pine	3,598	Elk, mule deer, bobcat, black bear, mountain lion, small mammals, raptors, neotropical birds, upland game birds, reptiles
Riparian/Wetland	3,513	Bobcat, small mammals, neotropical birds, wetland game birds, amphibian, fish, reptiles
Shrub, Steppe, Scrub	334,235	Mule deer, elk, pronghorn, raptors, small mammals, neotropical birds, upland game birds, reptiles
Total	**731,599**	**N/A**

Assumptions used in this impact analysis include the following:

- The BLM is responsible for managing habitats, whereas state and federal wildlife management agencies (e.g., NMDGF and USFWS) oversee management of wildlife species; therefore, this analysis primarily relies on changes to vegetation types to estimate impacts on wildlife habitats.
- For each alternative, changes to vegetation types, either in quantity, quality, or increased fragmentation, are compared with baseline conditions. Adverse and beneficial impacts on vegetation types (i.e., wildlife habitats) are assumed to have a corresponding adverse or beneficial impact on wildlife species.
- Disturbance impacts on wildlife are evaluated by comparison to current management practices in the Decision Area; increased protection in time or space are beneficial, whereas reduced protection results in adverse impacts.
- Disturbance during sensitive periods adversely impacts wildlife.
- Habitat fragmentation adversely impacts wildlife.
- Prescribed fire is a tool used to manage vegetative communities and can result in short-term adverse impacts with long-term beneficial impacts on wildlife and wildlife habitats.
- Management actions aimed at benefiting specific wildlife species can have adverse or beneficial impacts on other wildlife species.
- Alternatives with a larger number of acres of surface water developed will exhibit a greater benefit to migratory game birds and other riparian/wetland wildlife species, when compared with alternatives with smaller acreage of surface water developed.

- The potential for adverse and beneficial impacts on wildlife is anticipated to be commensurate with the intensity of allotment monitoring and the amount of forage utilization from livestock grazing in the Decision Area.
- The more acreage of habitats protected from fragmentation, the greater the benefit to big game and other wildlife species. Alternatives proposing to protect the most habitats from fragmentation are anticipated to have the most beneficial impact on wildlife.
- Prohibiting surface disturbance or occupancy is more restrictive and provides more protection for wildlife than avoiding surface disturbance or occupancy.
- The more surface disturbance that occurs on steep slopes or on highly erosive soils, the greater the potential for adverse impacts on wildlife habitats.
- The more area used by OHVs and the higher the density of OHV use, the more adverse impacts are anticipated to wildlife habitats.
- The BLM will utilize best available information, management and conservation plans, and other research and related directives, as appropriate, to guide wildlife habitat management on BLM-administered lands.
- All active grazing allotments will be managed in accordance with the conditions of the grazing permits.

4.2.22.2 Direct and Indirect Impacts

4.2.22.2.1 Cave and Karst Resources Decisions

Cave and karst resources management decisions would beneficially impact wildlife because caves can provide unique habitat to wildlife, specifically roosting, maternity, and hibernation habitat for bats. The Pronoun Cave Complex is the only known cave system on Decision Area lands. A bat survey conducted in 1998 found 11 species of bats in the Decision Area, five of which were documented in or near the cave complex (Gannon et al. 1998). The Pronoun Cave Complex would be protected through an ACEC designation under Alternatives A, B, and C; therefore, bat species and other wildlife that utilize the caves would be protected under these alternatives from such activities as oil and gas and wind and solar renewable energy development. Site-specific NEPA analyses would be completed for proposed actions that occur within or near the Pronoun Cave Complex.

4.2.22.2.2 Cultural Resources Decisions

Cultural resources management decisions would have beneficial impacts on wildlife because of restrictions on surface-disturbing activities that directly protect cultural resources and that would indirectly protect wildlife habitat. There are four cultural resource areas: Big Bead Mesa, Headcut Prehistoric Community, Azabache Station, and Ojo Pueblo and Fort Site. Surface restrictions for these areas have been proposed under various alternatives. The surface restrictions vary by alternative and are described in **Chapter 2** and **Appendix H**. They could include NSO or CSU for fluid leasable ~~s~~minerals, closed to salable mineral extraction, and/or recommended for withdrawal from locatable mineral entry.

Motorized travel is also generally limited to existing or designated primitive roads and trails for these areas. **Table 4-64** shows the number of acres for each cultural resource site that would have surface restrictions applied, by alternative.

4.2.22.2.3 Fire Management Decisions

Direction and guidance approved by the decisions for the comprehensive Fire and Fuels Plan Amendment (BLM 2004c), Updated Guidance for Implementation of Federal Wildland Fire Management Policy (BLM 2017), and the most recent RPFO Fire Management Plan (currently BLM 2011) have been incorporated into this RMP/EIS, which provides fire management direction common to all alternatives. This direction mandates the maintenance of existing healthy ecosystems and the protection of threatened, endangered, and special status species. It would have beneficial impacts on wildlife habitat on Decision Area lands wherever wildlife

habitat overlaps that of protected special status species. It would ensure that healthy ecosystems are not adversely affected by fire management and fuels reduction.

Fuels management actions include fuels reduction treatments on up to 32,000 acres annually. These are mechanical and manual treatments, prescribed fire, chemical or biological vegetation control, and aerial and ground seeding. These fuels management decisions would likely have a beneficial long-term impact on wildlife and fish populations by helping to restore the natural fire regime. This would improve habitat health (Lewis and Harshbarger 1976), forage, nesting opportunities, and cover. Restoring the natural fire regime would also reduce the chance of catastrophic wildfire and the subsequent loss of major ecosystem components. In the short term, vegetation treatments could result in adverse impacts, such as trampling or removal of wildlife forage and/or habitat and human-caused wildlife disturbance. **Table 4-65** displays the number of acres proposed for fire management treatments within each habitat type.

4.2.22.2.4 Forests and Woodlands Decisions

Forest and woodland management decisions would impact wildlife because wildlife habitat would be open to forest products removal under each alternative. Adverse impacts on wildlife from the removal of forest products could include direct habitat loss, forage loss, habitat degradation, and habitat fragmentation. Short-term indirect, adverse impacts of wood gathering on wildlife species and their habitats include trampling and removal of native vegetation, which result in habitat degradation that can include reduced prey species, forage species, and cover. Indirect, adverse impacts of wood gathering to bird species would also include reduced reproductive opportunity due to removal of trees causing a decrease in nesting substrate.

Collection of dead and down fuelwood would also have adverse impacts on those wildlife species that utilize such habitats for all or a part of their life cycle. Fuelwood collection would also cause additional direct impacts such as increased illegal off-highway vehicle use. Monitoring data has shown a common occurrence of unauthorized off-highway vehicle use in areas open to fuelwood collection. This type of activity causes habitat loss and fragmentation and can cause nest abandonment during critical nesting periods.

Forest and woodland management decisions would have a beneficial impact on wildlife. The goals and objectives of the forests and woodlands program not only focus on harvesting of forest products, but also on managing forested areas for ecosystem health, including, but not limited to, wildlife habitat, watershed process, and riparian restoration and enhancement.

Forest restoration projects, including those with forest product removal, can be designed to improve habitat by favoring certain vegetation types over others, reducing tree densities, altering spatial distribution of trees, or by reducing erosion and increasing herbaceous ground cover through lop and scatter of slash. Vegetative treatment would result in improvements to habitat that may benefit many wildlife species. Studies have shown that where dense stands of piñon-juniper have been thinned, understory vegetation increased dramatically on the heaviest thinned plots and the number of vegetation species present also increased significantly.

4.2.22.2.5 Lands and Realty Decisions

Lands and realty management decisions that have the potential to have adverse impacts on wildlife and wildlife habitat would result from authorizations of right-of-way grants and the expansion or development of utility corridors. These actions would create surface disturbances of various magnitudes, depending on the size and location of the project. Surface impacts from construction of communication facilities and other developments requiring a right-of-way would be disclosed in site-specific NEPA documentation; generally they would result in habitat loss and fragmentation due to the clearing of vegetation for development of facilities, such as communication towers, power lines, and placement of pipelines.

New road construction is also typically associated with rights-of-way due to the maintenance requirements of facilities. New road construction is a direct adverse impact of issuing rights-of-way and causes long-term habitat loss unless the roads can be rehabilitated post construction. There would also be a potential for the introduction of noxious or invasive plant species via construction equipment, vehicles, and personnel. Although the adverse impacts would be mitigated through BMPs, noxious weed controls, and restoration and rehabilitation measures, mitigation does not guarantee the site will return to its pre-construction condition, and the risk of adversely affecting wildlife habitat is present.

Lands and realty decisions would also adversely impact wildlife by those decisions to dispose of BLM-administered lands. Disposal of lands could result in fragmentation of otherwise contiguous habitat, depending on land use and ownership patterns. By transferring lands to private ownership, development and human activities, including introduction of domestic pets or livestock, could disturb wildlife or degrade adjacent habitat quality. Indirect impacts from land disposals could include disturbance to wildlife and degradation of habitat on those lands that remain in public ownership adjacent to the associated disposed lands.

Land disposals surrounding urban areas could result in the potential elimination of a buffer zone protecting wildlife and wildlife habitats. Conversely, disposals have the possibility to coincide with acquisitions as part of a land exchange; in this case, they can result in beneficial impacts in the form of acquiring more valuable/high-quality habitat, and consolidating BLM-administered landownership for more effective wildlife habitat management. Under Alternatives C and ~~E~~D, the most acres would be~~are~~ available for disposal, while under Alternative A, the least number of acres are~~would be~~ available for disposal. Beneficial impacts would result from land acquisitions and the identification of exclusion and avoidance areas for rights-of-way. Land acquisitions could result in the protection of special status species habitat that may not otherwise occur if the land in question were managed by a private entity. Exclusion areas would offer greater protection for wildlife habitat than avoidance areas because they would completely preclude surface-disturbing activities.

4.2.22.2.6 Livestock Grazing Decisions

Livestock grazing can have both adverse and beneficial impacts on wildlife. Livestock grazing could have adverse impacts on elk and mule deer due to foraging niche overlap with cattle (Torstenson et al. 2006). Livestock grazing could have adverse impacts on ground-nesting birds through trampling of nesting habitat (Fondell and Ball 2003) and indirectly through increased parasitism by brown-headed cowbirds (Torstenson et al. 2006).

Livestock grazing management decisions, including the continuing implementation of the New Mexico Standards and Guidelines (BLM 2001b) could benefit some wildlife habitat by promoting regrowth of forage species, reducing the prevalence of some invasive plants, and creating openings and disturbed areas used by some species. Other beneficial impacts from livestock grazing for wildlife and wildlife habitat would occur when range improvements are implemented in the Decision Area such as watering tanks, when placed within or near their habitat.

Under Alternative A, 15 allotments are in non-use status. Under Alternative B, these areas would be unavailable for grazing. Under Alternatives C, and D~~, and E~~, these areas would remain in non-use status until such time that conditions warrant authorization of livestock grazing for management purposes only. Alternative B would have the most beneficial impacts on wildlife habitat because there would be no foraging niche overlap between wildlife species and livestock. Alternatives C and~~,~~ D~~, and E~~ could have adverse impacts on wildlife. This is because, in the event grazing permits are issued for those areas, resource conflict could occur, and wildlife would be in competition with livestock for forage and water resources

Currently, grazing occurs in special designation areas. This would continue under Alternative~~s~~ A~~ and E~~. Under Alternative B, livestock grazing would be unavailable in all areas with special designations. Under

Alternatives C and D, grazing would be available in specially designated areas where grazing would not conflict with resources protected by the special designation. Making grazing unavailable in all special designation areas would benefit wildlife because it would eliminate competition for forage and water resources. Alternatives C and D would only have beneficial impacts on wildlife in areas that are specially designated for the protection of wildlife or special status species habitat. Areas that are specially designated for the protection of other resources such as cultural or paleontological resources are generally accompanied by restrictions for actions that cause surface disturbance, and therefore would also limit disturbance to wildlife habitat. For this reason, Alternative B would have the most beneficial impacts on wildlife and wildlife habitat.

4.2.22.2.7 Mineral Resources Decisions

Impacts from minerals decisions on wildlife and their habitats would include short- and long-term habitat loss and/or degradation resulting from the removal of vegetation (surface disturbance), and subsequent occupation of areas for oil and gas well pads, open pit mines, and associated roads and infrastructure. Wildlife avoidance of disturbed and occupied areas would reduce their value as habitat. Many species of wildlife avoid areas with high or inconsistent levels of noise, roads with frequent automobile/truck traffic, areas that are heavily lit at night, and areas surrounding structures. Impacts of minerals decisions on wildlife resources would be reduced by the implementation of leasing stipulations and BMPs. Restrictions include no surface-disturbing activities within riparian habitat and required revegetation of oil and gas well sites upon project completion.

Under Alternative B, C, and D~~, and E~~, the RPFO would implement a buffer around occupied and unoccupied raptor nests, between March 1 and June 30, where fluid leasable mineral activities would be prohibited. Under Alternative B, the buffer would be 1 mile, under Alternative C, the buffer would be 0.5 mile~~s~~, and under Alternative~~s~~ D ~~and E~~, the buffer would be 0.25 mile~~s~~.

Under Alternatives B and~~,~~ C~~, and E~~, the RPFO would also implement restrictions on fluid leasable mineral activities within big game winter range between November 15 and April 30. This would be applied to winter range for mule deer, elk, and pronghorn. Travel on designated roads may be included in the timing limitations.

Under Alternatives B and~~,~~ C~~, and E~~, the RPFO would prohibit fluid leasable mineral activities within fawning and calving habitat for mule deer, elk, and pronghorn. The restrictions would occur from May 1 to August 31 for mule deer, May 1 to June 30 for elk, and May 1 to July 15 for pronghorn. Surface disturbance would also be prohibited near wildlife habitat projects under Alternatives B and C. Both alternatives include a restriction to restrict fluid leasable mineral activities up to 200 meters (656 feet) of existing or planned wildlife improvement projects.

In addition, the implementation of BMPs for the benefit of wildlife and their habitats (e.g., centralization of drill rigs and storage tanks, reduction of the number of access roads, and interim and final reclamation practices) would also reduce some of the short- and long-term impacts listed above. Interim reclamation occurs during the operational phase of a project and consists of revegetating all areas surrounding wells and roads that are not actively used during oil or gas production. Final reclamation occurs when a well has been plugged and abandoned and includes the practices of recontouring soil surfaces to match surrounding landforms, replacing topsoil, and reseeding with native plant species.

The number of years required for successful final reclamation would depend on the habitat type; grasslands recover more quickly than sagebrush or desert shrublands, which recover more quickly than forested areas such as piñon-juniper or ponderosa pine habitat. A commonly used average value and goal for reclamation across the project area is 10 years. Following the successful reclamation of a well site or road, the long-term adverse impacts on wildlife species would be largely eliminated.

The amount of land that is open to oil and gas leasing or other mineral use is not necessarily indicative of the number of acres that would be directly disturbed. Areas managed under standard or TL and/or CSU stipulations allow mineral development, but not all of those acres would be subjected to surface disturbance. Habitat quality may be preserved by the implementation of seasonal restrictions and spatial buffers that protect crucial habitats. For example, under Alternative B, big game winter range and wildlife habitat projects areas that are also designated by the US Department of Agriculture-NRCS as having low reclamation opportunity would be closed to oil and gas leasing. Areas categorized as NSO or closed preclude all surface-disturbing mineral development and therefore improve the quality and condition of wildlife habitats.

4.2.22.2.8 Recreation and Visitor Services Decisions

In general, wildlife can be adversely affected by recreation caused by human interactions, including higher noise levels, litter, and wildlife harassment and/or degradation of habitat (Knight and Gutzwiller 1995). While camping tends to be more concentrated along riparian areas, such as Bluewater Creek, locally there can be major impacts on vegetation and streambank stability.

During hunting seasons, mostly in Sandoval County, nominal impacts occur in upland pine forests. In these undeveloped settings, wildlife could be collected or harvested, displaced, harassed, and disturbed, and degradation of habitat can occur from trampling or vegetative collection (authorized and unauthorized firewood collection, plant/seed collection, etc.).

Collection of firewood for campfires has the potential to adversely impact wildlife with removal of live, dead, and downed material. This material provides shelter for various species, including birds, small mammals, bats, reptiles, and amphibians. OHV use and other disturbances to soils from unauthorized travel increase soil loss from wind and water erosion, which can further degrade habitat quality. Where this occurs repeatedly, impacts on wildlife, vegetation, and soils could be an issue at the site, but minor at the landscape level.

Increased development of trails, climbing routes, and other recreation pursuits throughout the Decision Area could increase habitat fragmentation and adversely impact wildlife (Rost and Bailey 1979; Wisdom et al. 2005). Under Alternatives B and C, 537,800 acres of SRMAs and ERMAs are proposed on Decision Area lands; 305,000 acres are proposed under Alternative D ~~and 72,400 acres are proposed under Alternative E~~. These areas could attract more visitors because they are managed to provide specific recreation opportunities. Increased visitation by recreational user groups could result in an increase in human disturbance to wildlife.

4.2.22.2.9 Renewable Energy Decisions

Renewable energy management decisions that have the potential to have adverse impacts on wildlife and wildlife habitat would result from authorizations for development of renewable energy projects. Renewable energy projects would create surface disturbances of various magnitudes, depending on the size and location of the project. Impacts from wind and solar energy developments would include vegetation removal and habitat fragmentation. Additionally, wind farms are known to cause high rates of mortality for birds and bats.

There would also be potential for the introduction of noxious or invasive plant species via construction equipment, vehicles, and personnel. The adverse impacts would be mitigated through BMPs, noxious weed controls, and restoration and rehabilitation measures; however, the success levels of rehabilitating such large acreages of cleared vegetation from projects with similar surface disturbance, such as oil and gas and mineral development, are variable. The long lifespan of renewable energy projects generally means an increase in cost associated with noxious weed control.

Beneficial impacts would result from the identification of exclusion and avoidance areas for renewable energy projects. Exclusion areas would offer greater protections for wildlife and wildlife habitat than avoidance areas because they would completely preclude surface-disturbing activities.

4.2.22.2.10 Riparian Resources Decisions

There are many goals shared by the riparian and wildlife programs, the main one being the protection, restoration, and enhancement of riparian ecosystems and biodiversity. Many wildlife species are riparian obligate or facultative species that heavily rely on riparian habitat for all or part of their life cycle. Due to this close association, riparian resources management decisions would have beneficial impacts on wildlife habitat in the Decision Area.

Under Alternatives B and C, restrictions on surface-disturbing activities are proposed for protection of riparian resources. Under Alternatives A and, D~~, and E~~, no restrictions are proposed to protect riparian areas from surface-disturbing activities. Alternatives B and C would protect riparian habitat from surface-disturbing activities.

4.2.22.2.11 Special Status Species Decisions

Under all alternatives, no management action would be permitted on public lands that would jeopardize the continued existence of plant or animal species that are listed, officially proposed, or candidates for listing as threatened and endangered. The BLM would commit to current and future conservation agreements, management plans, and recovery plans specific to threatened and endangered species and BLM sensitive species, as described in **Section 2.2.17**, Special Status Species. Although meant to protect and conserve special status species, the actions would also benefit other wildlife species that share habitat with the targeted special status species.

Special status species management in the RPFO heavily emphasizes protection, restoration, and enhancement of riparian habitats. This is because many special status species depend on riparian areas for all or a portion of their life cycle, including the southwestern willow flycatcher and the yellow-billed cuckoo. Similarly, a plethora of wildlife species rely on these habitats as well because they are rare oases in the desert Southwest. The special status species decision common to all alternatives to implement the Southwestern Willow Flycatcher Recovery Plan would beneficially impact wildlife. This is because so many other wildlife species utilize riparian habitats as well.

The special status species decision to designate suitable habitat for prairie dog population augmentation would benefit wildlife. This is because prairie dogs are a keystone species that perform a multitude of ecosystem functions; examples are providing a prey base for predators, such as raptors, creating and maintaining burrow systems that are used by other wildlife and special status species for reproduction, and increasing water infiltration into local soil benefitting the plant community and reducing the chance of erosion.

Studies have shown that when keystone species are removed from an ecosystem, species richness decreases. Decisions to protect prairie dog populations from shooting would benefit wildlife. This is because shooting produces noise disturbance that can disrupt foraging, reproductive patterns, and other processes that are essential to survival. Additionally, prohibiting shooting in these areas would lessen the chance that other wildlife species, including sensitive species, would become the target. Controlling surface-disturbing activities around and within prairie dog populations would benefit wildlife species that co-occur with prairie dogs or that utilize the ecosystems for all or a part of their life cycle. Surface disturbance directly adversely impacts this habitat and results in habitat loss and fragmentation.

4.2.22.2.12 Soil and Water Decisions

Under all alternatives, soils and water management decisions would comply with New Mexico Standards and Guidelines (BLM 2001b). In addition, all floodplains and riparian areas and wetlands would be managed in accordance with Executive Orders 11988 and 11990, which would protect the quality of stream water and federally listed species habitat. Uses on Decision Area lands would be managed to minimize and mitigate damage to soils; activities located in areas with sensitive soils would be subject to site-specific NEPA analysis.

These restrictions would decrease the number of acres on Decision Area lands that are subject to the adverse impacts of surface-disturbing activities on wildlife habitats, including surface water contamination and sedimentation by runoff from disturbed soils.

Under Alternatives B and C, the RPFO would prohibit surface-disturbing activities within 200 meters (656 feet) of riparian areas and springs. In addition, fluid minerals leasing stipulations would implement CSU for 15 percent to 30 percent slopes, NSO for slopes over 30 percent, and CSU for low reclamation soils. ~~Alternative E would apply NSO for slopes over 30 percent.~~ These actions would help to mitigate the adverse impacts of surface-disturbing activities to wildlife and wildlife habitat. These management decisions would also help to mitigate adverse impacts on fish and other aquatic species' habitat from increased overland flow associated with upland soil disturbance.

4.2.22.2.13 Special Designations Decisions

Special designation areas, such as ACECs, would generally have long-term positive impacts on wildlife and fisheries that occur within their boundaries by limiting or preventing surface disturbance, human activities, and associated habitat degradation and fragmentation. Impacts on wildlife and fisheries vary between alternatives primarily according to the proposed acreage of these specifically designated areas.

ACECs designated specifically to protect wildlife and vegetation would directly benefit wildlife species and their habitats. ACECs designated to preserve historic, cultural, and scenic values (as opposed to wildlife or vegetation) would indirectly benefit wildlife by limiting human and surface disturbance, preserving habitat, or preventing noise. Under Alternatives B, C, and D, ~~and E,~~ where ACECs would be avoidance areas for rights-of-way and renewable energy developments, including wind and solar sites, prohibiting these uses would prevent adverse impacts on wildlife related to these developments.

The designation of ACECs could increase recreational use in those areas, resulting in a greater amount of impacts on wildlife and wildlife habitat. Increased interpretation, monitoring, maintenance, and enforcement along proposed ACECs by the BLM and interested partners would strive to minimize existing or additional impacts on wildlife from recreational use.

Table 4-11 shows the number of size of proposed ACECs. Under Alternative B, the most acres would be proposed for special designations; under Alternative D~~E~~ the least number of acres would be proposed for special designations. ACECs designated for protection of wildlife and rare plant values include 8 ACECs under Alternative A, 11 ACECs under Alternatives B and C, and 7 ACECs under Alternative D~~, and 4 ACECs under Alternative E~~.

4.2.22.2.14 Lands with Wilderness Characteristics Decisions

Volcano Hill (23,800 acres) and Cimarron Mesa (7,300 acres) are mainly composed of short to medium shrubby grasslands. These grasslands are prime habitat for pronghorn antelope, the species likely to be most affected by any of the alternative prescriptions. Cimarron Mesa has little piñon-juniper woodland and is low to moderate in tree density, which is potential habitat for elk and deer.

If the BLM managed Volcano Hill and Cimarron Mesa as land with wilderness characteristics per Alternative A, no change of management would occur in these areas. This no-action alternative could lead to negative impacts on wildlife in response to allowance of extraction of leasable minerals, mineral sales, and surface disturbance activities. These allowances entail a considerable amount of surface disturbance, which leads to vegetation destruction and ultimately the destruction of habitat for species in the area.

Forest product removal would be permitted and could negatively impact wildlife with destruction of elk and deer woodland habitat. Unrestricted travel would make vehicle collisions with wildlife and vegetation destruction more likely. Construction of new rights-of-way (addition of roads, pipelines, transmission lines,

or communication sites to the area) could lead to habitat degradation by vegetation and landscape disturbance and destruction.

Livestock grazing would be permitted in the Volcano Hill and Cimarron Mesa area. Grazing would create competition between wildlife and cattle for forage and would lead to vegetation destruction by direct forage or footpath damage, which ultimately leads to soil degradation.

Creation of new recreational developments would bring more travelers to the area, which increases likelihood of disturbance.

A positive impact on wildlife under Alternative A lies in the potential installation of new wildlife developments such as wildlife drinkers and exclosures, which are meant to augment and preserve habitat in an area.

Alternative B could positively impact wildlife through the restrictions on the development of mineral materials, travel, rights-of-way, livestock grazing, recreational developments, and surface disturbance activities. All of these actions have potential for disturbance or removal of wildlife habitat (as discussed above, for Alternative A). Exclusion of wood product removal would positively impact wildlife because this would likely decrease the amount of illegal off-highway vehicle use associated with retrieval of these products; however, an accumulation of fire fuel in the area may lead to higher temperature fires and increase fire severity. Alternative B would also restrict the development of new wildlife habitat improvement projects in these areas that are developed for the benefit of wildlife.

Alternative C would have positive impacts on wildlife by completely excluding extraction of leasable minerals. Extraction leads to habitat loss and fragmentation and often results in the introduction and/or spread of noxious/invasive weeds. Management under this alternative would include evaluation of surface disturbance activities on a case-by-case basis, which, with interdisciplinary planning, would lead to mitigation proceedings for the benefit of wildlife and wildlife habitat.

Under Alternative C, forest products removal and management would be allowed. Allowing forest product removal has the potential to positively and negatively impact wildlife. Forest products include vegetative material found on public lands that can be harvested for recreation, personal use, or as a source of income. Some examples are grasses, seeds, roots, bark, berries, mosses, greenery, edible mushrooms, tree seedlings, transplants, poles, posts, and firewood.

Due to the biological nature of these products, there are ecological costs associated with removing them from an ecosystem. Many wildlife species rely on these products for various reasons, such as forage and nesting substrate. More specifically, removing whole trees for fuelwood would cause nesting habitat loss for some species, including, but not limited to, the piñon jay and gray vireo.

Vehicle use would be limited to designated routes, which would cause less of an impact than unrestricted travel but more impact than a no-travel alternative.

Livestock grazing would be permitted under Alternative C. Grazing would cause direct disturbance of vegetation due to cattle foraging, footpaths, waste, and associated soil degradation. To reduce adverse impacts, all construction of new range improvements would be consistent with maintenance of wilderness characteristics. Under Alternative C, the lands would be managed as VRM II, for which the emphasis is on retention of the existing character of the landscape (per the management type, the level of change to the characteristic landscape should be low).

Alternative~~s~~ D ~~and E~~ reflect~~s~~ Alternative A. All alternatives entail a no-action approach, resulting in the same management prescriptions and related impacts.

4.2.22.2.15 Travel Management Decisions

The impacts of travel decisions on wildlife would primarily depend on the number of acres open and closed to motorized travel use under each alternative. Motorized travel use can cause damage to vegetation used as wildlife forage and cover, cause noise disturbance, and result in mortality of wildlife through vehicular collisions or unauthorized removal of both plant and animal species. OHV use therefore generally has adverse impacts on wildlife species, especially birds, in the Decision Area (Reijnen and Foppen 1994; Gelbard and Belnap 2003). Areas closed to OHV use would include some WSAs. OHV use also contributes to habitat fragmentation and habitat degradation, including the spread of noxious weeds. Habitat fragmentation may be less obvious than direct impacts such as vehicle collisions with wildlife or vegetation removal, but often carries considerable consequences for long-term population and reproductive success. Large expanses of habitat may be required to meet the minimum habitat requirements of the largest, most widely roaming species, including top carnivores and large migrating herd animals.

4.2.22.2.16 Vegetative Communities Decisions

Vegetative treatment would result in improvements to habitat that may benefit many wildlife species. Studies have shown that where dense stands of piñon-juniper have been thinned, understory vegetation increased dramatically on the heaviest thinned plots and the number of vegetation species present also increased significantly. While vegetation composition changed, deer use increased in correlation with the amount of trees removed, and overall small mammal abundance increased on all treated plots (Albert et al. 1994).

Sagebrush treatments that provide minimal disturbance to soils, including the use of prescribed fire or mechanical blading (shaving), would increase vegetative diversity, providing greater habitat choices to a variety of species. Piñon-juniper thinning, either through prescribed fire or mechanical means, would allow more sunlight and water to reach the understory for grass and forb growth or increased vegetative diversity and structure, which provide additional habitat for more species of animals. Some areas would be treated for priority species habitat, such as mule deer, which would benefit other species, such as hawks, rodents, game birds, reptiles, and amphibians. Over-thinning of piñon-juniper ecosystems could also have an adverse impact on piñon-juniper obligate species.

Vegetative treatments to reduce invasive species, such as saltcedar, cheatgrass, thistles, or knapweeds, would be beneficial to wildlife habitat because treatments restore native plant communities and improve the ecological health of the area. Prescribed fire would likely result in the temporary loss of habitat but would have beneficial impacts in the long term.

All alternatives would benefit wildlife habitat by using prescribed burning, planting native seed when possible, and establishing natural disturbance regimes across the landscape to increase biodiversity and structure diversity, adding long-term benefits to wildlife habitat for as many species as possible.

4.2.22.2.17 Wildlife and Fisheries Decisions

Wildlife and fisheries management decisions would have beneficial impacts on wildlife and wildlife habitat. The RPFO has proposed a series of restrictions on surface-disturbing activities to protect wildlife and wildlife habitat. Under Alternative B, C, and D~~, and E~~, the RPFO would implement a buffer around occupied and unoccupied raptor nests, between March 1 and June 30, where surface-disturbing activities would be prohibited. Under Alternative B, the buffer would be 1 mile, under Alternative C, the buffer would be 0.5 mile~~s~~, and under Alternative~~s~~ D ~~and E~~, the buffer would be 0.25 mile~~s~~.

Under Alternatives B~~,~~ and C~~, and E~~, the RPFO would also implement restrictions on surface-disturbing activities within big game winter range between November 15 and April 30. This would be applied to winter range for mule deer, elk, and pronghorn. Travel on designated roads may be included in the timing limitations.

Under Alternatives B, and C, ~~and E~~, the RPFO would prohibit surface-disturbing activities within fawning and calving habitat for mule deer, elk, and pronghorn. The restrictions would occur from May 1 to August 31 for mule deer, May 1 to June 30 for elk, and May 1 to July 15 for pronghorn. Surface disturbance would also be prohibited near wildlife habitat projects under Alternatives B and C. Both alternatives include a restriction to restrict surface-disturbing activities up to 200 meters (656 feet) of existing or planned wildlife improvement projects. Large-scale vegetation manipulation, such as prescribed burns, would be accepted.

Under Alternatives B, C, and D, ~~and E,~~ the RPFO would prohibit surface-disturbing activities near prairie dog towns. Under Alternative B, activities determined to adversely impact prairie dogs and/or associated species or habitat would be strictly controlled within 0.5 mile~~s~~ of prairie dog towns. Under Alternative C, activities determined to adversely impact prairie dogs and/or associated species or habitat would be strictly controlled within 0.25 mile~~s~~ of prairie dog towns if an activities would adversely impact prairie dogs and/or associated species. Under Alternative~~s~~ D ~~and E~~, activities determined to adversely impact prairie dogs and/or associated species or habitat would be strictly controlled within prairie dog towns if an activities would adversely impact prairie dogs and/or associated species.

Wildlife and fish improvement projects would have beneficial impacts on wildlife. Wildlife-accessible watering sites and wildlife-adapted fences would improve mobility of wildlife species. Conservation, enhancement, and restoration projects for special status species would have beneficial impacts on wildlife habitat within the Decision Area. It is also possible that wildlife improvements, such as vegetation treatments, for one particular species could adversely impact another species. Site-specific NEPA documentation would be completed before habitat improvement projects are approved by the RPFO. Impacts on wildlife from other wildlife improvement projects would be analyzed at that time.

4.2.22.2.18 Visual Resources Decisions

The impacts on wildlife from visual resources decisions are primarily associated with limitations on surface disturbance intended to reduce impacts on areas with high visual resource values. VRM Class I and II designations are the most restrictive of oil and gas development and other surface-disturbing activities and would therefore be the most beneficial to wildlife and their habitats. In areas designated as VRM Class I or II, surface-disturbing activities are generally prohibited or limited. Acres of VRM Class I would be the same under all alternatives. ~~The most acres of VRM Class I are proposed under Alternative E, with Alternatives B, C, and D almost as high; slightly fewer acres are VRM Class I under Alternative A.~~ Under Alternative B, vastly more acres of VRM Class II are proposed than the other alternatives, followed by Alternatives C, A, and D, ~~and E~~.

4.2.22.3 Cumulative Impacts

Reasonably foreseeable projects that would adversely impact wildlife include developments that would result in habitat loss or fragmentation. Mineral developments, new road projects, urban growth, renewable energy projects, and other surface-disturbing activities that occur on public, private, or tribal lands near the Planning Area could displace wildlife for the length of the project. Change in land use could result in habitat loss for some wildlife species. New transmission corridors, the proposed N55 Road Improvement Project, new mines, and the Northwest Loop Road could result in habitat fragmentation and habitat loss. Linear projects, such as roads and transmission lines, could have adverse impacts for migrating wildlife species if not properly mitigated with appropriate wildlife crossing areas. These projects, where specific project areas are known, account for approximately 6,000 acres of habitat disturbance.

Beneficial cumulative impacts on wildlife would occur from such restoration projects as the Southwest Jemez Mountains Restoration Project. The proposed fire and fuels management projects on public lands in New Mexico would also have long-term beneficial impacts on wildlife. These projects would lead to restored, native ecosystems that support healthy populations of wildlife and provide improved habitat areas for seasonal migrations.

The planning area for these projects accounts for approximately 500,000 acres of habitat restoration within and near the RPFO RMP Planning Area. The BLM estimates that federal and state agencies would treat up to 206,800 acres with prescribed fire, 35,900 acres with mechanical treatments, and 10,000 acres with chemical treatments over 20 years (BLM 2004c, 2017). The Southwest Jemez Mountains Restoration Project is currently in the planning phases; the specific treatment areas are unknown at this time. The planning area for the project is approximately 210,000 acres in the southwest Jemez Mountains.

4.2.23 Unavoidable Adverse Impacts

Unavoidable adverse impacts are those that remain following the implementation of mitigation measures or impacts for which there are no mitigation measures. Mitigation measures include stipulations and the BMPs specified for the RMP alternatives. These measures also include compliance with the applicable laws, regulations, policies, and guidelines. Furthermore, implementation decisions require project-specific planning and NEPA analysis where additional mitigation measures are imposed as conditions of approval.

Some unavoidable adverse impacts would occur as a result of implementing the decisions in the RMP. Implementation decisions require appropriate project-specific planning and NEPA analysis and constitute the BLM's final approval for authorizing on-the-ground activities to proceed.

Surface-disturbing activities (e.g., construction of well pads and roads, renewable energy projects, pipelines and transmission lines, mining, and vegetation treatments), OHV use, fire management, some recreational activities, and operation and maintenance of existing facilities and infrastructure on Decision Area lands would cause fugitive dust, exhaust emissions, and smoke, thereby adversely affecting air quality.

Soil erosion could be caused by surface-disturbing activities, OHV use, fire management, some recreational activities, uncontrolled animal concentrations, and operation and maintenance of existing facilities and infrastructure on Decision Area lands. These same activities, in combination with precipitation events, also may result in runoff and sedimentation to existing surface waters. Additional unavoidable adverse impacts from these activities include the transport and spread of noxious weeds on Decision Area lands. Noxious weed seeds would continue to spread via the wind, in water courses, and by attaching to livestock, wildlife, humans, and vehicles. The presence of noxious weeds in the Decision Area is considered an unavoidable impact.

Surface-disturbing activities and the development of mineral, energy, and other facilities on Decision Area lands are expected to cause the unavoidable degradation, loss, and fragmentation of habitats. OHV use, fire management, some recreational activities, concentrated livestock grazing, and operation and maintenance of existing facilities and infrastructure on Decision Area lands may contribute to the unavoidable degradation, loss, and fragmentation of wildlife habitats. **Section 4.2.22** provides the detailed analysis of these impacts on wildlife and fisheries within the Decision Area.

Protection of some resource values (e.g., wildlife, special status species, cultural, and paleontological resources) would adversely impact the use of other resources, such as minerals and renewable energy. Conversely, use of minerals and renewable energy is expected to adversely impact the distribution of some wildlife, special status species, and vegetative communities.

Minerals exploration and development, rights-of-way development, road and trail construction, fence and water developments, and mechanical vegetation manipulation would cause unavoidable beneficial impacts on the economic well-being of the Decision Area. These activities would have minimal impacts on the natural character and opportunities for solitude and primitive recreation through project location, design, and BMPs.

Surface-disturbing activities and development from BLM actions would cause minimal change to the landscape, scenic quality, and setting in the Decision Area. Non-BLM actions on lands adjacent to BLM-administered lands also would cause change to the landscape and setting. Fire, insect and disease damage,

and development also are expected to temporarily impact the scenic quality of the Decision Area. Surface-disturbing activities, OHV use, vandalism, and natural processes (e.g., fire and erosion) would impact cultural and paleontological resources in the Decision Area.

There would continue to be impacts on cultural and paleontological resources associated with dispersed recreation activities, OHV use, vandalism, and other types of activities not authorized by the BLM. Unavoidable damage to cultural resources from permitted activities could occur if resources undetected during surveys were identified during ground-disturbing activities. In these instances, further impacts would be ceased upon discovery and measures would be taken to mitigate the adverse impact on the resource.

4.2.24 Irreversible and Irretrievable Commitment of Resources

Section 1502.16 of CEQ regulations requires that the discussion of environmental consequences include a description of "any irreversible or irretrievable commitment of resources which would be involved in the proposal should it be implemented." This refers to decisions affecting the use of nonrenewable resources and results in the resource being permanently lost. For example, the production of oil and gas is an irreversible commitment of these resources. An irretrievable commitment of a resource refers to decisions resulting in the loss of production or use of a resource over a given period of time. For example, in the construction of a road, the forage is lost for as long as the road remains.

Given the definitive nature of irreversible commitments of resources, their consideration is imperative in land use planning. Soil erosion, loss of productivity, and soil structure might be considered irreversible commitments to resources. These effects are caused by surface-disturbing activities, such as construction of corridors and mineral resources development. Although they might be mitigated, the loss of soil and soil productivity is still anticipated.

Irretrievable commitments are perhaps the predominant type of commitment that the BLM makes for the resources it manages, given that over time, whether during the life of the plan or beyond, most current resources and opportunities can be restored. Diminished water quality from sedimentation, salinity, and nonpoint source pollution caused largely by anticipated surface-disturbing activities associated with mineral resource development and recreation use could be restored. Resource management decisions under Alternatives B, C, and D to limit disturbance to soil and water would decrease the potential for impact.

4.2.24.1 Cultural Resources

Disturbance to cultural resources of any kind, whether associated with cultural- and heritage-oriented recreation, mineral resource development, renewable energy, or other uses of public lands, typically are irreversible. Any activity administered by the BLM that disturbs the surface and subsurface or causes wear could destroy cultural materials. This would also apply to paleontological resources, for which any damage, including loss of opportunity to collect scientific data, would be irreversible.

Because the location and nature of all cultural resources in the area under consideration are unknown, it is not possible to determine the amount or level of irreversible and/or irretrievable impacts on cultural resources in the Decision Area; however, it is likely that, in spite of Section 106 of the NHPA and BLM policy and guidelines, some non-mitigable impacts would occur. They would likely be irreversible due to audible and visual effects on setting, feeling, and association or because restoration of an archaeological site is typically very difficult, if not impossible.

4.2.24.2 Fire Management

The prohibition of fuels reduction and vegetation treatments could result in irretrievable increases in fire suppression costs, as well as irretrievable losses in habitat value as vegetation types move away from the desired future condition; however, non-surface-disturbing vegetation treatments and/or effective suppression followed by effective rehabilitation/restoration could prevent these impacts from being

irreversible. It should be noted that reactive fire management (fire suppression and rehabilitation) is typically more expensive, time consuming, and damaging than proactive fire, fuels, and vegetation management (prescribed burns, mechanical thinning, chemical treatment, and subsequent restoration).

4.2.24.3 Lands and Realty

All alternatives permit landownership adjustments that may result in the permanent loss of lands from public ownership if they enter state or private ownership.

4.2.24.4 Livestock Grazing

Areas not available for livestock grazing would result in an irretrievable loss of forage for livestock under the life of the plan. Also, vegetation treatments, prescribed burns, and wildfire would result in an irretrievable loss of vegetation and forage for livestock grazing until the vegetation is restored.

4.2.24.5 Minerals

The extraction and development of mineral resources from Decision Area lands would result in both an irreversible and irretrievable loss of those mineral resources because of the finite nature of the resource. The impacts would be irretrievable and irreversible because, once extracted, the mineral resource cannot be used again, nor can it be replaced in the foreseeable future. BLM Handbook H-1624-1, Planning for Fluid Minerals, acknowledges leasing of oil and gas resources as an irreversible commitment.

4.2.24.6 Lands with Wilderness Characteristics

Any loss of size, naturalness, and/or opportunities for solitude or primitive and unconfined recreation within lands with wilderness characteristics caused by surface-disturbing activities, such as mineral development, forest product harvest, and cross-county travel, would most likely be irretrievable until and if the impact area is fully reclaimed. The scenic quality of areas with scenic values that are proposed to be managed as VRM III, as in Cimarron Mesa, could be degraded over the life of the plan.

4.2.24.7 Recreation and Visitor Services

There would be no irreversible losses of recreation resources for any of the alternatives. Irretrievable impacts on recreation resources would be caused by short-term loss or diminishing of recreation-related scenic quality from vegetation treatments, fuel reductions, or invasive weed control until vegetation regrowth; and short-term irretrievable loss of scenic recreational opportunities caused by mineral development until disturbances are reclaimed.

4.2.24.8 Riparian Resources

Irretrievable loss of riparian habitat could occur because of grazing, visitor trampling, and construction-related removal of riparian habitat; however, this habitat could eventually be restored, so those impacts would not be irreversible. It is possible that noxious weed infestation of disturbed riparian areas could become an irreversible impact based on past difficulties in controlling invasive species, such as saltcedar and Russian olive. An irretrievable loss of riparian habitat could also occur if riparian habitat is converted to upland habitat by filling, draining, or other landscape alterations, in association with the placement of utility corridor infrastructure.

4.2.24.9 Soil and Water

Where surface-disturbing activities occur and are not mitigated, an irreversible loss of soil and soil productivity would result. Where surface disturbance affects sensitive soils, the impacts would be irretrievable in the long term because of these soils' limitations. Either of these types of impacts may result from livestock grazing, mineral development, or recreation or travel, including the use of OHVs.

4.2.24.10 Special Status Species

Irretrievable impacts associated with surface-disturbing activities proposed throughout the Decision Area include the loss of special status species habitat value from mineral development, fire treatments, renewable energy development, and motorized travel. These resource values would be lost until successful restoration/rehabilitation takes place. Implementation of reclamation/rehabilitation would prevent these impacts from being irreversible.

4.2.24.11 Travel Management

All routes not designated would be irretrievable, in that the use of that travel resource would be irretrievably lost until the routes were designated for use; however, none of these non-designations would be irreversible, in that it is possible to make these routes available for use again subject to additional analysis and/or adaptive management response.

4.2.24.12 Vegetative Communities

There could be irretrievable impacts associated with surface-disturbing activities and livestock grazing proposed on Decision Area lands. The protective measures required by the RPFO include the reclamation of disturbed areas following completion of the management action (e.g., well pad deconstruction, road rehabilitation, reseeding, and weed eradication).

Vegetation resources would be restored or rehabilitated after proposed disturbance and/or development; therefore, minimal irreversible impacts on native vegetation resources would be associated with the management decisions proposed for Decision Area lands. If vegetative communities found on sensitive soils are disturbed, restoration and rehabilitation efforts may not be as effective and could result in irreversible impacts on native vegetative communities. Livestock grazing could also result in irretrievable impacts on vegetative communities if livestock grazing is not appropriately managed, especially during drought conditions.

4.2.24.13 Visual Resources

Irretrievable impacts on visual resources would also be produced by surface disturbances, such as mineral development, access road construction, renewable energy development, fire management, and vegetation treatments. This irretrievable loss would be most apparent under those alternatives that propose lower visual protections for those areas. The visual resources affected by such developments would be irretrievably lost until those areas are rehabilitated or restored; however, because they can be restored, these impacts would not be irreversible.

4.2.24.14 Wildlife and Fisheries

Irretrievable impacts associated with surface-disturbing activities proposed throughout the Decision Area include the loss of wildlife habitat value from mineral development, fire treatments, or motorized travel. These resource values would be lost until successful restoration/rehabilitation takes place. Implementation of reclamation/rehabilitation would prevent these impacts from being irreversible.