BLM

VOLUME II
Appendices

COLORADO RIVER VALLEY FIELD OFFICE
ROAN PLATEAU PLANNING AREA

Including Naval Oil Shale Reserves Numbers 1 & 3

Draft Resource Management Plan Amendment and Supplemental Environmental Impact Statement

BLM/CO/PL-16/001

United States Department of the Interior
Bureau of Land Management
Colorado State Office

NOVEMBER 2015

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United States Department of the Interior
Bureau of Land Management
Colorado State Office
Colorado River Valley Field Office

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Roan Plateau Planning Area Resource Management Plan Amendment and Supplemental Environmental Impact Statement

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November, 2015

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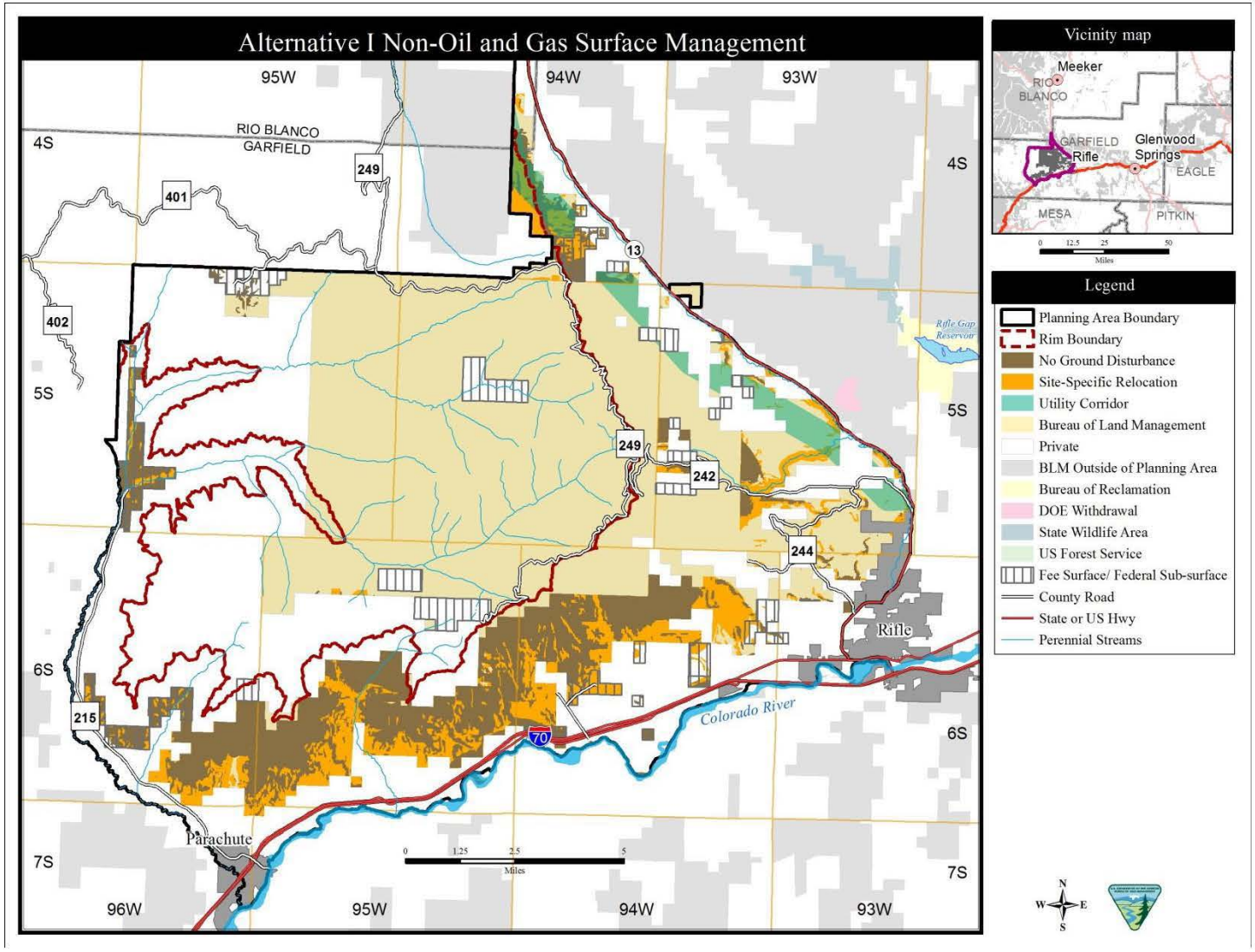

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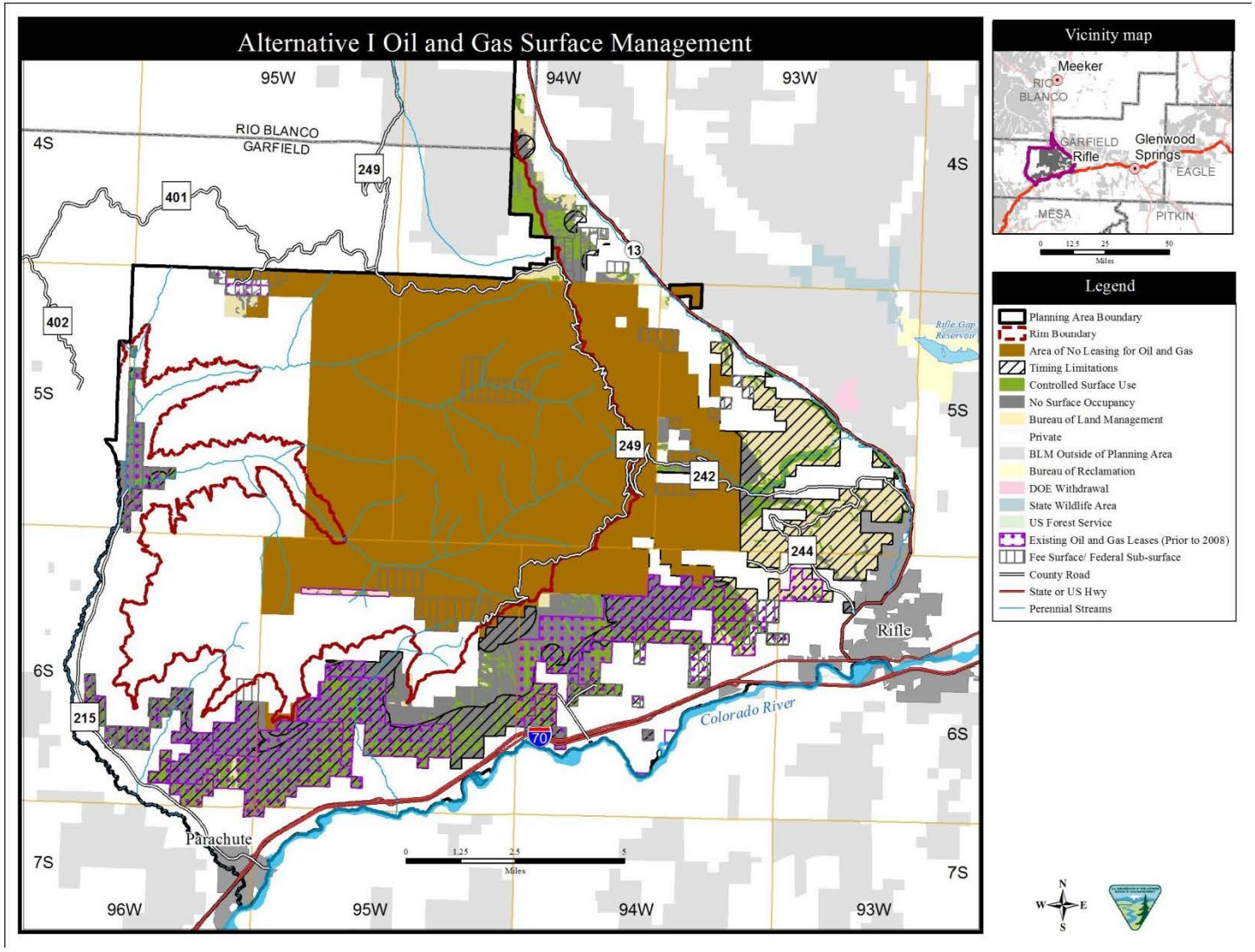

Map 2. Alternative I
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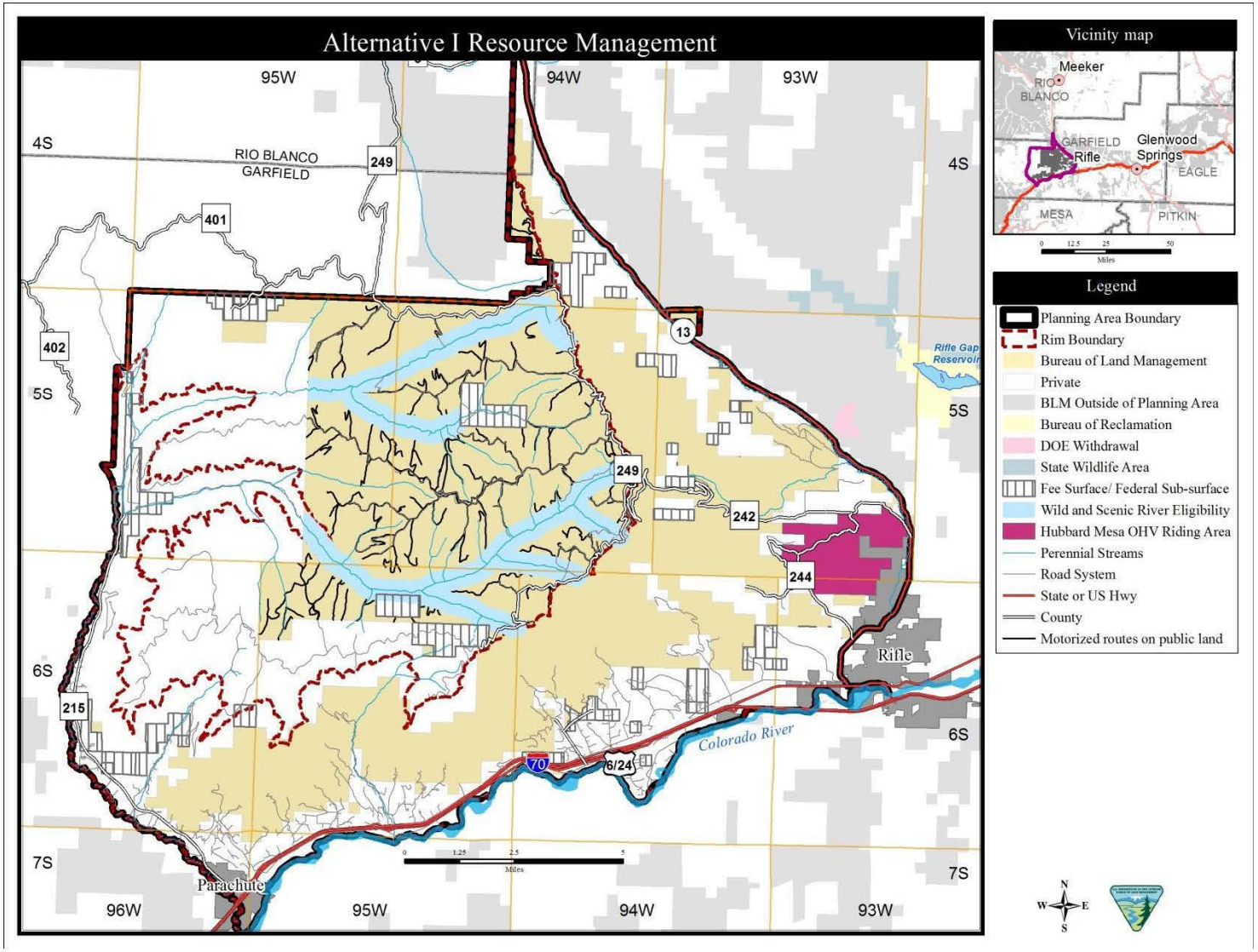

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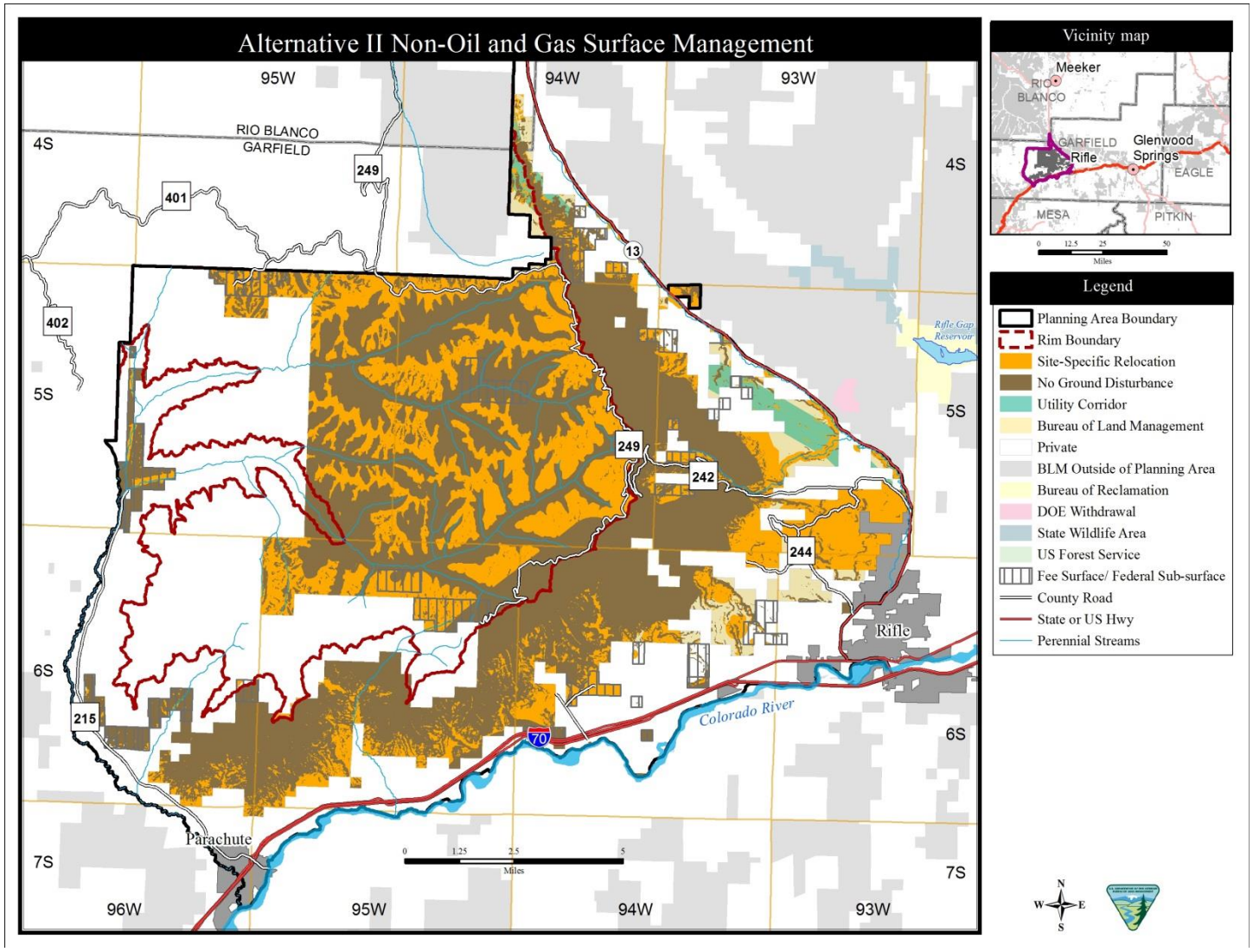

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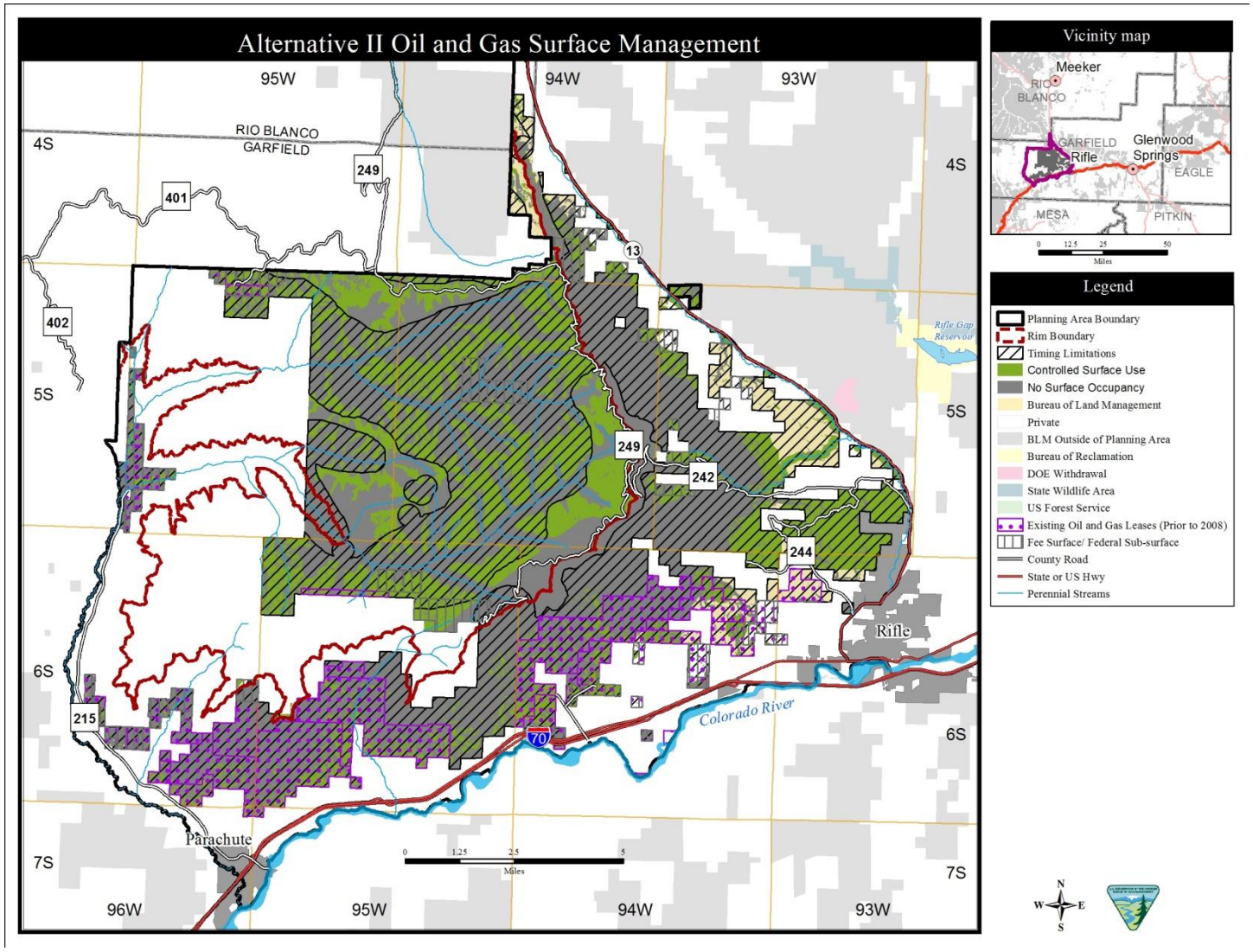

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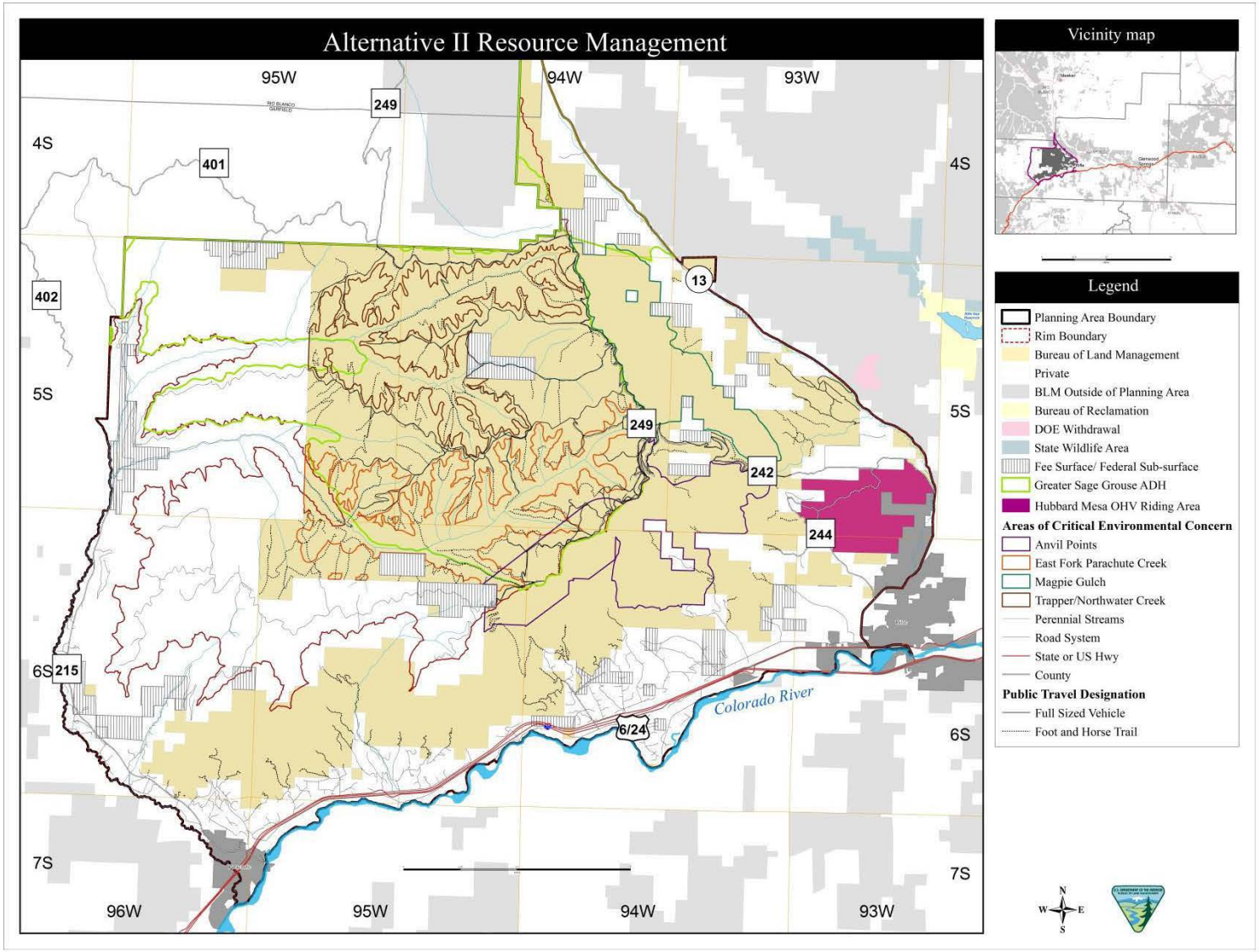

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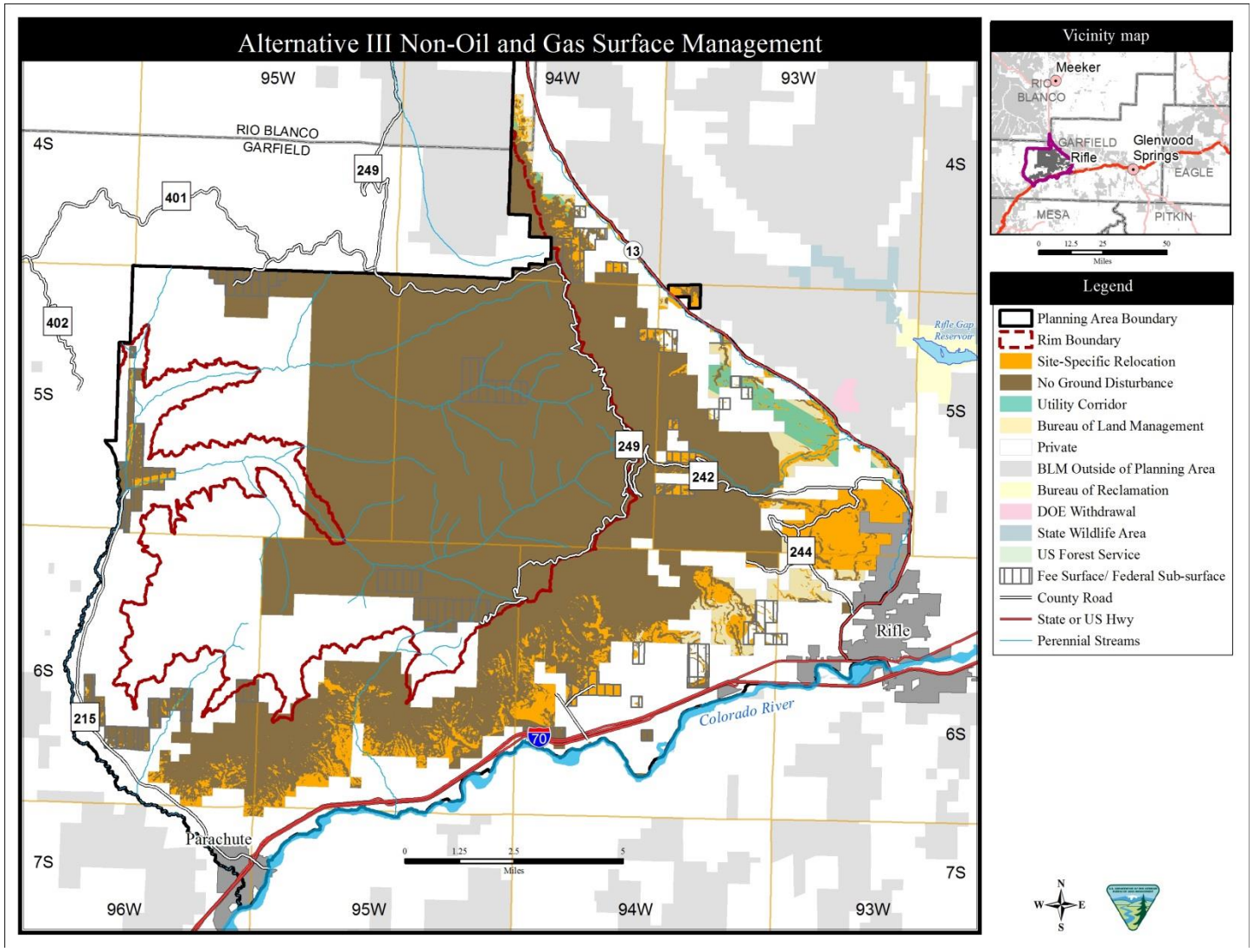

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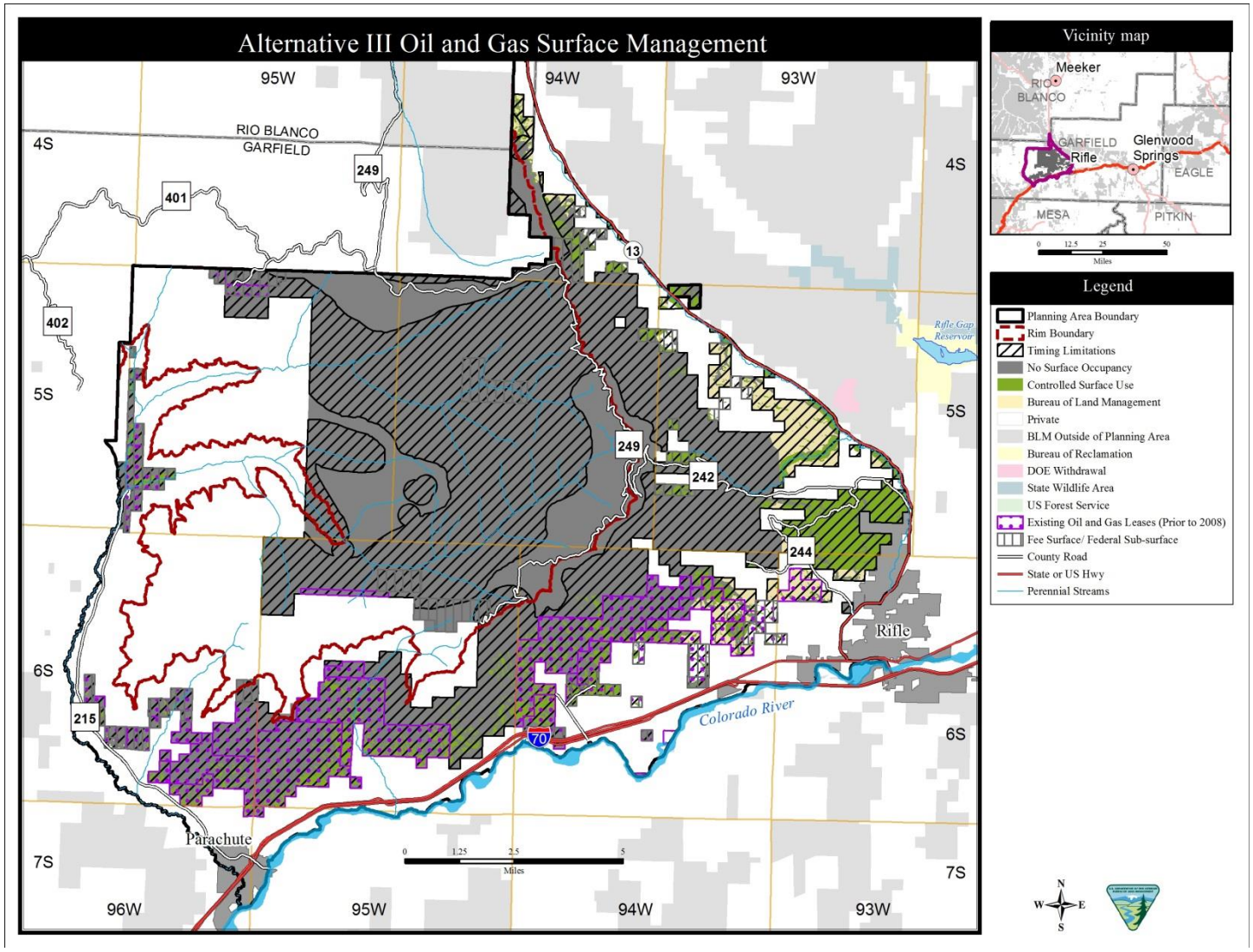

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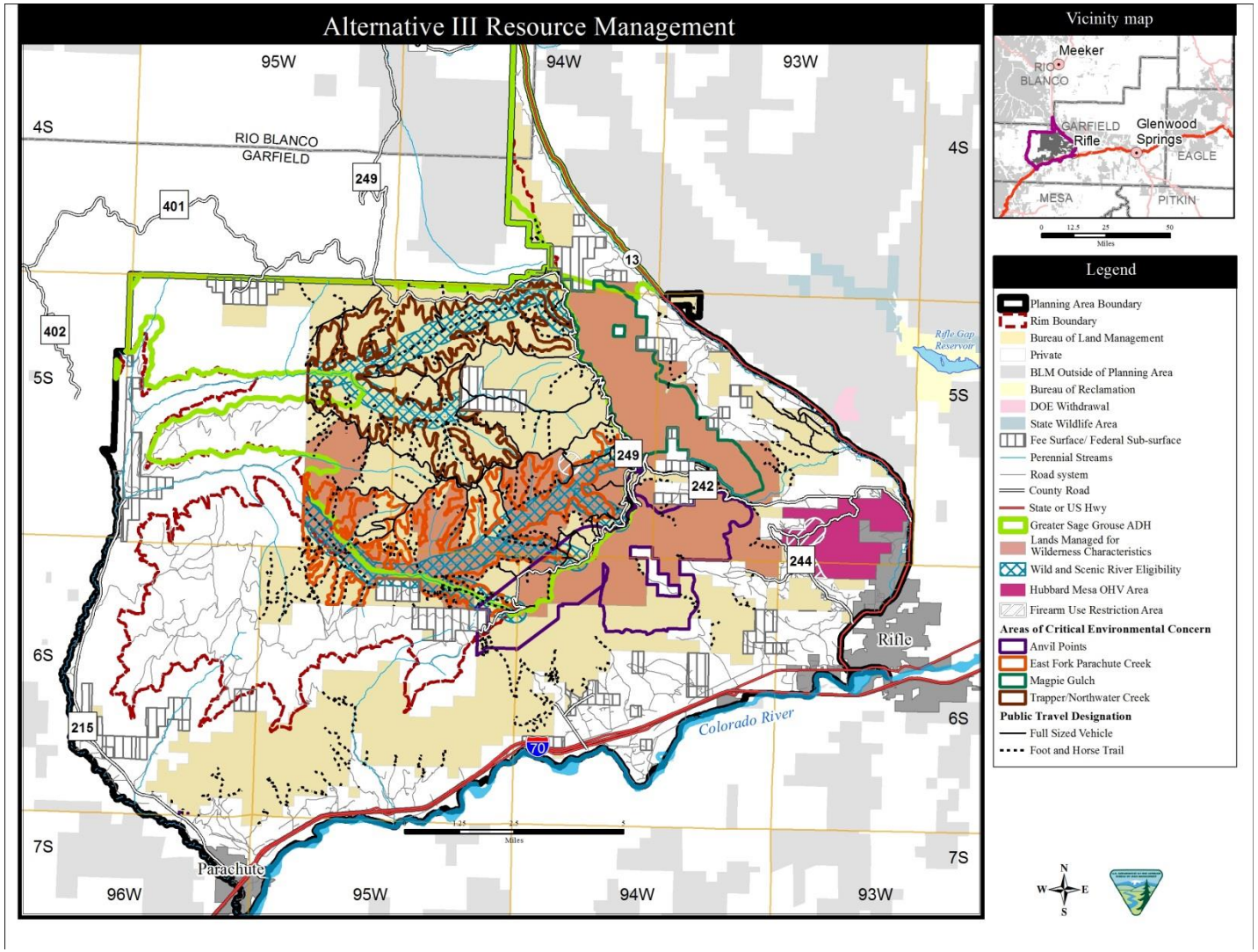

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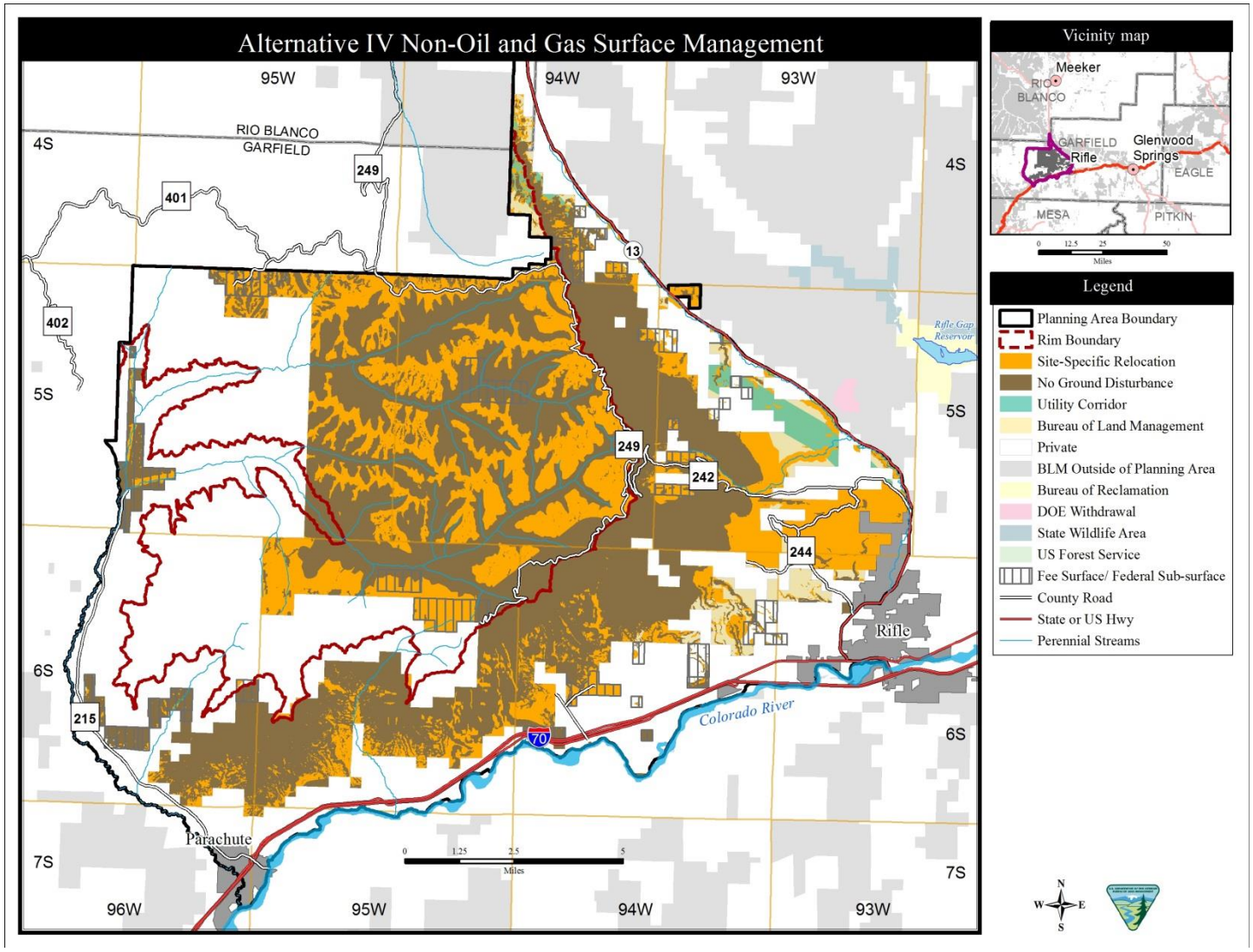

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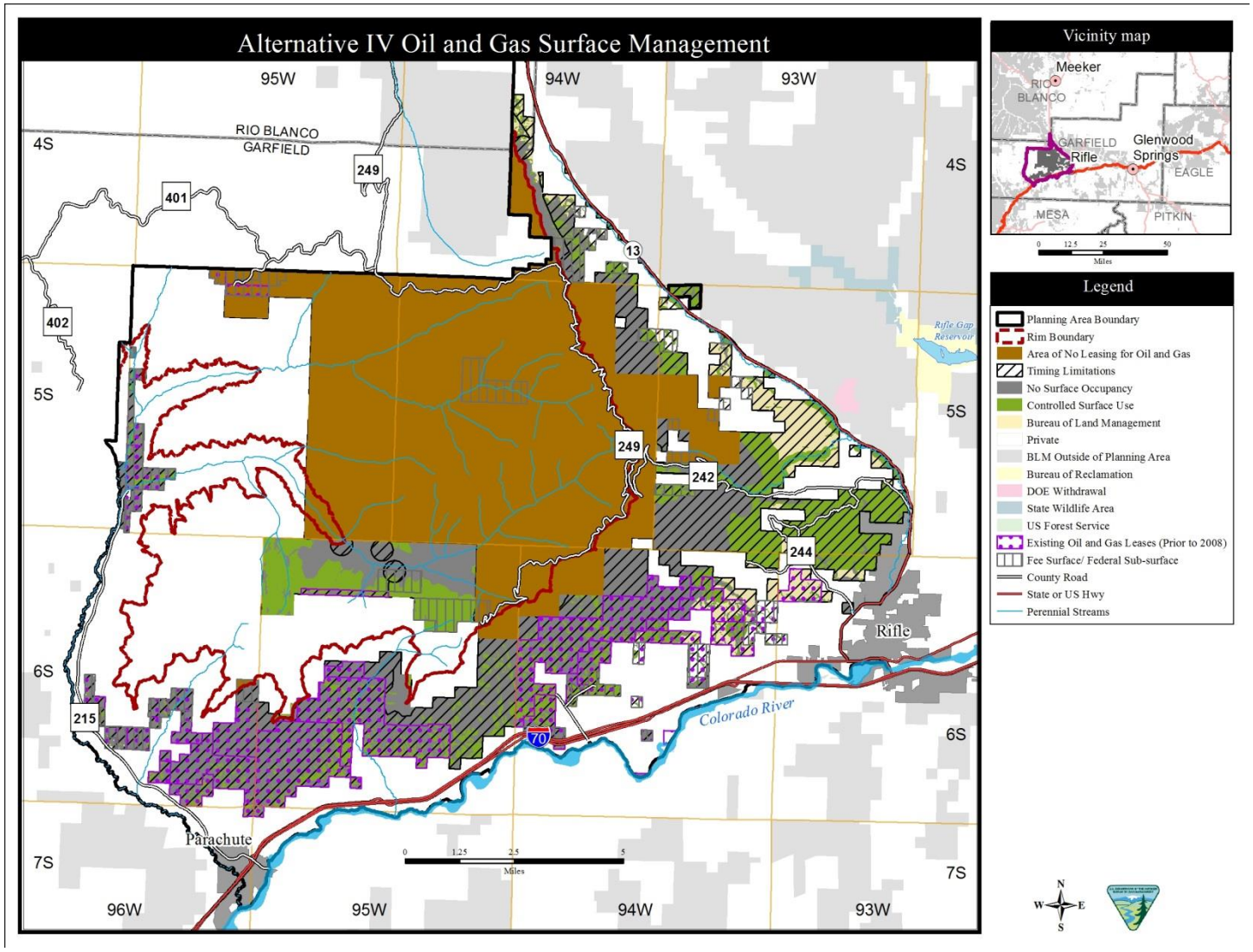

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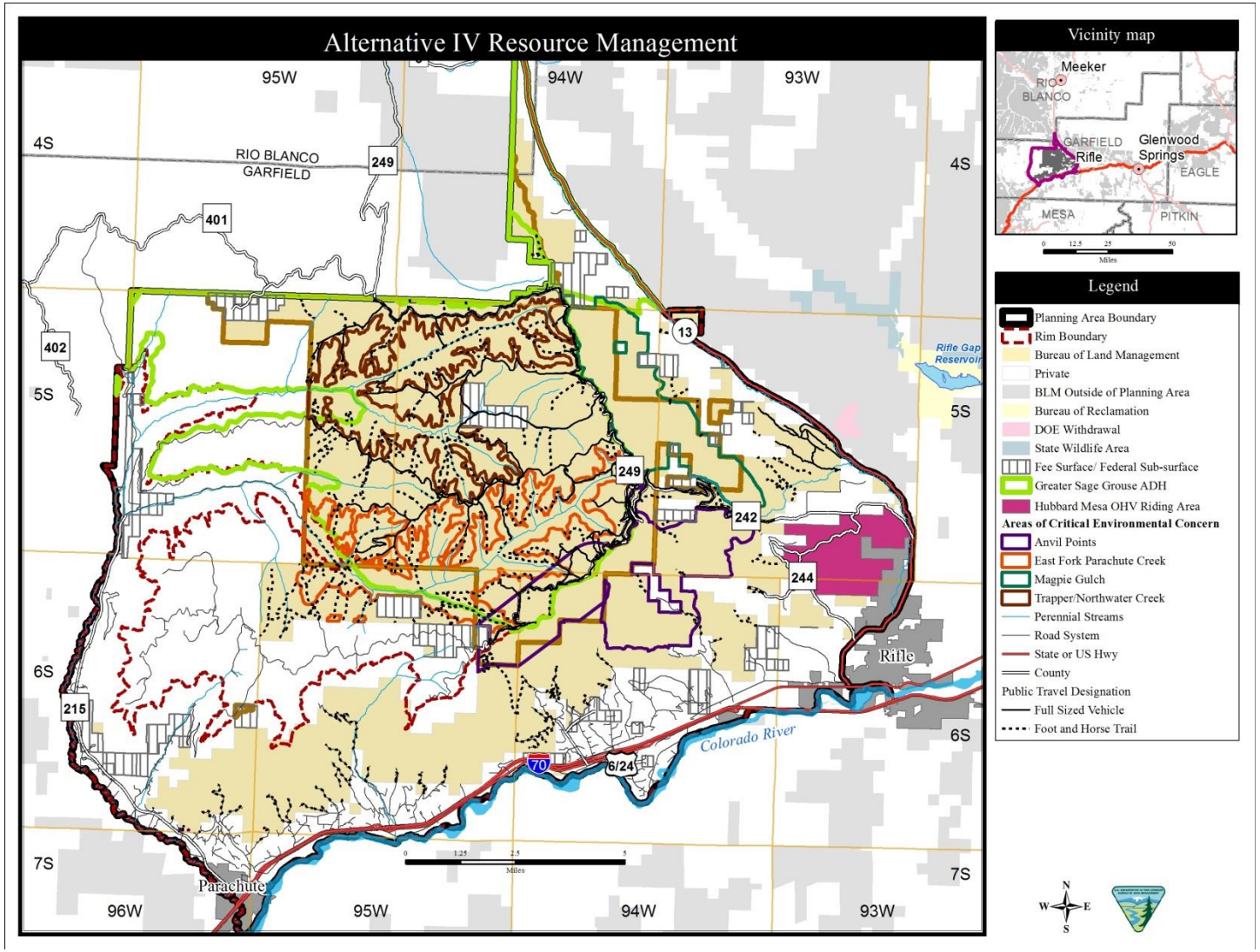

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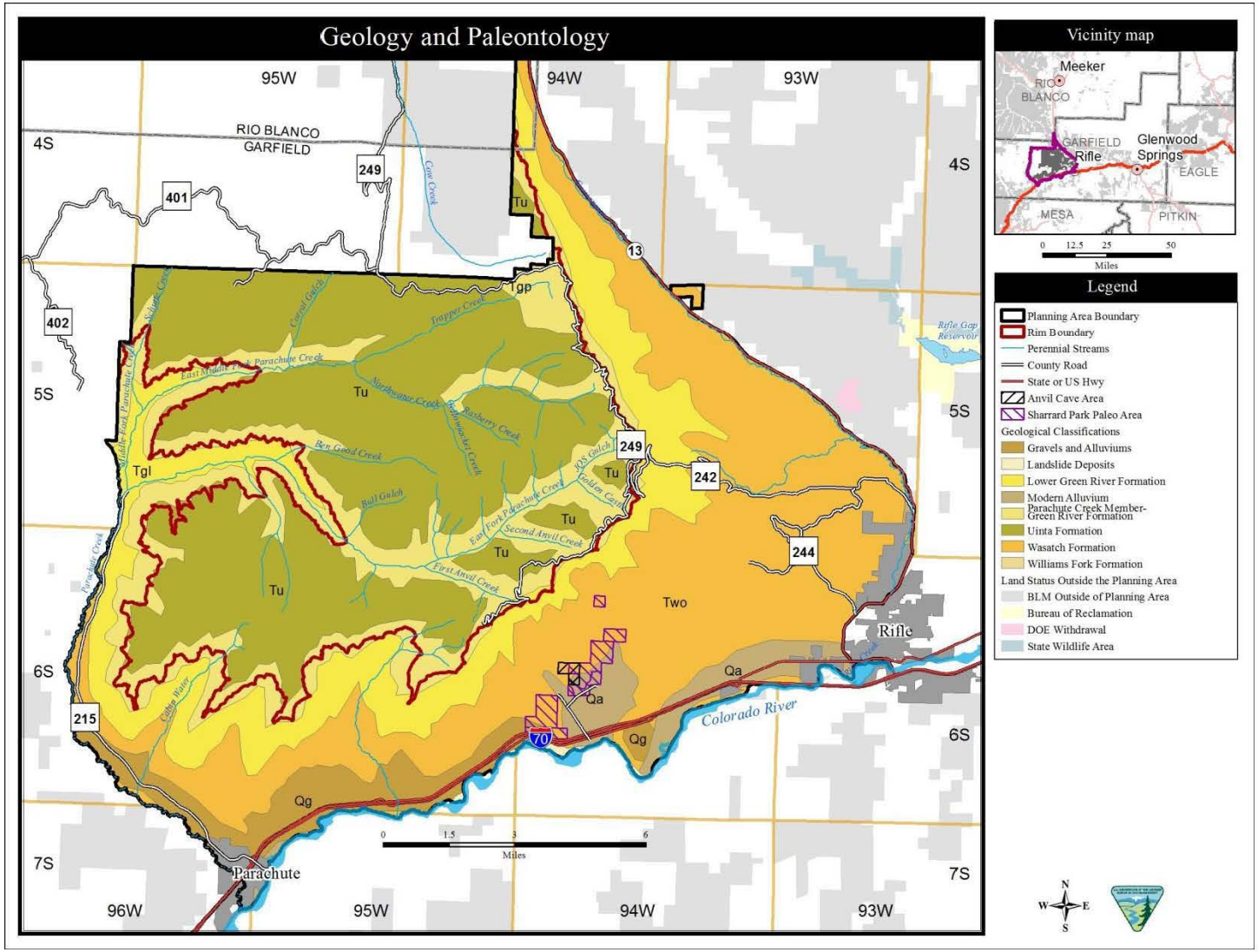

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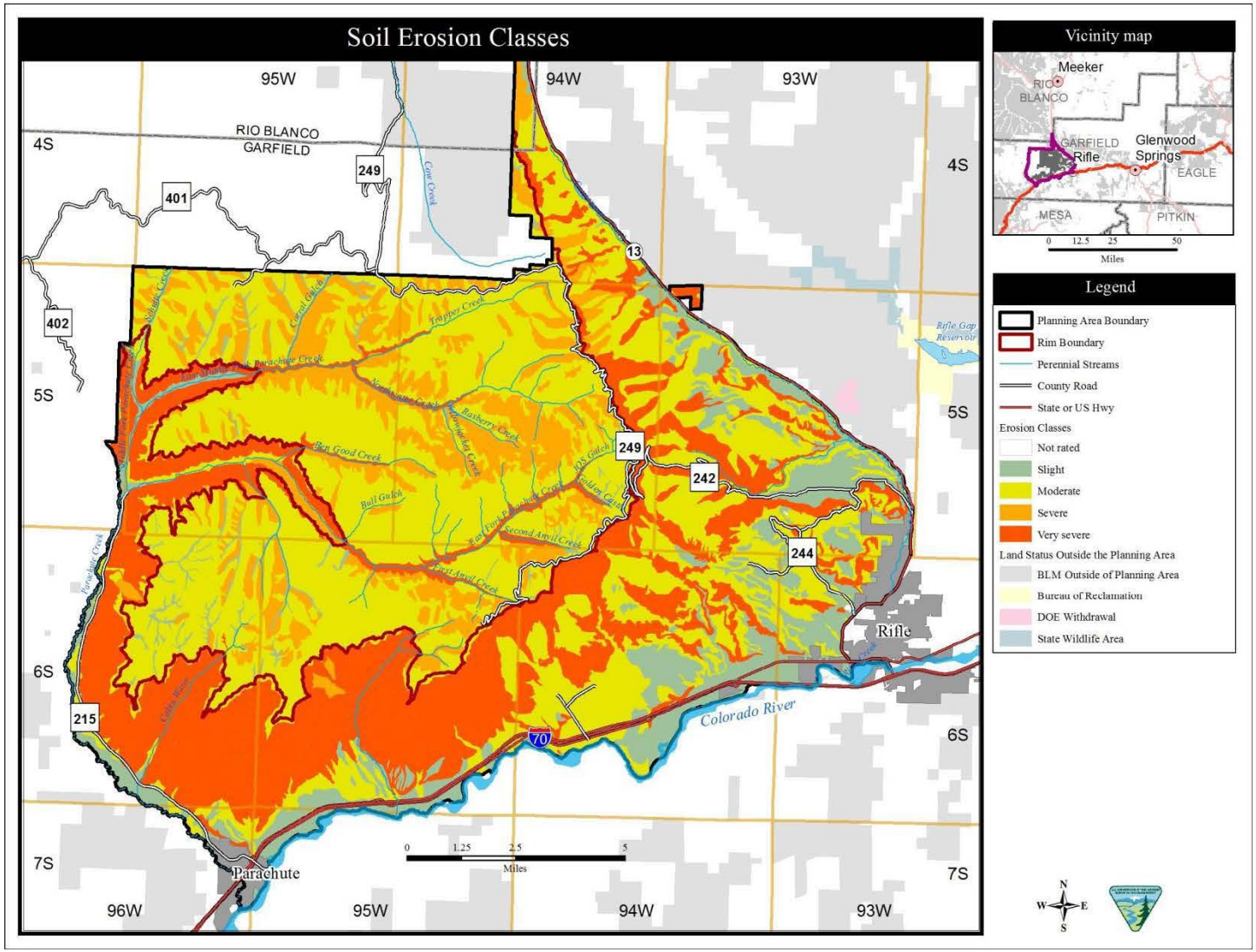

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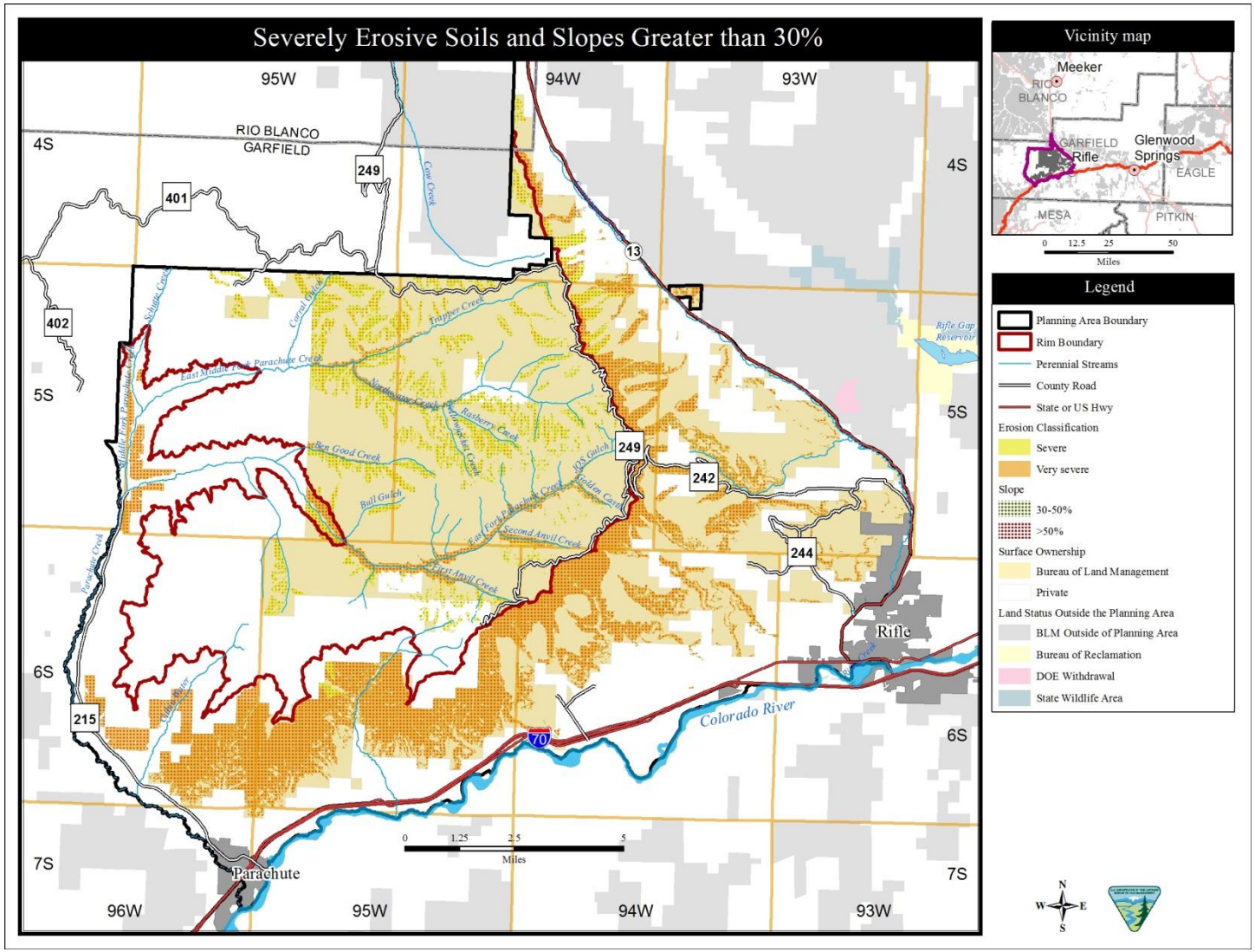

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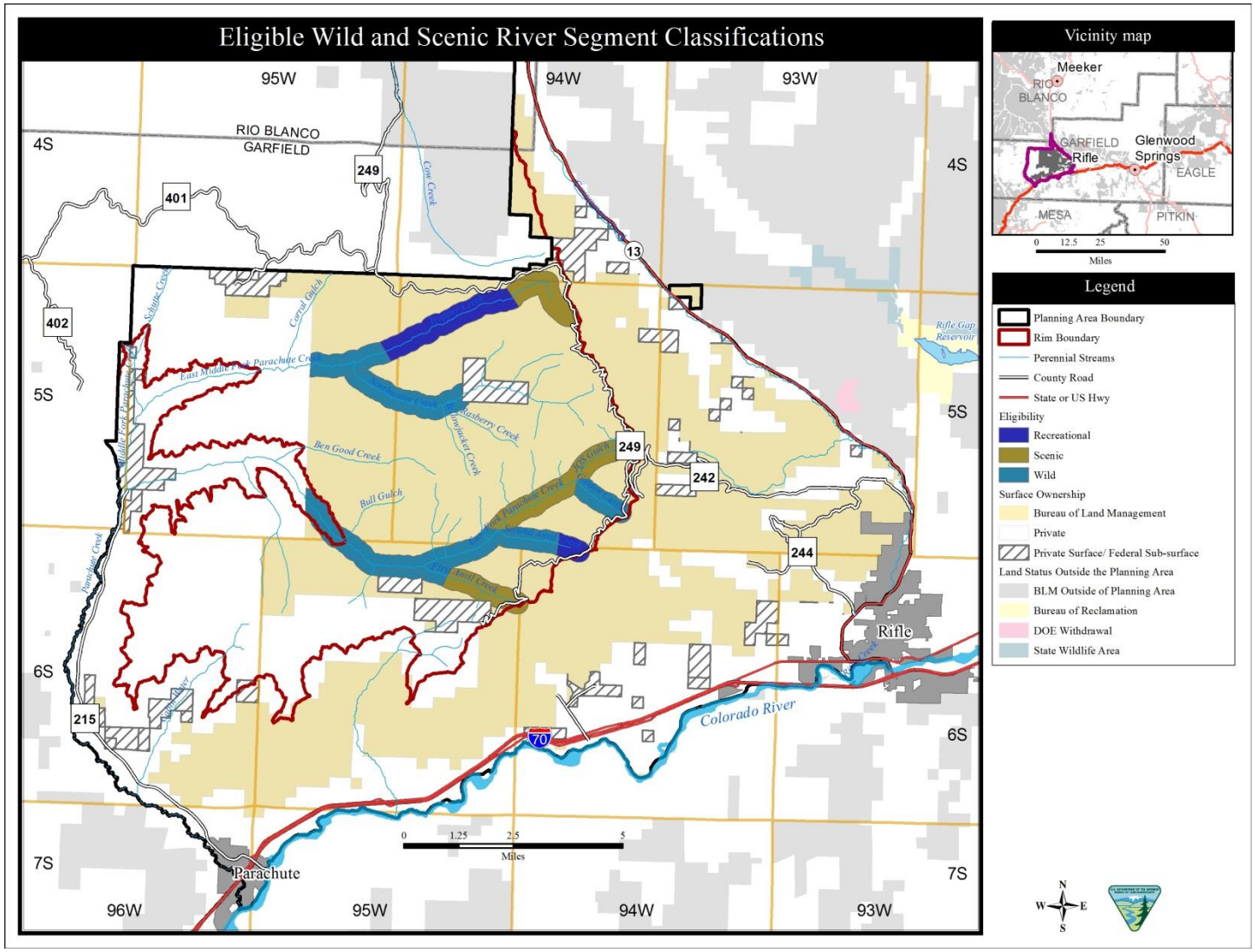

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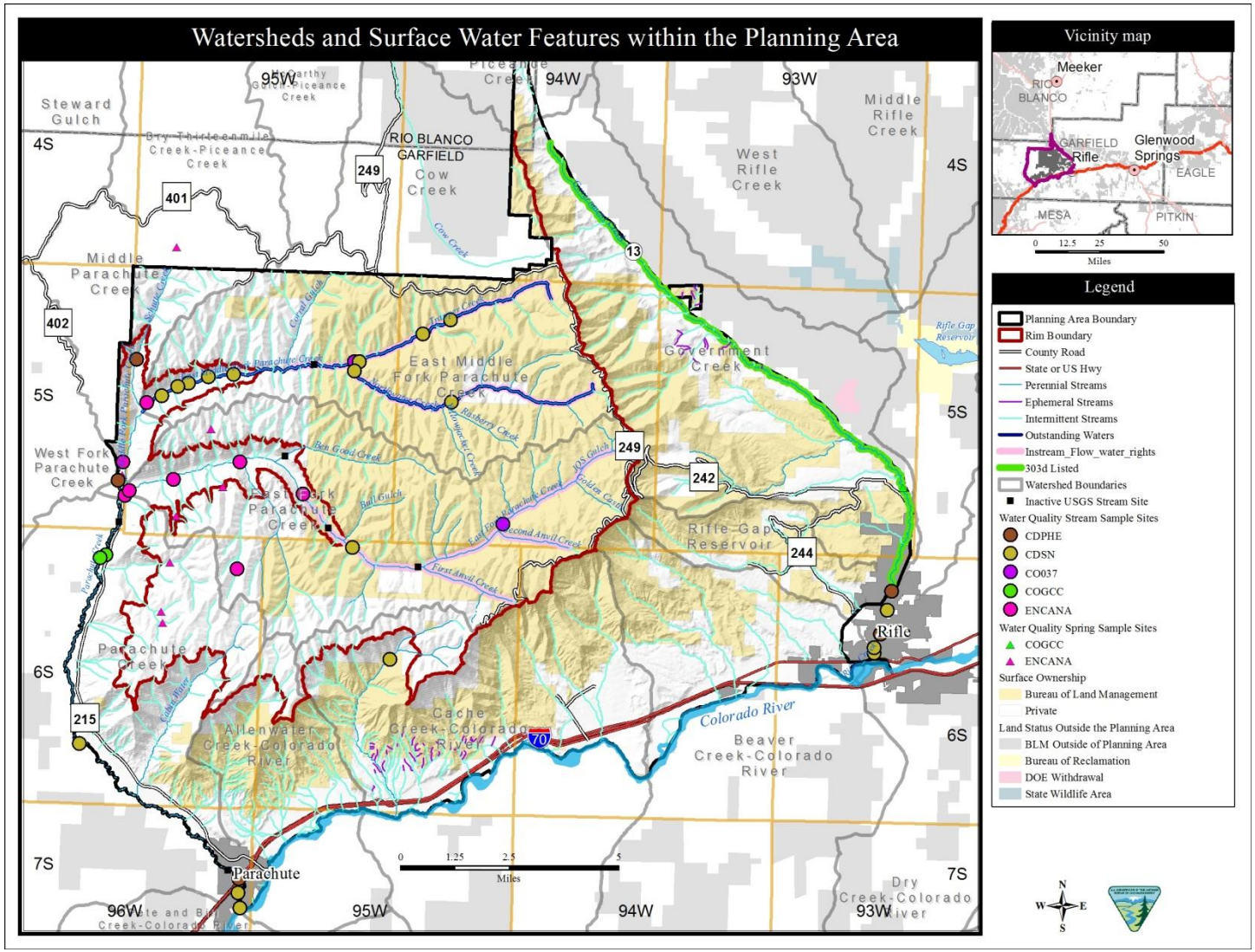

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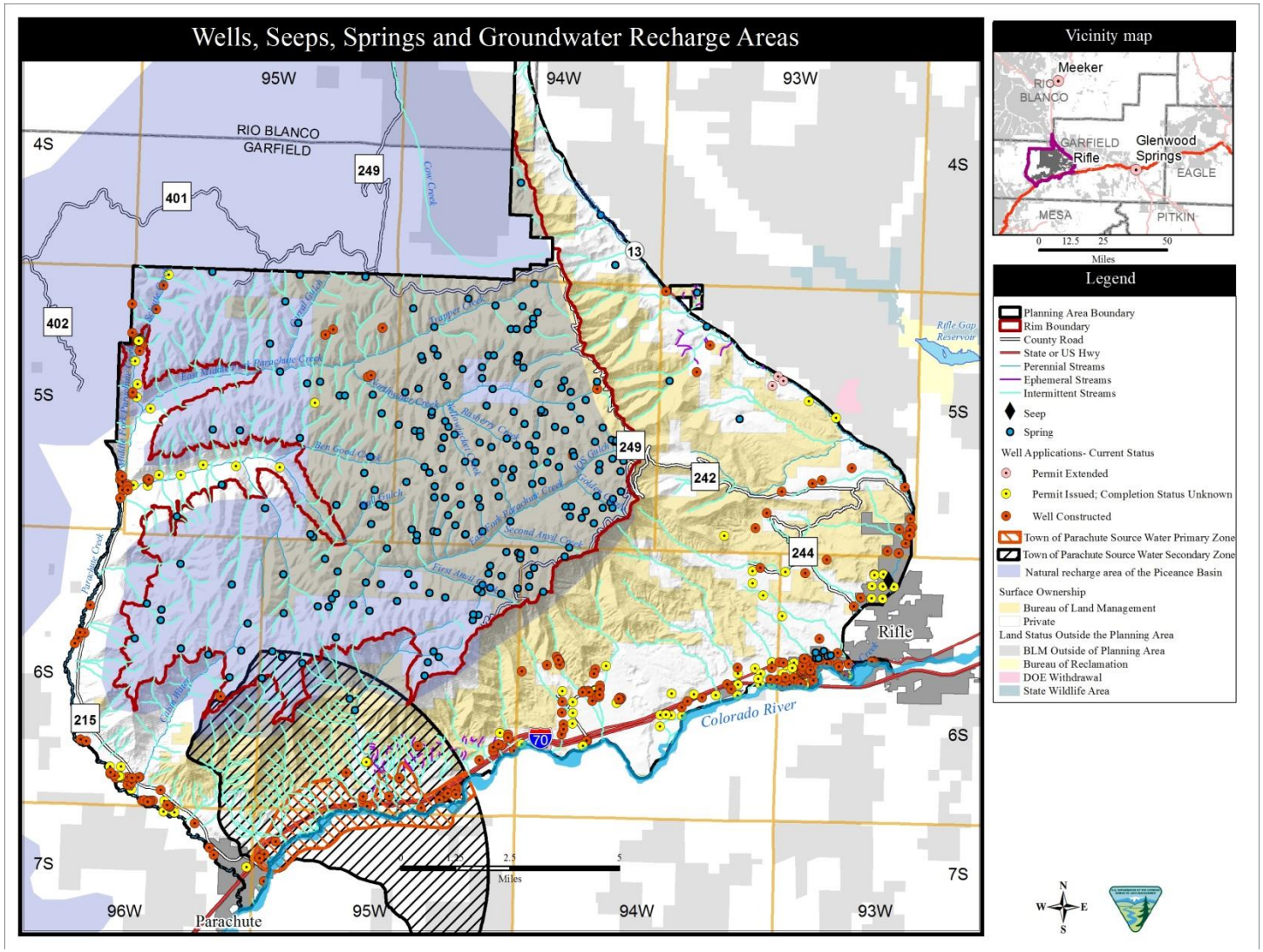

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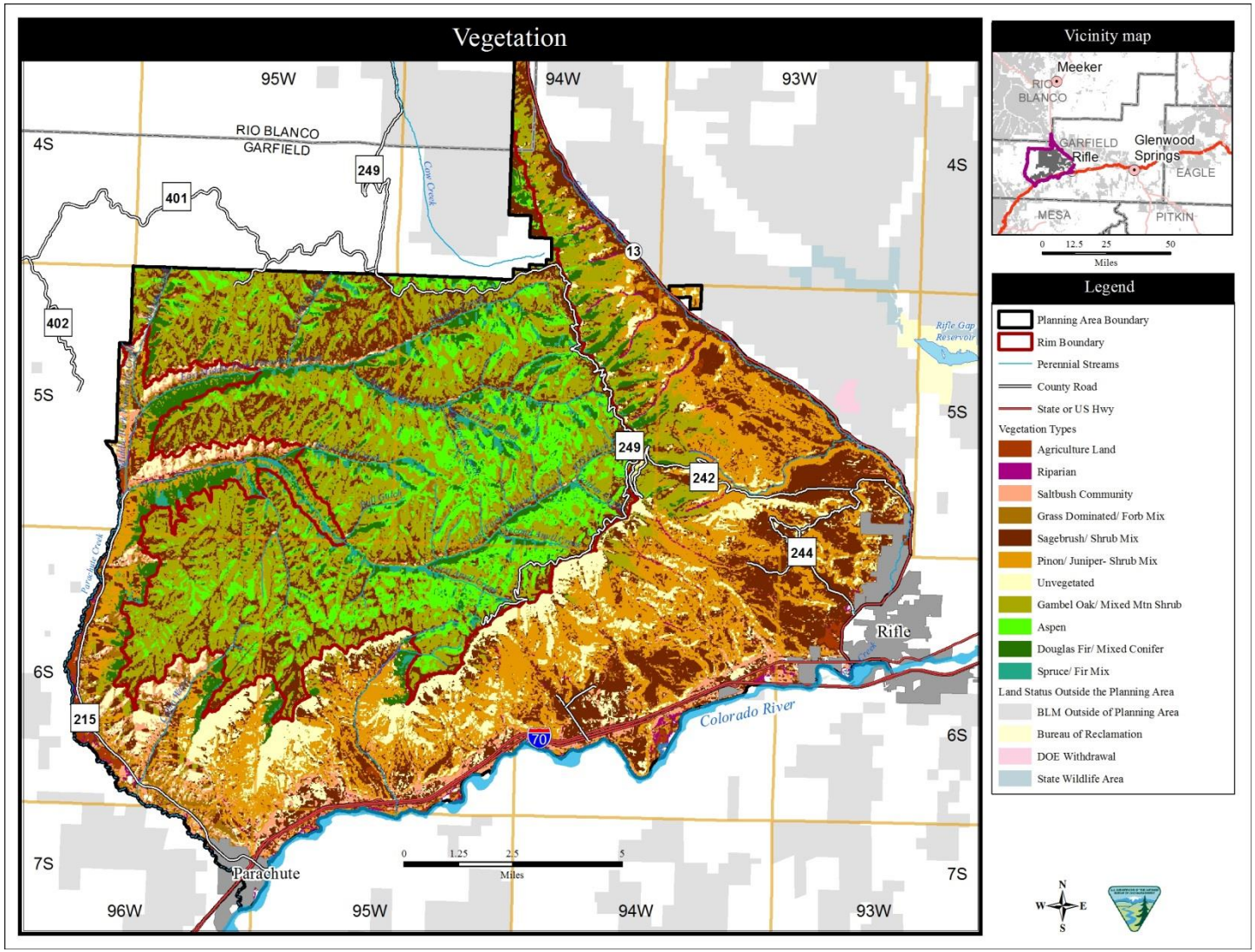

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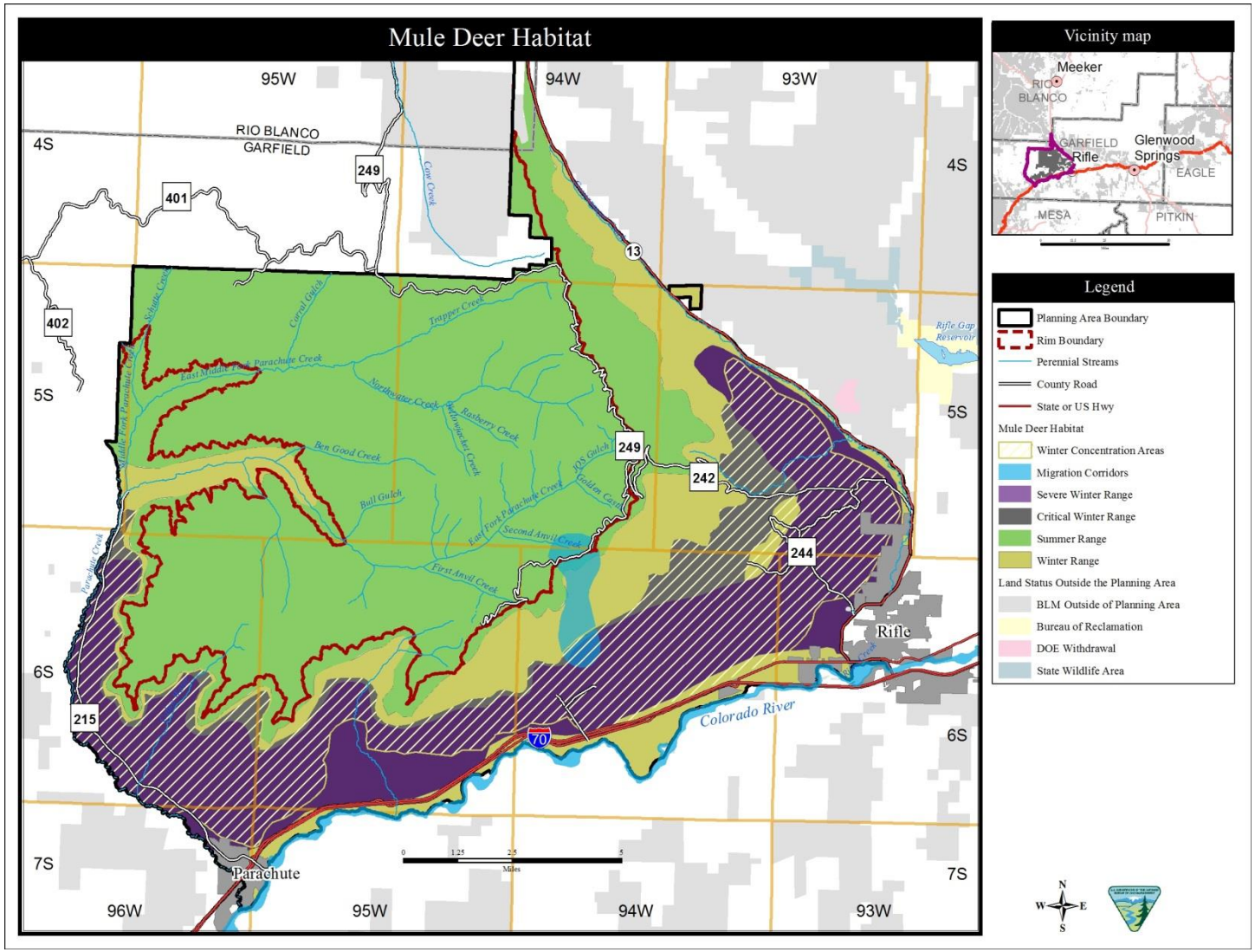

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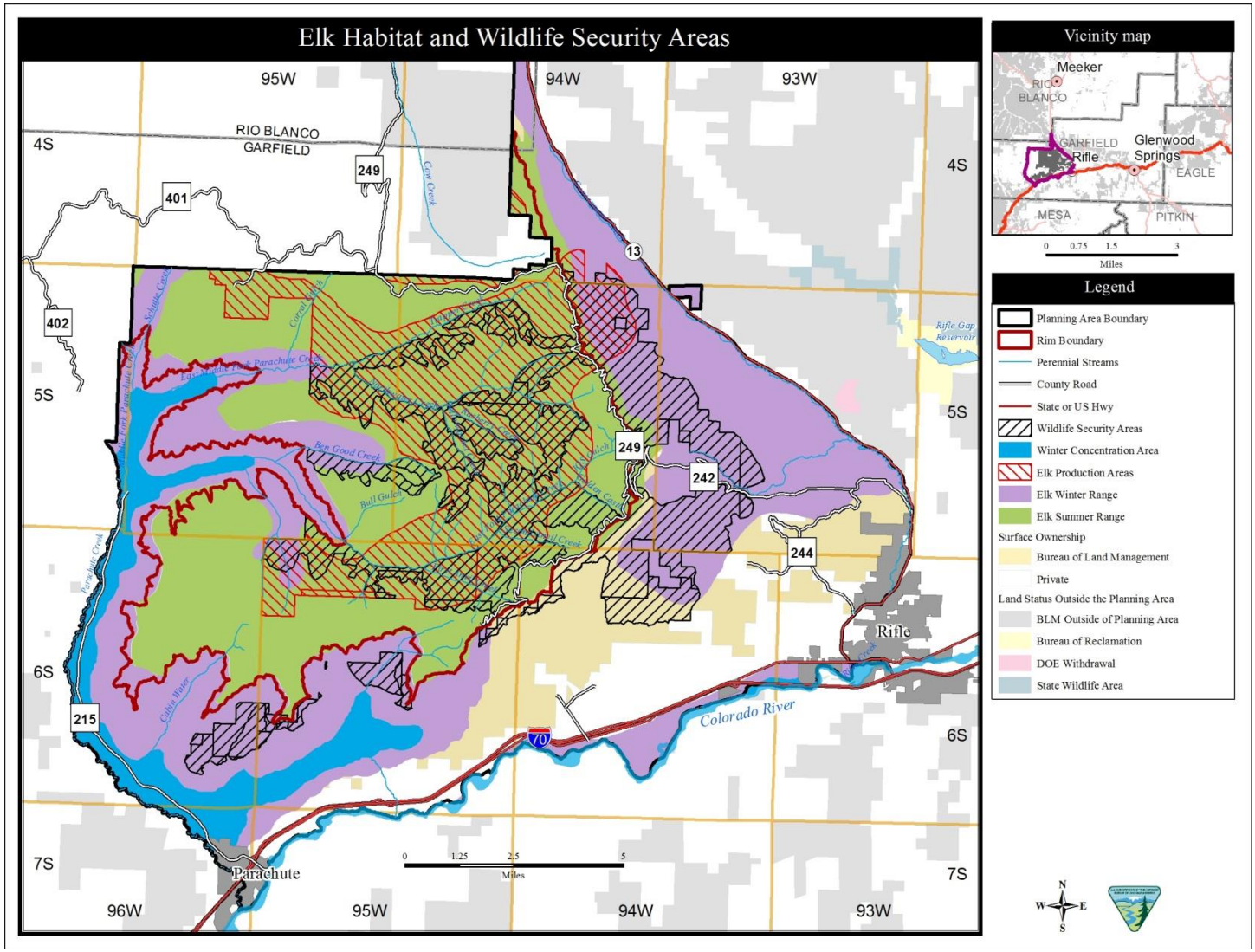

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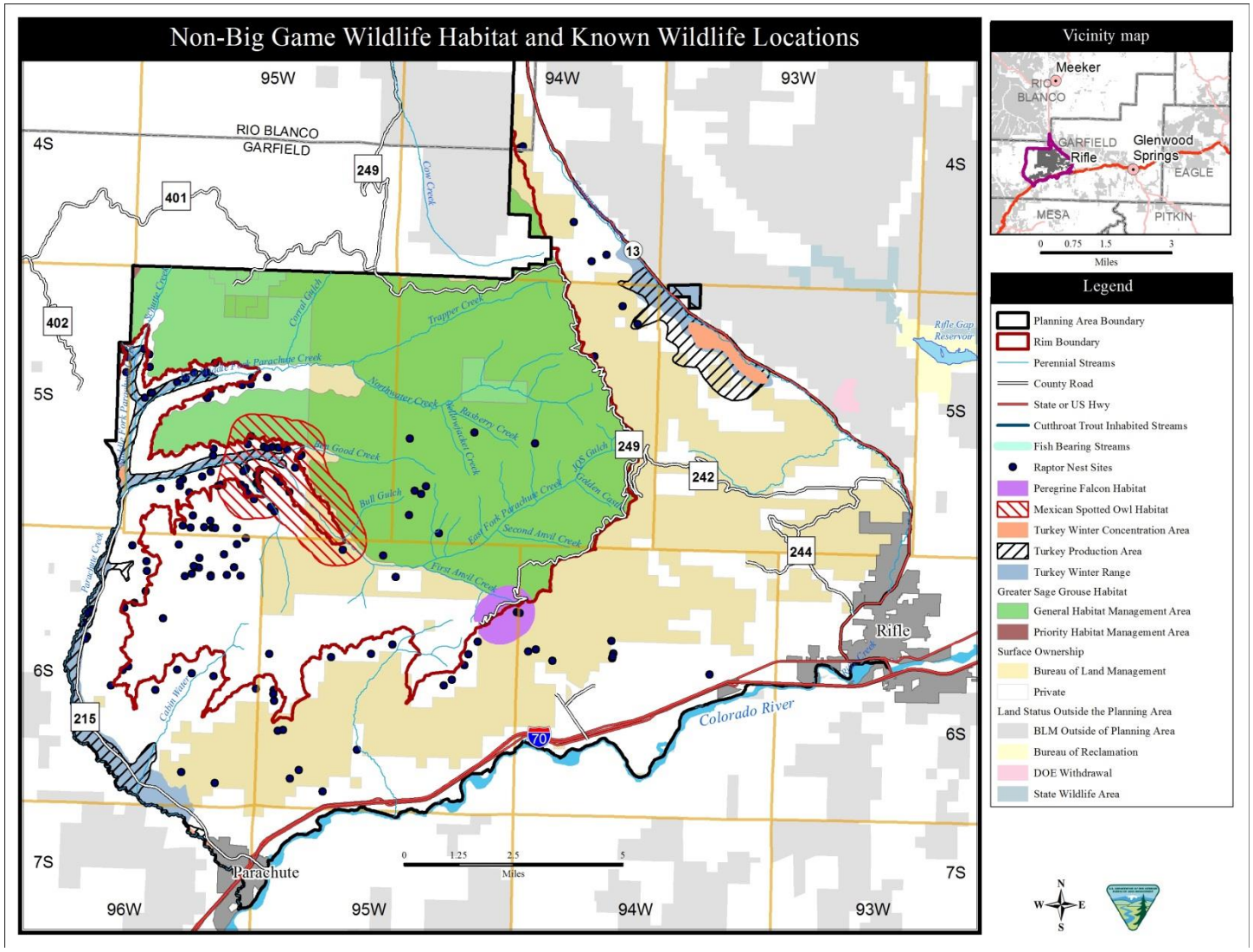

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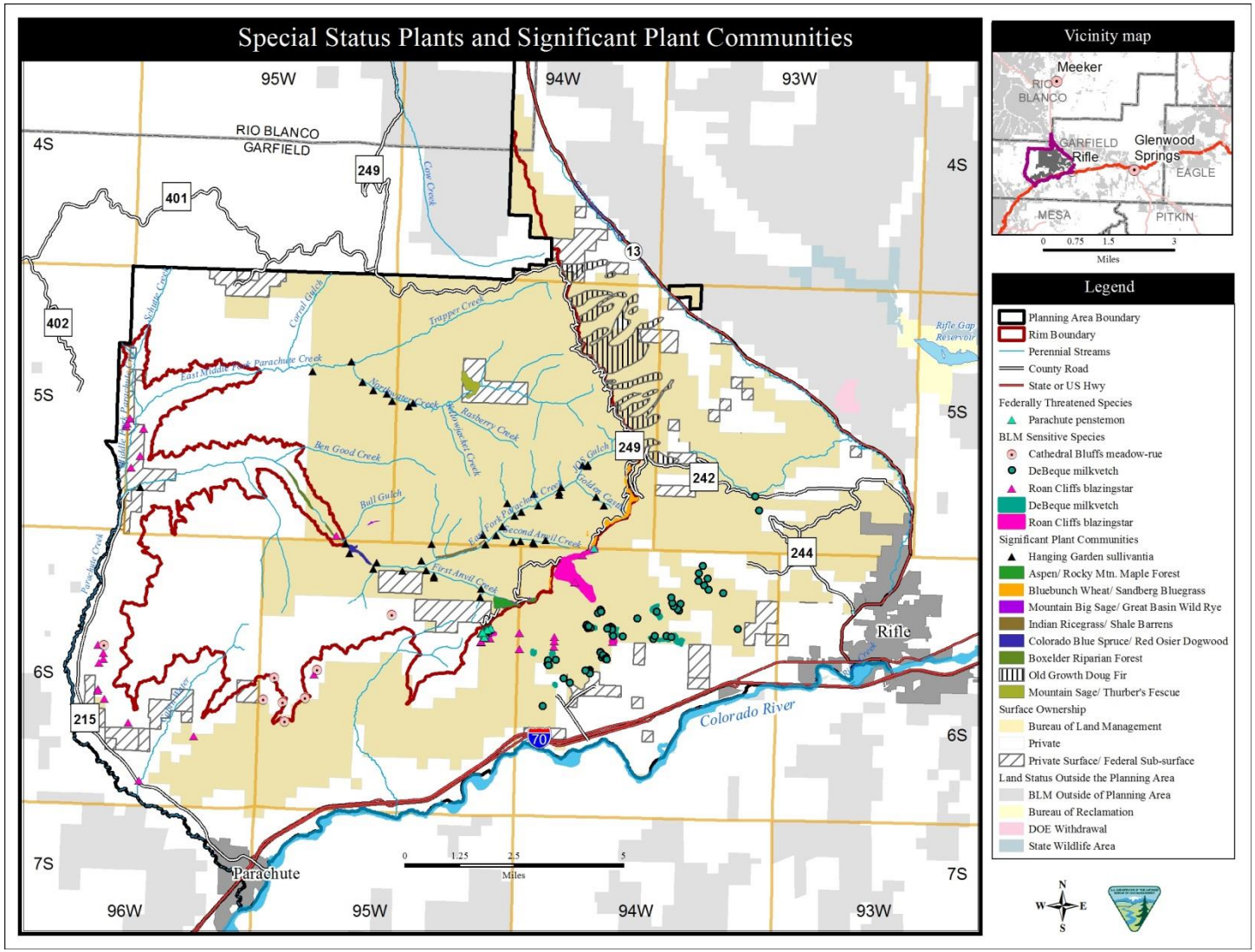

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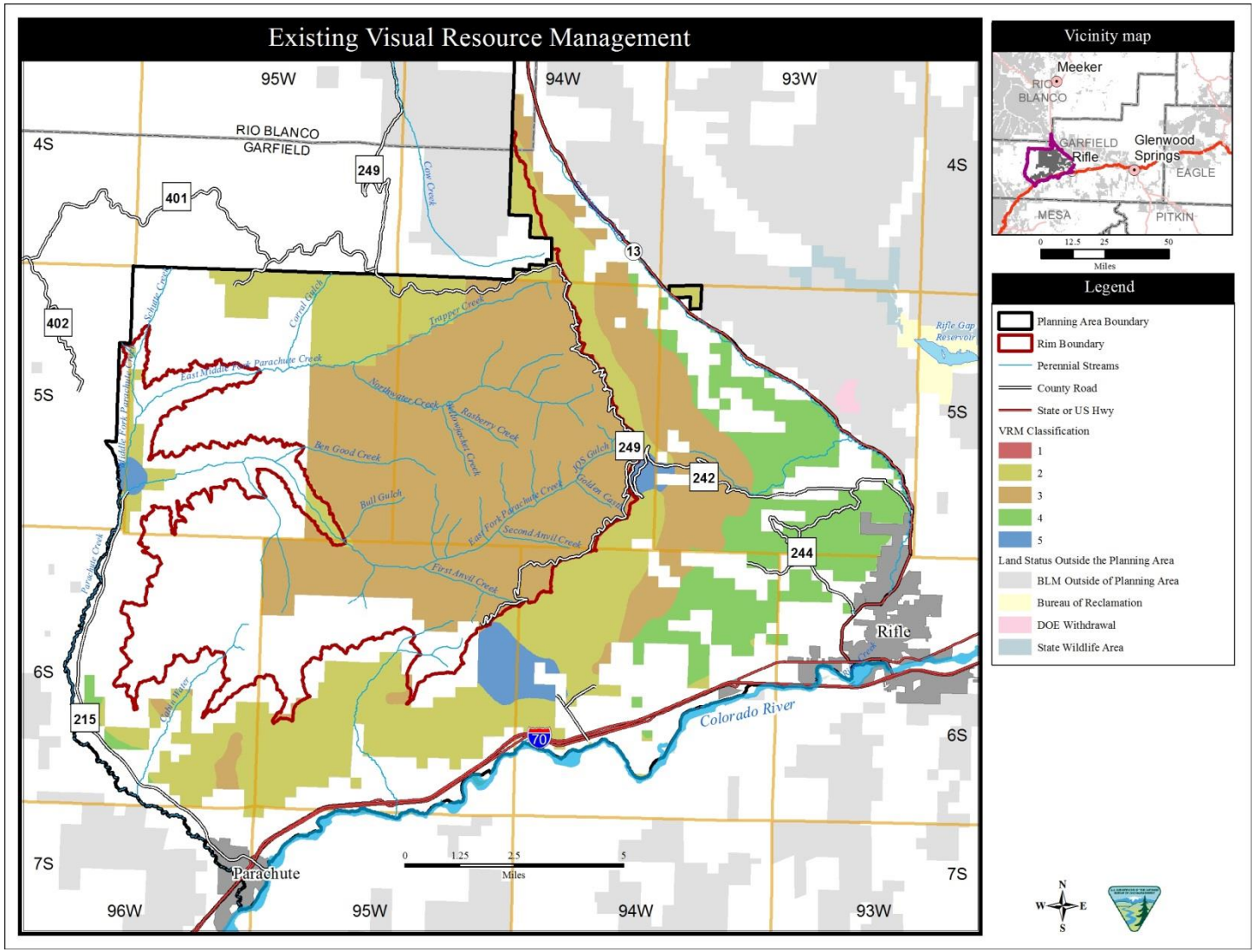

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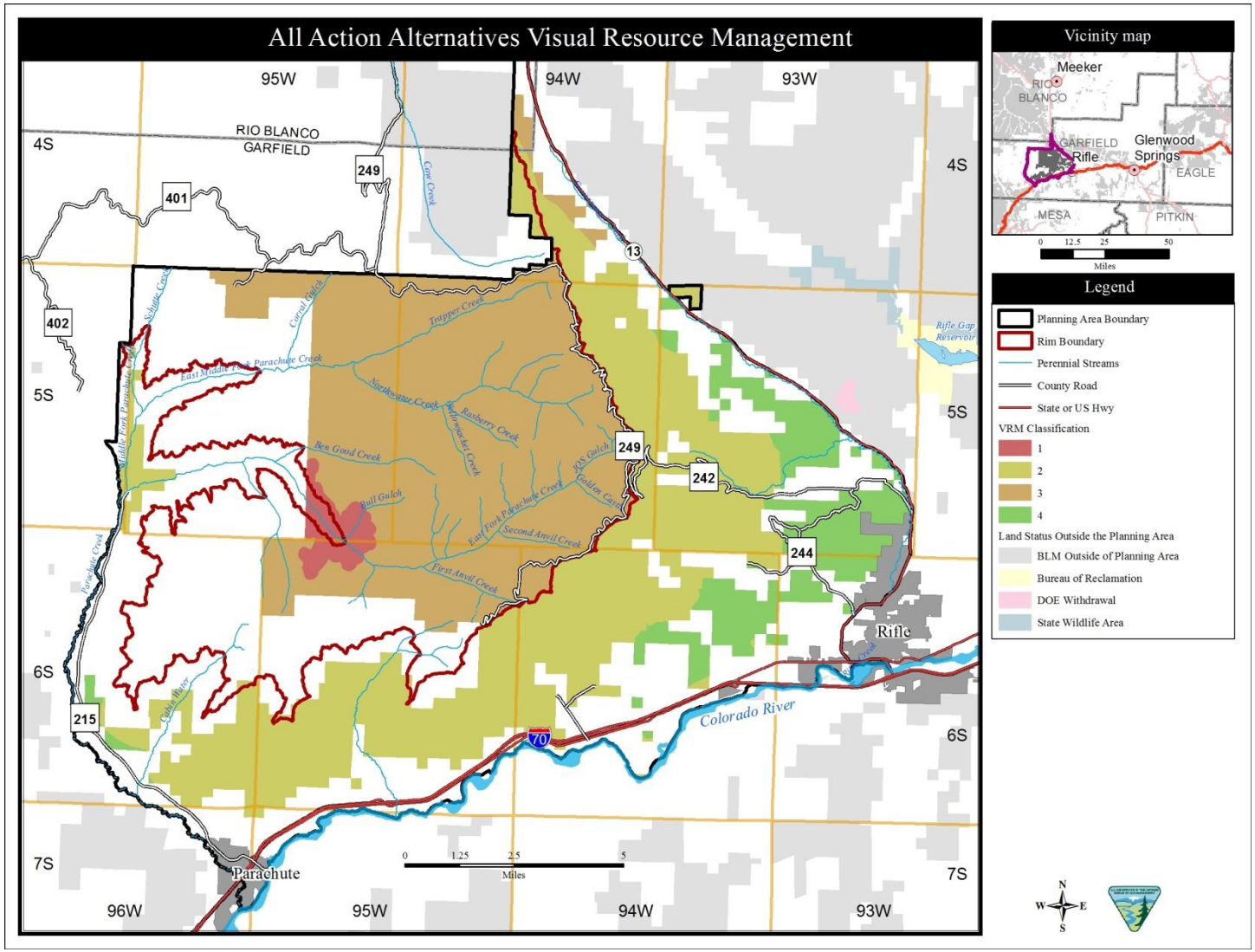

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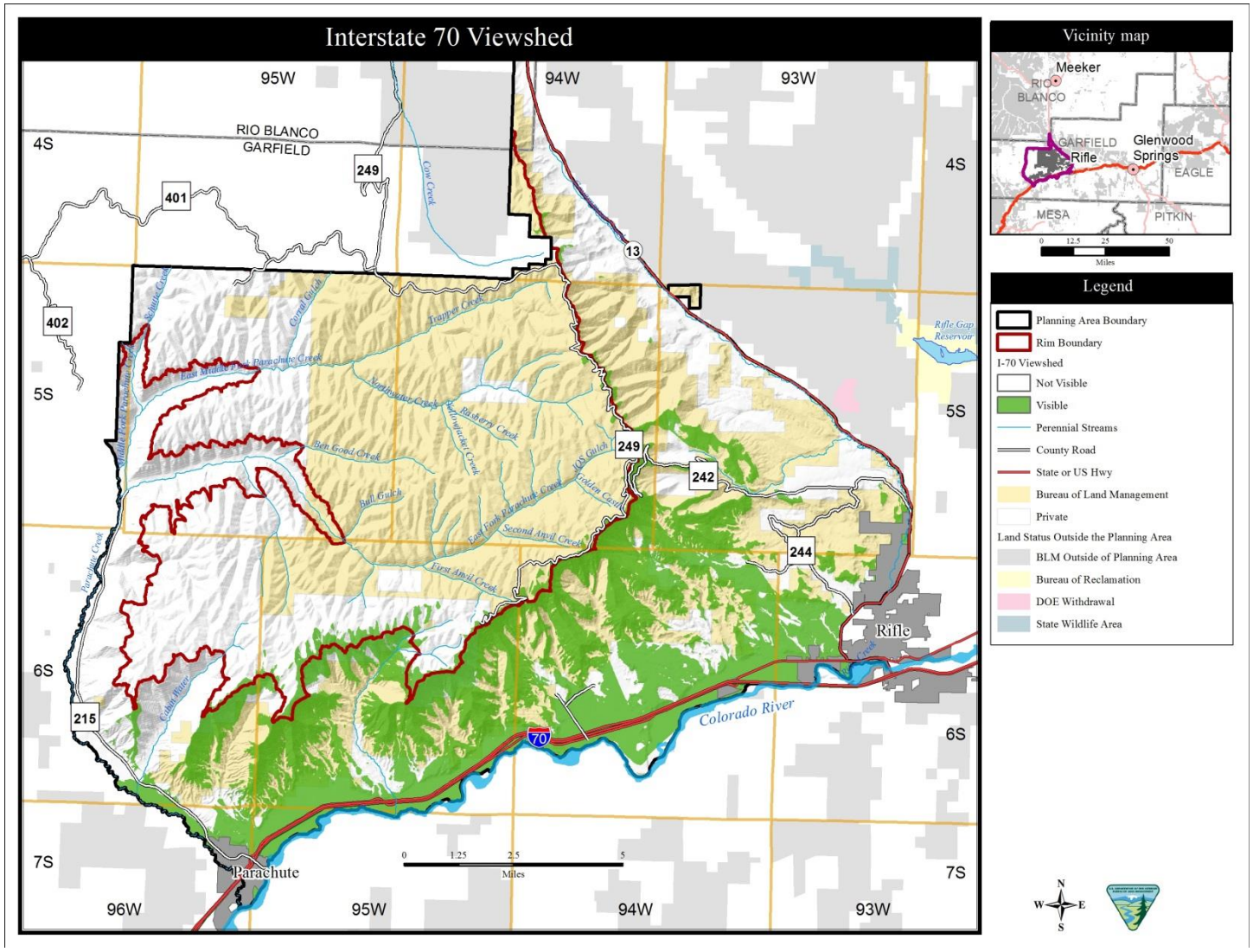

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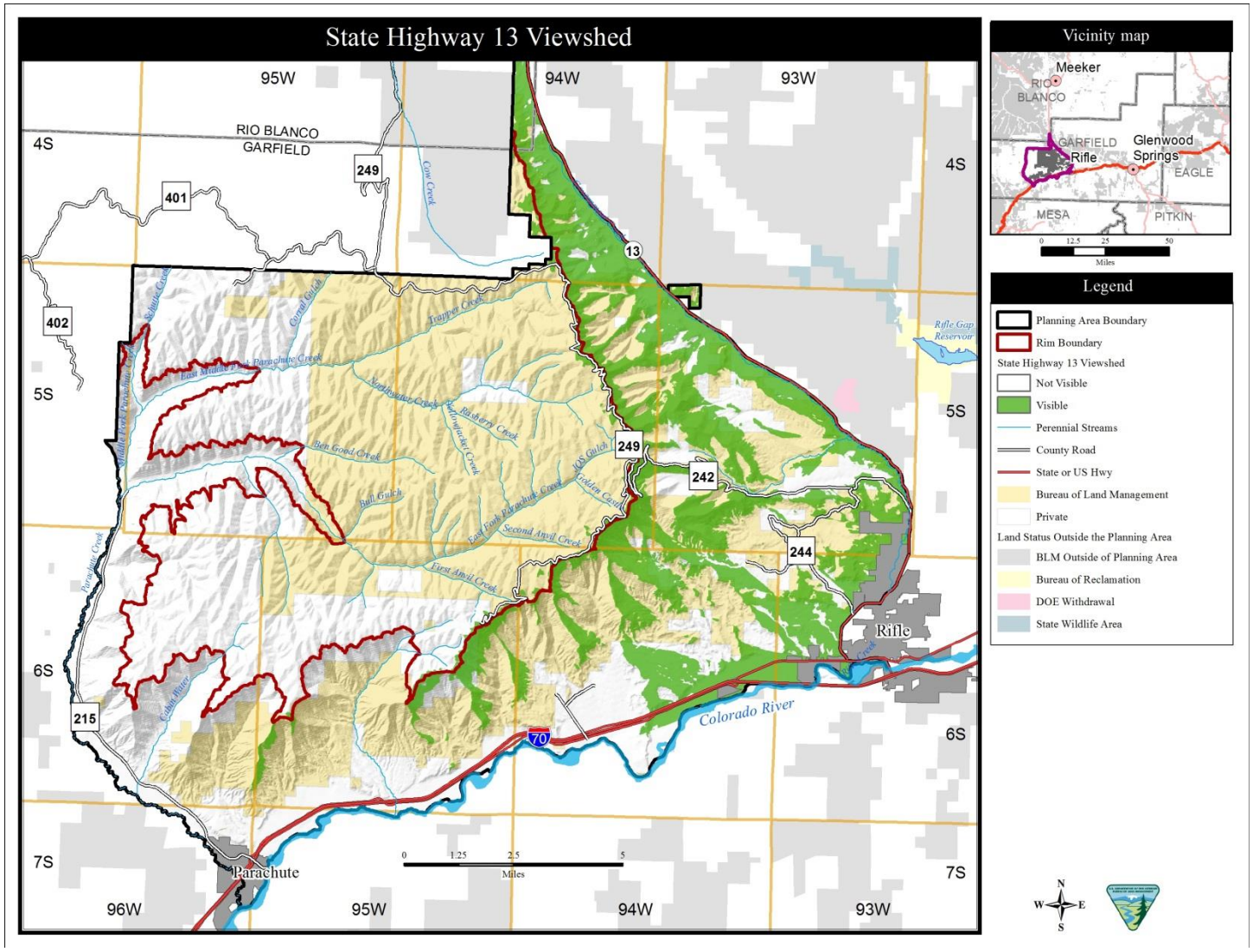

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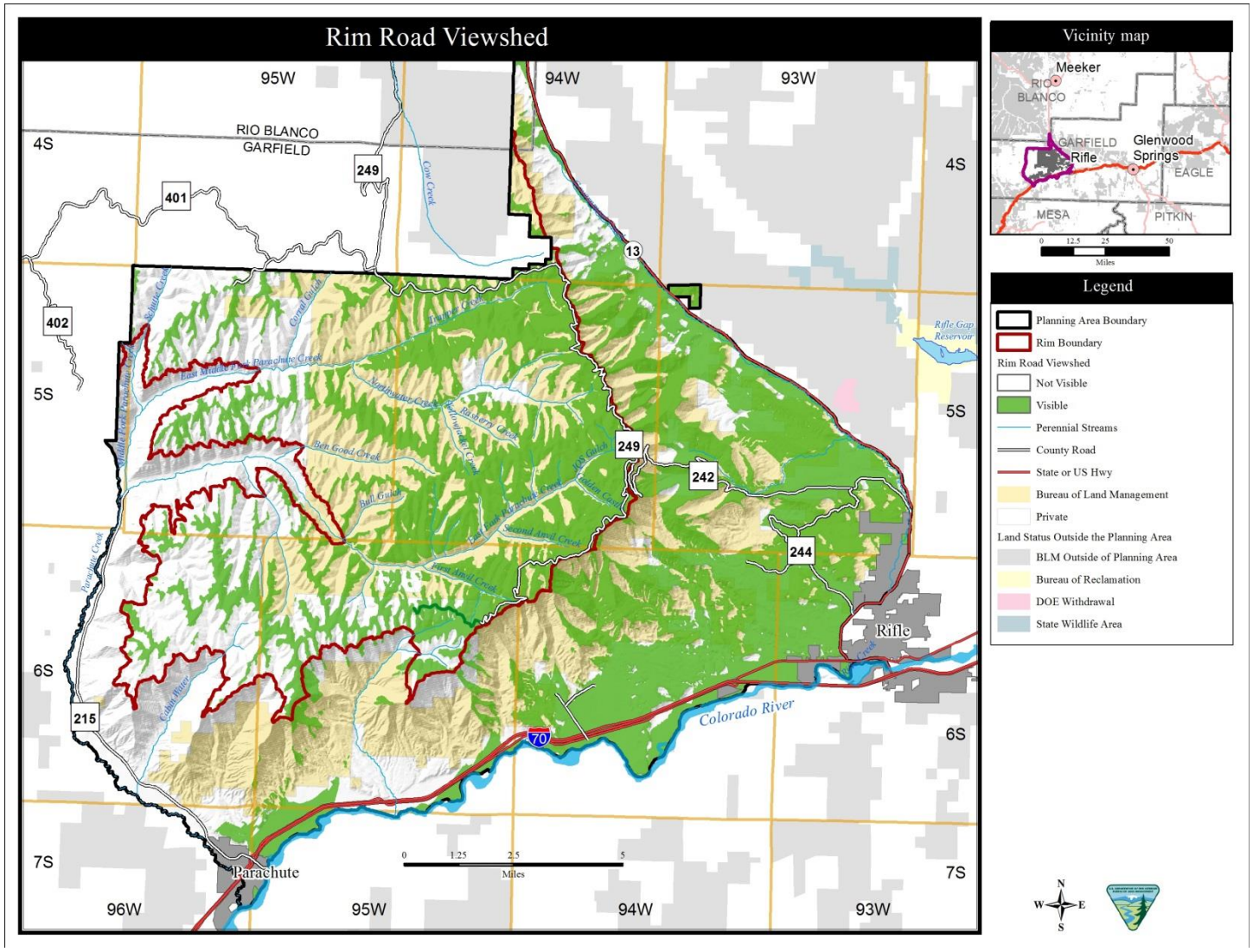

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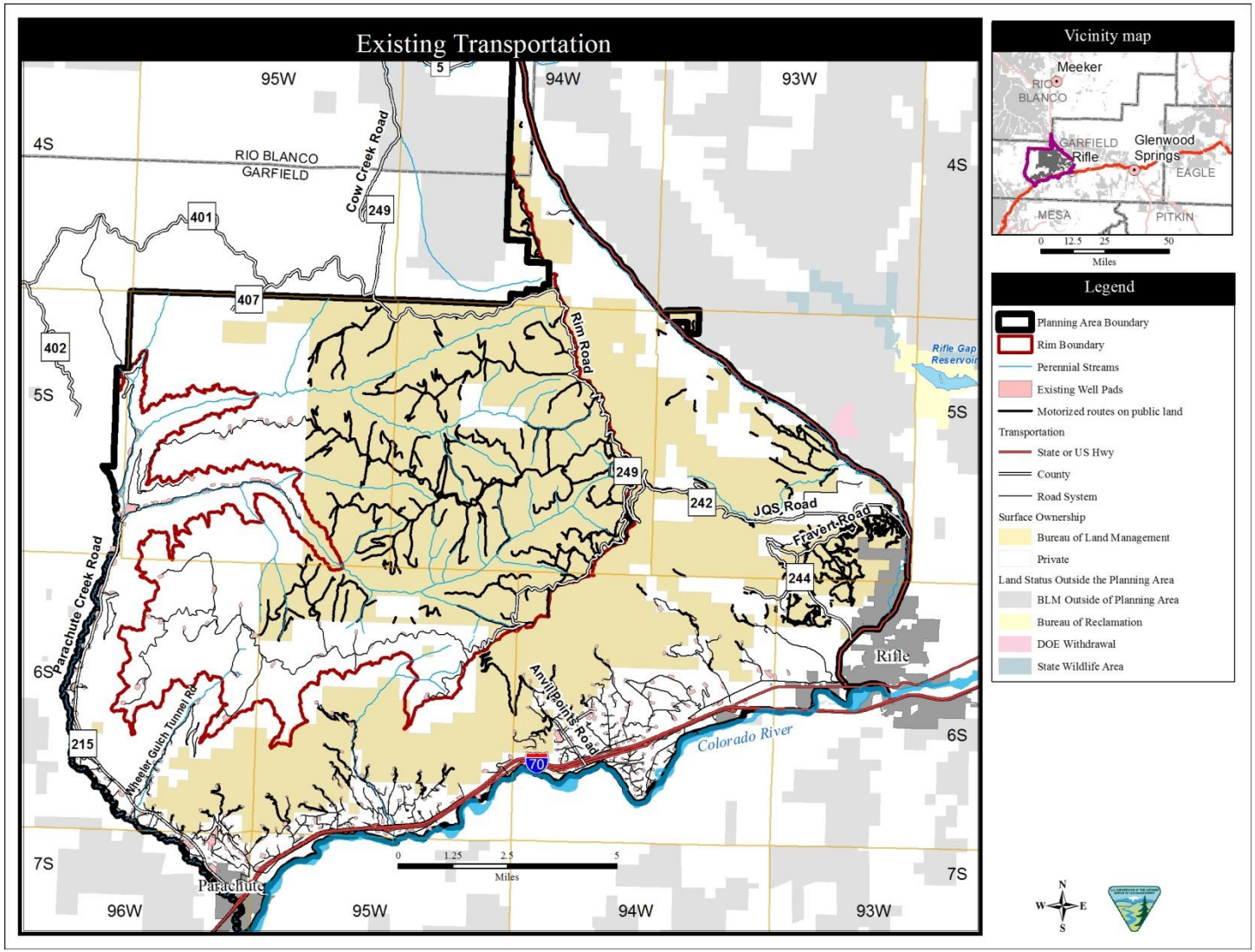

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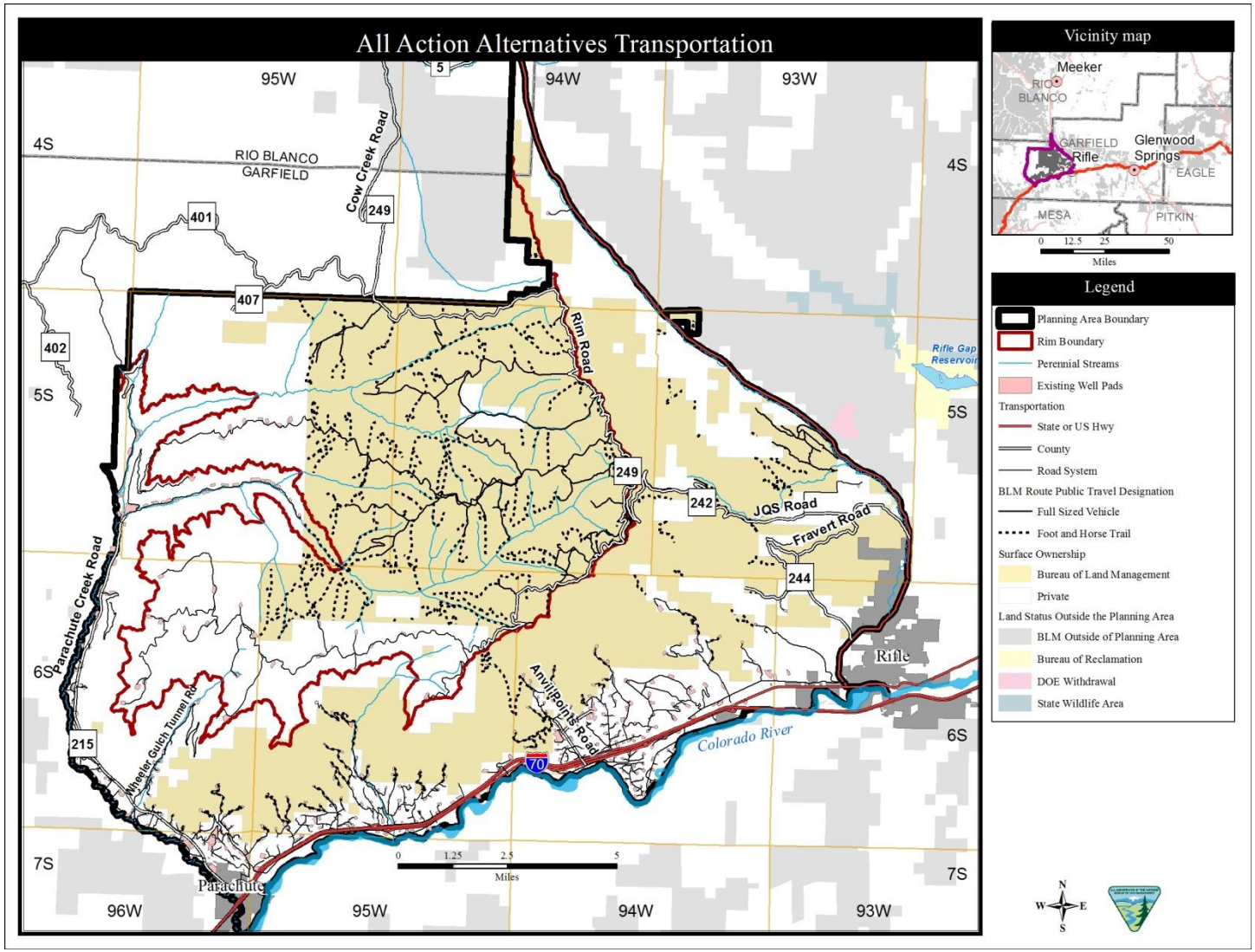

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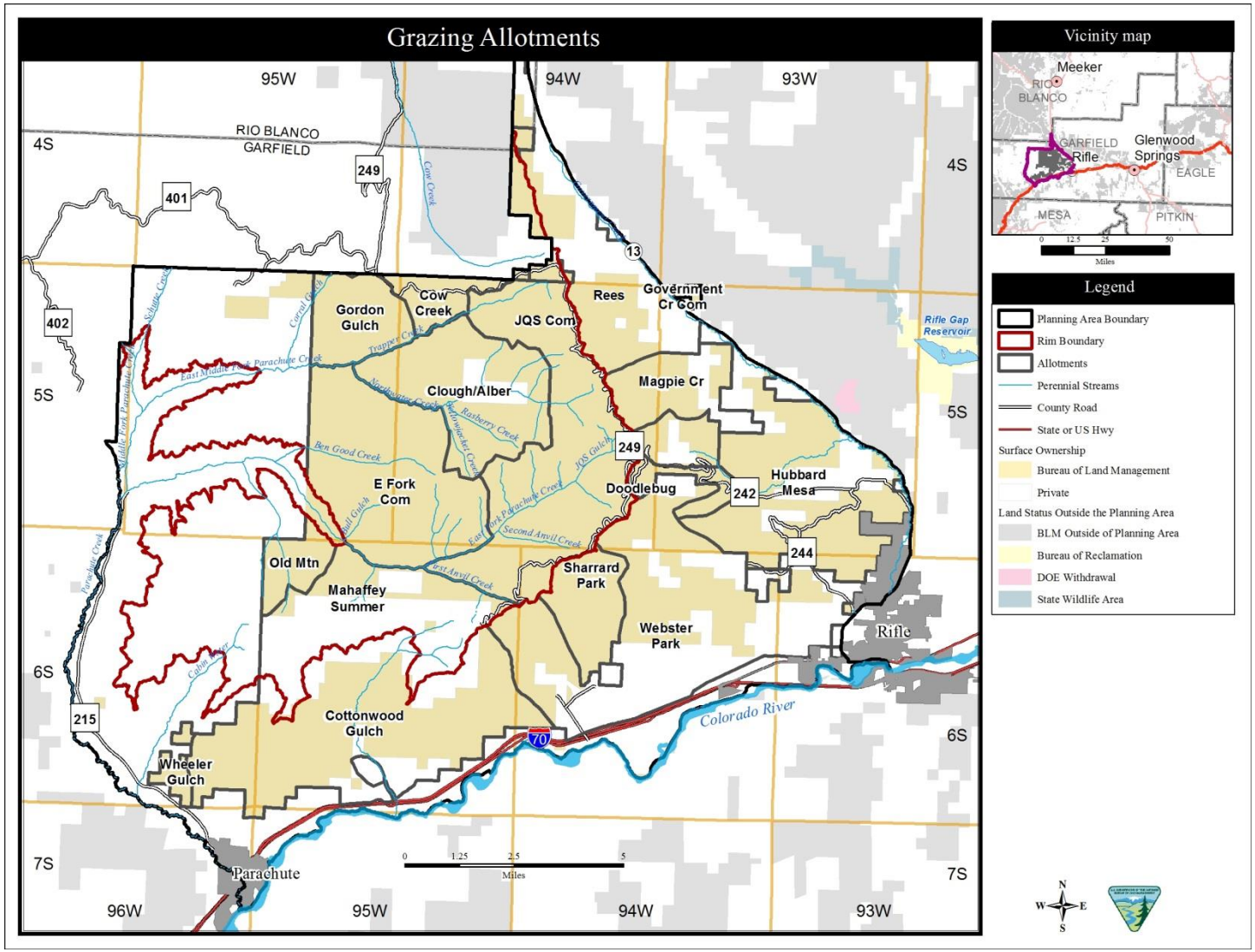

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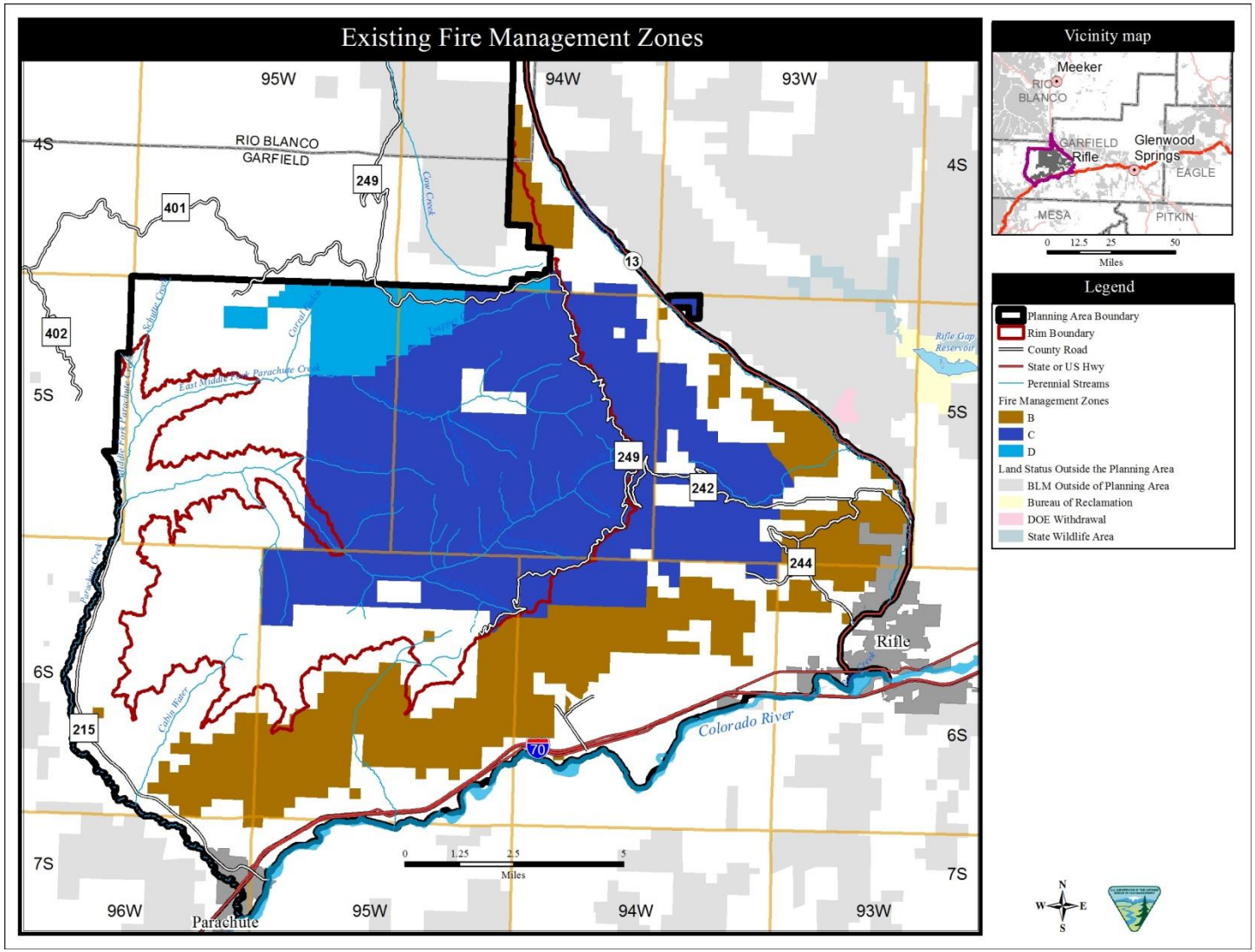

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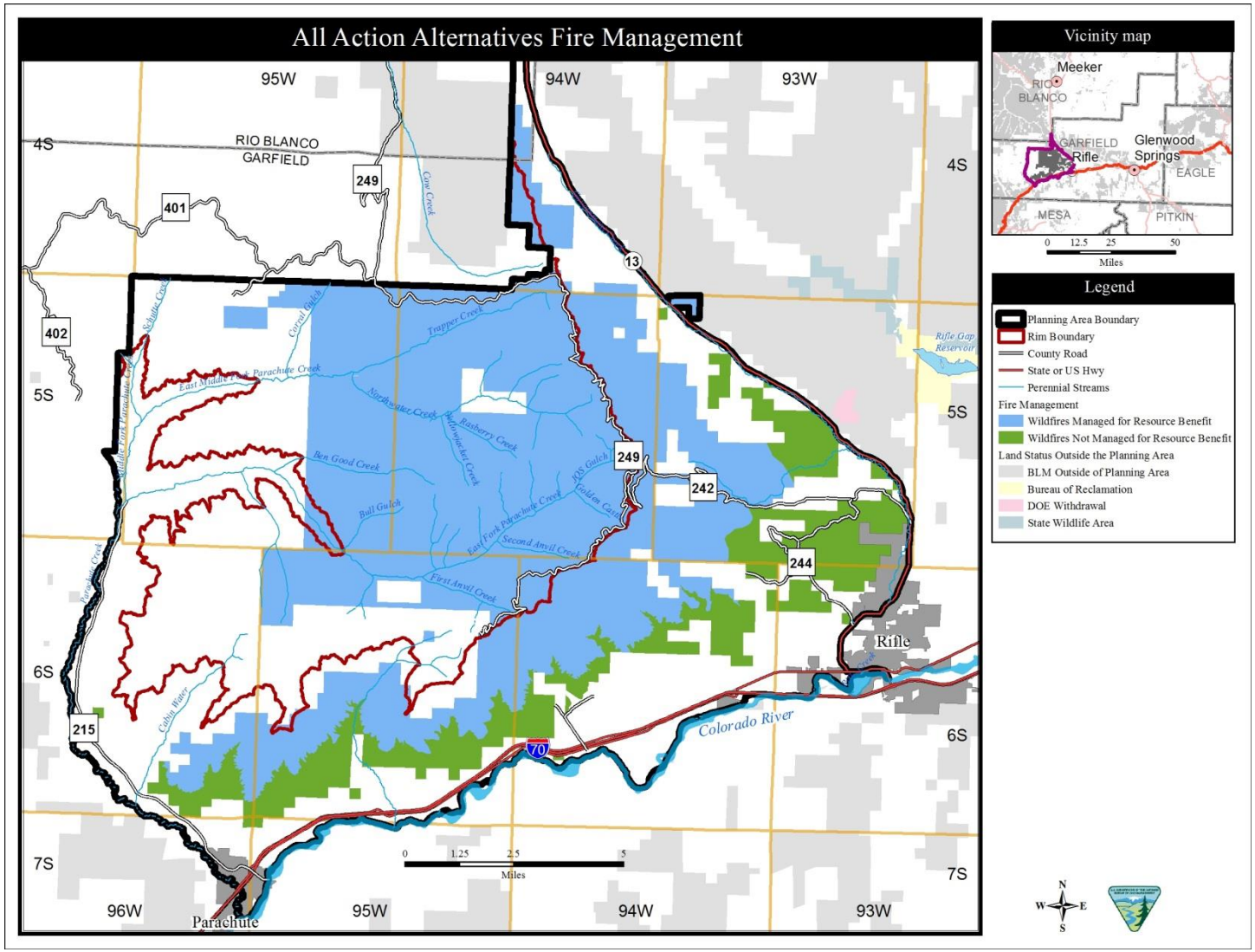

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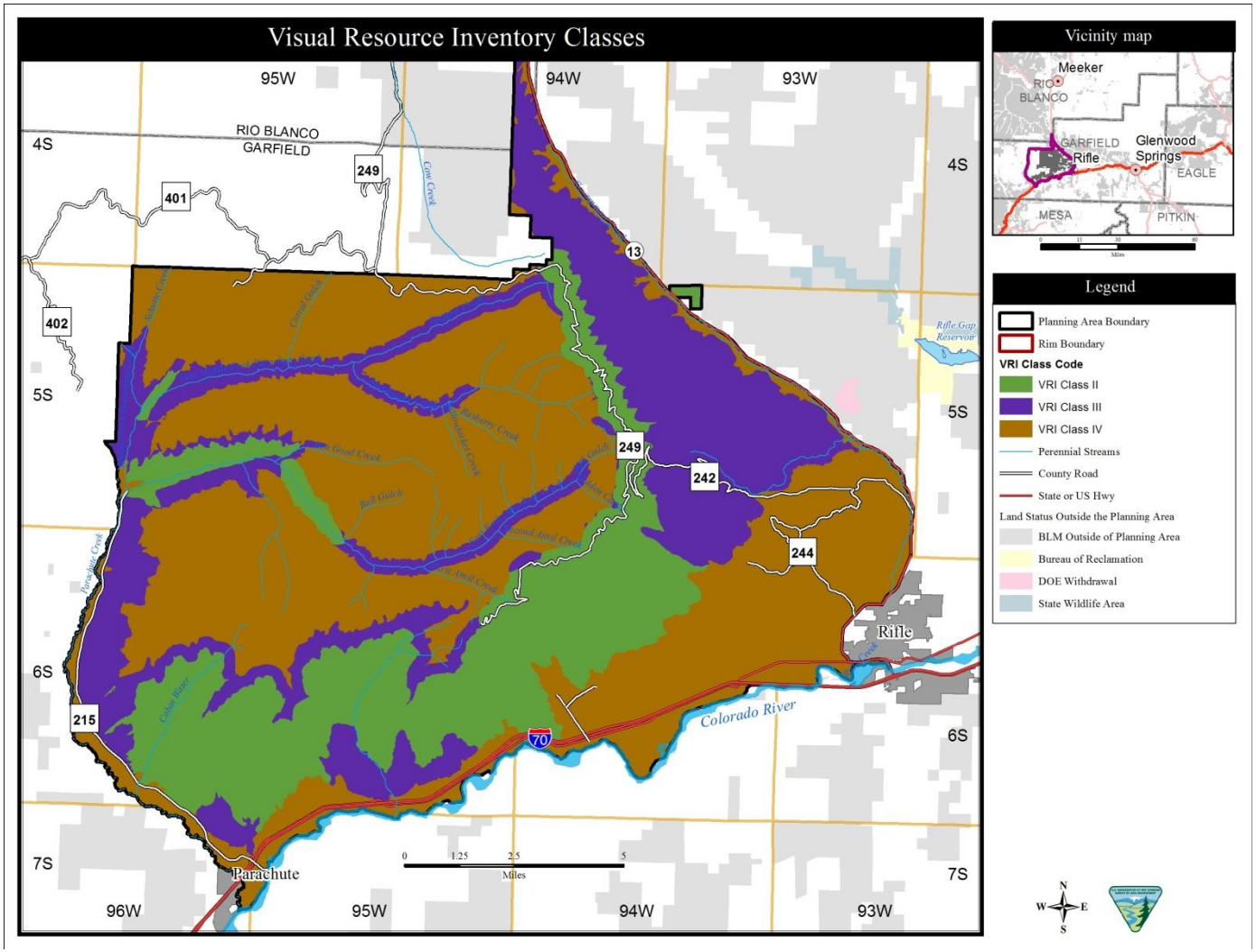

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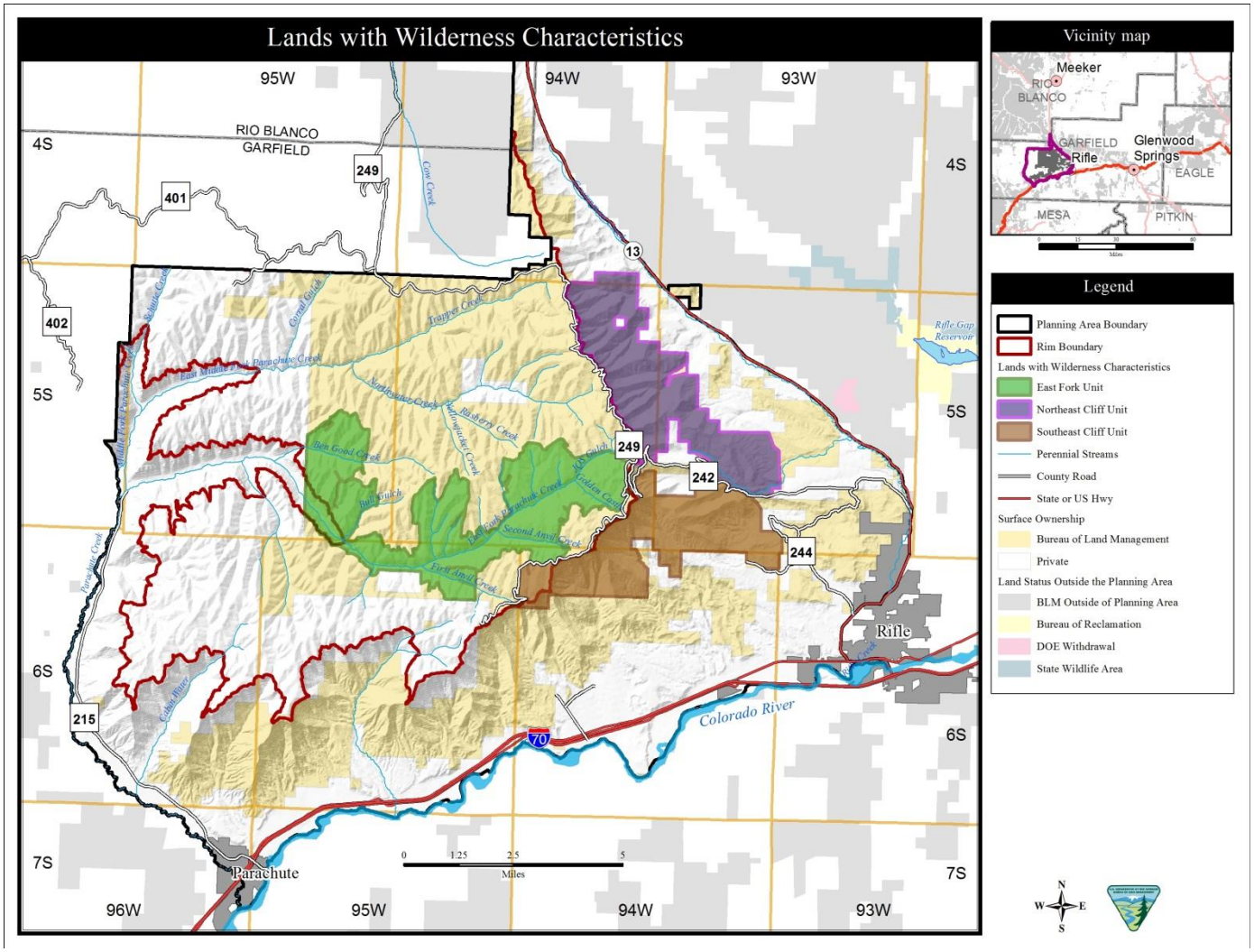

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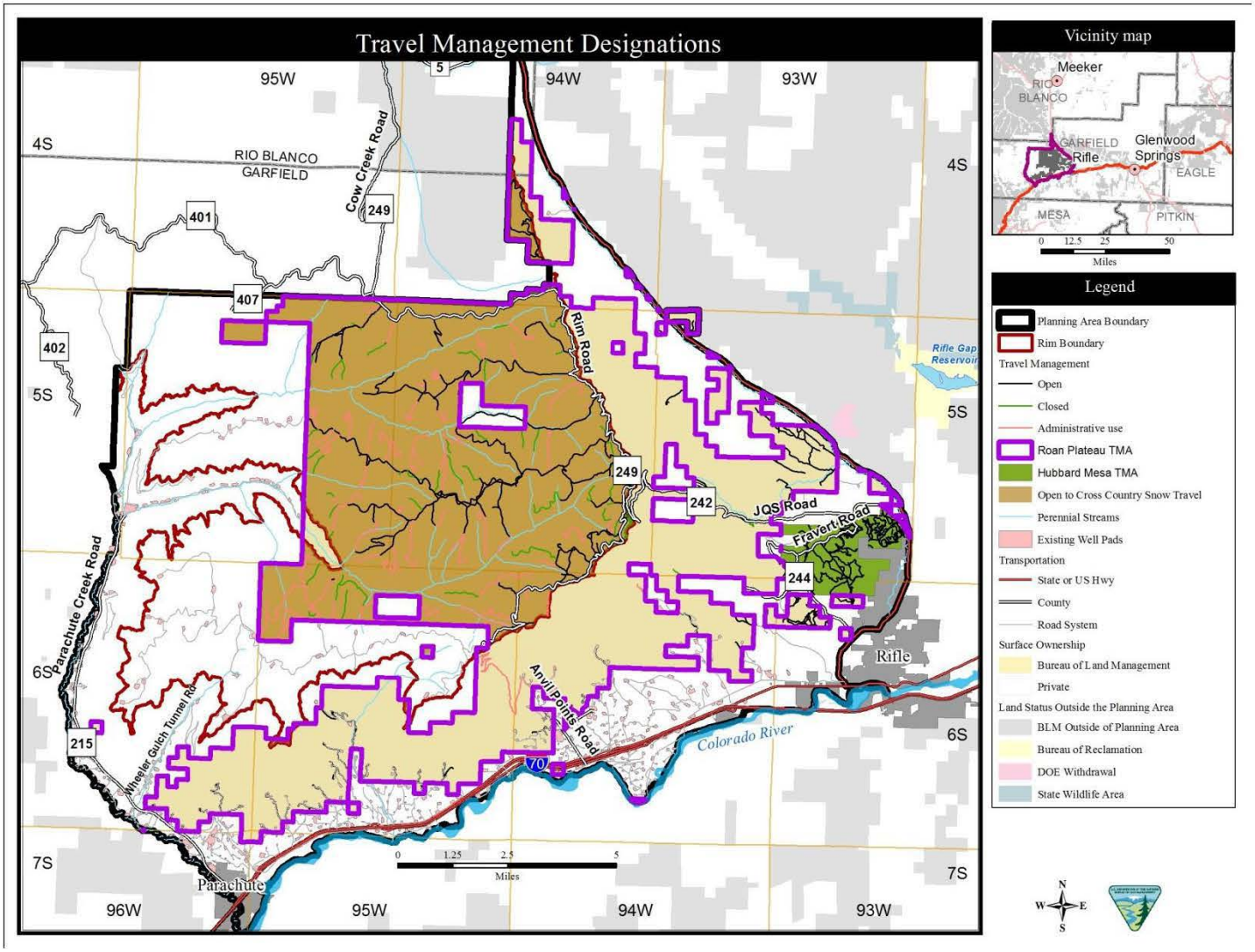

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Appendix B

Information Related to Oil and Gas Leasing, Permitting, and Development

Description of Typical Oil and Gas Operations

Sample Oil and Gas Lease

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Appendix B

B-1. Information Related to Oil and Gas Leasing, Permitting, and Development
Typical Oil and Gas Operations

BLM Authority and Responsibilities for Oil and Gas Operations

The BLM has responsibility for environmental protection, public health, and safety related to oil and gas operations on public lands. There are three laws which give the BLM its primary direction for oil and gas operations: the Mineral Leasing Act of 1920 (MLA) as amended, the National Environmental Policy Act of 1969 (NEPA), and the Federal Land Policy and Management Act of 1976 (FLPMA). However, other laws also affect the various stages of oil and gas operations, including the National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Bald and Golden Eagle Protection Act (BGEPA), Migratory Bird Treaty Act (MBTA), Clean Water Act (CSW), Clean Air Act (CAA), and others.

Under MLA, BLM is responsible for mineral leasing, including onshore oil and gas leasing, for all Federal lands, including lands with a Federal mineral estate but private surface ownership (43 CFR 3100). The MLA and other laws specify types of Federal lands that are not available for oil and gas leasing.

Under NEPA, BLM's responsibilities are triggered by a Federal action or undertaking. This legislation directs the BLM to analyze and disclose to the public the impacts of Federal actions. Oil and gas leasing, permitting and development are all Federal actions which require varying degrees of NEPA analysis.

Under FLPMA, BLM's responsibilities are tied to the use of Federal lands. This legislation directs the BLM to prepare and disclose to the public its plans for the public lands under its jurisdiction.

Since leasing for oil and gas under MLA, impact analysis under NEPA, and management under FLPMA apply to the same lands during the leasing process, the three laws are tied together in a workable process to accomplish Congressional intent. The vehicle by which the process occurs on BLM lands begins with a Resource Management Plan (RMP) and accompanying Environmental Impact Statement (EIS). The RMP/EIS determines if the public land is available and suitable for leasing and establishes the appropriate lease stipulations.

OIL AND GAS LEASING

The decision to lease for the development of fluid minerals is a discretionary action that is made through BLMs' land use planning process. The RMP identifies lands open to oil and gas leasing. All leases are subject to a standard set of terms and conditions that are found in section 6 of the lease form. The lease grants the lessee a right to use and develop the leased lands as is necessary to explore for, extract, and dispose of all the leased resources subject to (a) stipulations attached to the lease, (b) restrictions derived from non-discretionary statutes (i.e., ESA, NHPA), and (c) Conditions of Approval (COAs) used in the permitting process to minimize adverse impacts to other resource values, uses and users not addressed in the lease stipulations at the time operations are proposed.

The MLA provides that all public lands designated "open to oil and gas leasing" in BLM's land use planning shall be made available for lease sale. Based on the Federal Onshore Oil and Gas Leasing Reform Act of 1987, all leasable Federal minerals must be made available for competitive lease sales. Lands for which bids are not received at the lease sale will be available for noncompetitive leasing for a period not to exceed two years. Competitive sales will be held at least quarterly and by oral auction. Competitive and noncompetitive leases are issued for a 10-year term or ~~for~~ as long as oil and/or gas are produced on the lease. The Federal Government receives yearly rental fees on non-producing leases.

Royalty payments are received at the rate of 12.5 percent of the total saleable production, approximately one-half of which is returned to the State of Colorado.

In the preparation of parcels offered in competitive lease sales, stipulations may be attached to each lease parcel. Initially, stipulations are attached to a parcel by the state office leasing section from various databases. The parcel list is segregated and sent to the field office that has the majority of the parcel lands in its area. In the field office, the lease parcel(s) is reviewed by resource and National Environmental Policy Act (NEPA) specialists to ensure that lands are in conformance with the applicable land use plan (RMP), the stipulations are correct, and that any missing stipulations are included.

Instructional Memorandum No. 2010-117 has added a requirement of preparation of a NEPA Environmental Assessment as a basis for a decision to offer the lease for sale, and for determining whether the stipulations identified in the land use plan as applicable to the lease area would be sufficient or whether other available stipulations identified in the land use plan should be applied. This decision is typically based on more site-specific information, including site surveys, that may have been available at the time the RMP was finalized. The leasing EA process also ensures updated resource information and concerns are adequately considered in attaching stipulations and making a leasing decision. After the lease sale packages are finalized, a NEPA leasing decision, documenting the environmental impacts of the leasing the various parcels, is rendered at the state office.

Lease stipulations are conditions of lease issuance that provide protection for other resource values or land uses by establishing authority for delay, site changes, or the denial of operations within the terms of the lease contract. The stipulations are specified for each applicable parcel in the Notice of Competitive Oil and Gas Lease Sale and are intended to inform interested parties (potential lessees, operators) that certain activities will be regulated or prohibited unless the operator and the surface owner and/or surface management agency (SMA) arrive at an acceptable plan for mitigation of anticipated impacts. The authorized officer has the authority to relocate, control timing, and impose other mitigation measures under Section 6 of the Standard Lease Form. This authority is generally invoked when lease stipulations are not attached to the lease, or new resources are discovered on a lease.

New science, comprehensive documentation of resource requirements, land pattern interference, and ongoing monitoring of the effectiveness of a stipulation may allow granting of a waiver, exception, or modification to a stipulation. A lease stipulation "waiver" is a permanent exemption to a lease stipulation. An "exception" is a onetime exemption to a lease stipulation and is determined on a case-by-case basis. A "modification" is a change to the provisions of a lease stipulation, either temporarily, or for the term of the lease.

EXPLORATION

Seismic Reflection Surveys

The potential of oil and gas resources can be detected by direct or indirect exploration methods, such as borehole data from existing wells and seismic or other geophysical surveys conducted at the surface increases the chances of drilling a successful well by identifying the presence, thickness, and depth specific geologic formations present beneath an area. This information sheds light on the presence of potential hydrocarbon source rocks and the presence of potential stratigraphic or structural traps that may have led to the concentration of hydrocarbons.

The most widely used geophysical exploration tool consists of seismic reflection surveys. These include either two-dimensional (2D) or three-dimensional (3D) surveys. Seismic surveys generally use truck-

mounted vibrators or detonation of small explosive charges on or just beneath the surface to generate shock waves that propagate through the subsurface. The waves are reflected back to the surface, depicting the subsurface bedrock topography at a given point (2D), or differentially by different rock layers (3D), giving a more detailed picture of the vertical stacking of various rock types as well as faults and folds at varying depths. With either process, the information is useful in locating the downhole targets for oil and gas wells.

In rugged or remote terrain, and especially in 3D seismic surveys, helicopters supporting ground crews are used to lay out source lines and perpendicular receiver or receptor lines. In the past, the source points along a line were connected by wires, as were the receiver points along a line. Wireless equipment is now commonly used, which is both simpler logistically and reduces the amount of potential surface disturbance. The resolution of the resultant seismic picture of subsurface geology is related to the spacing of the source points and receiver points.

With truck-mounted vibration ("vibroseis") sources, travel is limited to relatively gentle terrain and, for resource protection reasons, may be restricted to existing roads. Where terrain, the type of plant cover, and other resource considerations permit, the trucks—equipped with oversized rubber tires, four-wheel drive, and often center articulation—may be allowed to drive cross-country, which allows a more regular (perpendicular) source-receiver pattern. Where trucks are limited to existing roads, receiver lines are typically laid outward from the road, on foot or, if permitted, all-terrain vehicles to establish the grid.

Geophysical operations within federal lease(s) are reviewed by the appropriate federal surface management agency (SMA) (e.g., Bureau of Land Management [BLM], Bureau of Reclamation, or U.S. Forest Service [USFS]). The NOI includes map showing the location of the proposed source and receiver lines, all access routes, and ancillary facilities. Upon completion of operations, including required rehabilitation, the operator is required to file a "Notice of Completion of Oil and Gas Exploration Operations."

Geophysical surveys are typically evaluated and authorized using a NEPA Categorical Exclusion (CX) is available to the BLM for approving NOIs. However, approving the CX requires that a series of questions standard be asked and responded to appropriately to ensure that the surveys would be consistent with the relevant land use plan and would avoid significant adverse impacts to a variety of other resources and resource uses. For geophysical operation methods involving surface disturbance, a cultural resources survey is also required. Similarly, surveys are required for methods involving surface disturbance potentially causing direct or indirect impacts on a federally listed or proposed threatened or endangered species. An effects determination other than "No Effect" requires consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act.

Other resource surveys may be required to ensure adequate protection of wetlands and other waters of the U.S., nesting raptors or other migratory birds, and big game or other wildlife species of special concern. If the requirements for approving a CX cannot be met, either as the project as initially proposed or with required mitigation measures applied by the BLM as Conditions of Approval (COAs), or if the proponent wishes to continue with the request, the BLM would prepare a NEPA Environmental Assessment.

Because the Roan Plateau planning area is already partially developed, including some private wells atop the plateau, it is unclear if geophysical surveys would be sought. If so, they probably would be limited to the top of the plateau and limited to truck-mounted vehicles travelling on the existing road system that follows the major east-west ridges and are linked at the eastern end by the Rim Road.

Exploratory Drilling

Either preceding or following geophysical exploration, one or more exploratory wells are sometimes drilled to provide a more detailed picture of not only the rock types at depth but of the type and volume of hydrocarbons and water they contain. In areas that have not already been developed, the relatively remote and isolated "wildcat" wells help the operator decide whether further exploration is warranted and, if so, help to design the type of development. In areas near existing fields, exploratory drilling consists of "step-out" wells to confirm that the geologic conditions remain favorable for oil and gas development.

Successful wildcat wells in areas remote from other facilities may be temporarily shut in until further drilling is sufficient to support the cost of establishing infrastructure (access road and pipelines) to support long-term production. Gas flowing to the surface during the exploratory phase is typically flared. Unsuccessful wildcat wells are plugged and abandoned. In any area drilled outside an existing field, the first well is normally considered exploratory, because the quantity of the resource has not been proven. However, the likelihood of success is typically high.

Because the Roan Plateau planning area already supports a substantial amount of development, it is unclear to what extent exploratory drilling would be conducted. Depending on the alternative selected from the SEIS process, exploratory drilling could range from confirming an appropriate location for additional wells within a limited number of leases or determining which development area (ridge) is most appropriate for the initial development before moving to other ridges.

Any future leasing would be as described in section B.2. Any exploratory drilling would require approval of an Application for Permit to Drill (APD), as described in Section B.4.

DRILLING PERMIT PROCESS

A federal lessee or the operator of record is governed by procedures set forth by the Onshore Oil and Gas Order No. 1, "Approval of Operations on Onshore Federal and Indian Oil and Gas Leases," issued under 43 CFR 3164. These procedures cover the full gamut of operations on federal minerals, from initial permitting of the well to subsequent operations and final abandonment. In the initial permitting process, the operator selects the location of a proposed drill site. This selection is based on COGCC spacing requirements, the subsurface geology, the topography, and the avoidance of known protected surface resource values.

Spacing requirements are established by the COGCC to protect the correlative rights of offsetting mineral owners and efficiently recover the resource. This applies to all mineral ownership (i.e., fee, State, and federal minerals). The Roan Plateau planning area is subject to State spacing COGCC Rule 318, which for wells deeper than 2,500 feet would be about 40 acres. This does not mean that all wells can be approved at 40-acre spacing. For wells shallower than 2,500 feet, the wells must be spaced at least 300 feet from the nearest well and a distance of at least 200 feet from the lease boundary. However, the majority of wells drilled target the Mesa Verde formation, in which 10 acre equivalency spacing is typically approved by the COGCC. This allows wells to target the equivalency of 10 acres per drilling and spacing unit, so that efficient drainage of isolated tight sand lenses may take place.

Ten-acre spacing requires that every well be set back 100 feet away from adjacent lease or drilling and spacing units with the same spacing. Wells that abut leases or drilling and spacing units that do not have 10-acre equivalency, require 200-foot setbacks. New spacing regulations may be necessary to accommodate new drilling and production techniques in the planning area. Future production from previously undeveloped plays such as the Niobrara play and in the Mancos Formation may also require

spacing changes. Surface density of wells would be a variable based on the surface resource conflicts, economics of directional drilling, accessibility within the checkerboard (surface locations on fee land to access federal minerals within resource conflict areas), and the subsurface density. Occasionally, BLM could require that a lessee drill a directional well on a lease if it is determined that federally owned minerals are being drained by an adjacent well on private or State-owned lands. The BLM could also require compensatory royalty be paid, or require a communization agreement be formed, any of which may be utilized to mitigate surface impacts and prevent drainage of federal mineral.

Well permitting begins with submittal of either a Notice of Staking (NOS), followed by the submittal of an Application for a Permit to Drill (APD), or directly through submittal of an APD. The lessee or operator for the lease has the option of which route to use. The APD must include both a drilling plan and a Surface use Plan of Operations (SUPO).

Notice of Staking (NOS)

The NOS is an abbreviated notice that consists of an NOS form, a staked location map, and sketched site plan. This notice is posted for a 30-day public review, which provides the time frame for processing the approval of the APD. The NOS triggers the onsite inspection of the well, which determines whether there are any conflicts with critical resources, as well as provides the preliminary data to assess what additional items are necessary to complete the APD. The NOS informs the BLM of the well location, the access road, any ancillary facilities, and the need to conduct an onsite inspection. If the well location needs to be moved or reoriented, then the necessary re-surveying and re-staking can be performed before all subsequent documents are submitted.

Application for Permit to Drill (APD)

Before drilling a well, the lessee or operator for the lease, must file an APD. The operator must file an application with the BLM Field Office having jurisdiction over the lands described in the application. The application must include a plan for the drilling of the well and a plan for the protection of the surface and environment. The drilling plan (as per the requirements set forth in Onshore Oil and Gas Order No. 1) contains information as to the depth of the well, how it will be constructed, how groundwater and other mineral resources will be protected, and how blowouts and other emergencies will be prevented or dealt with. The surface use plan (as per the requirements set forth in Onshore Oil and Gas Order No. 1) covers such concerns as the location and amount of surface disturbance and how that disturbance will be reduced or eliminated. It covers mitigation of impacts to wildlife, cultural resources, vegetation, soils, surface water and other resource values. The operator is responsible for incorporating all RMP decisions in the proposed APD. If the APD does not have the appropriate information and mitigation incorporated, the application may be modified or rejected. Any RMP decisions not incorporated by the operator are attached to the approved application by the BLM as COAs.

Regardless of the permitting option selected by the lessee, no surface disturbing activity can be conducted in conjunction with the drilling operations until the APD is approved by the Field Manager.

Onshore Oil and Gas Order No. 1 requires an onsite inspection as part of the review of an APD. The inspection is a meeting between the parties to explain and clarify the proposed action. If the onsite inspection is conducted with the NOS option (before filing the APD), the applicant is more likely to submit a complete surface use plan without the need for amendments. The onsite inspection is held with the operator, surface landowner, COGCC and County oil and gas liaison and other interested parties. The purpose of the onsite inspection is to evaluate the operator's plan, to assess the situation for possible impacts (surface and subsurface), and to formulate resource protection stipulations. To lessen

environmental impacts, a pad, road or pipeline can be moved, reoriented, or resized, within certain limits, at the onsite inspection.

The administrative review of the APD is usually led by the field office natural resource specialist (NRS), who is responsible for evaluating the surface plan, checking the proposal against the RMP and other guidance, conducting the onsite inspection (with other appropriate specialists), and leading the preparation of the NEPA document (usually an EA) and its associated impact analysis and proposed mitigation. The various BLM staff resource specialists provide input into project design and mitigation measures based on the onsite field visit.

The field office is responsible for preparing appropriate environmental documentation necessary to satisfy the NEPA requirements, issuing a Record of Decision (ROD) authorizing the project components and identifying the mitigation measures (COAs) attached to the APD to protect any affected resource values.

Another component of the review process is the technical review of the drilling plan portion of the APD. The APD review by the field office geologist includes the following items: geological markers and formation tops, oil, gas, and mineral bearing zones, potential hazards such as abnormal pressure, casing set points, and cement tops. A geologic review report documents the review and is incorporated in the APD case file. The APD review by the field office petroleum engineer includes the following items: casing and cement program, drilling fluid program, pressure control system, and testing, coring, and logging.

Consideration is also given to the protection of subsurface water resources. When processing an APD, the BLM geologist is required to identify the maximum depth of usable water as defined in Onshore Oil and Gas Order No. 2. Usable water is defined as water containing 10,000 parts per million or less of total dissolved solids. Water of this quality is to be protected usually by surface casing and cement. Determining the depth of fresh water requires geophysical log determination of water quality. The field office requires that the first well on every pad have an open hole log run for both the surface hole and production hole. The open hole log is required to be submitted within 24 hours of running so that a field office geologist has the opportunity to timely analyze the log. If usable fresh water is found to be present below the surface casing, then the operator will be required remediate and change the casing setting depths for future wells. The depth of the casing is specified to be below a depth reasonably anticipated for future useable water recovery. When final approval is given by BLM, the operator can commence construction and drilling operations. Approval of an APD is valid for two years. If drilling does not begin within two years, the conditions of approval can be revised before extending the APD for a maximum of two additional years.

Economic conditions, regionally and nationally, have a dramatic effect on oil and gas exploration and development activities. Currently, oil and gas markets are depressed nationwide, and an upturn in the oil and gas commodities pricing would be expected to increase the number of wells sought and drilled in the planning area. Changes in technology that improve resource recovery in relation to development costs or changes in geopolitical situations also have the potential to affect drilling rates, the latter through potentially higher prices associated with reduced production in other regions or countries.

NEPA Compliance

The NEPA process provides a written documentation of the environmental review for an APD and the development of mitigation (COAs). The NEPA process also serves as the vehicle to check for conformance with the applicable land use plan, consisting of the Resource Management Plan (RMP). In some instances, multiple layers of NEPA are conducted during in the oil and gas process. The RMP/EIS

determines if the public land is available for leasing and the appropriate stipulations for leasing. The leasing EA as a basis for a decision to offer the lease for sale, and for determining whether the stipulations identified in the land use plan as applicable to the lease area would be sufficient or whether other available stipulations identified in the land use plan should be applied. At the site-specific level, EAs are prepared for a majority of APDs in Colorado. In cases where the proposed well is obviously part of a larger field development, and such development has not already been analyzed by a NEPA document other than the RMP, a Field Development EA or Master Development Plan EA can be prepared.

A Documentation of Land Use Plan Conformance and NEPA Adequacy (DNA) can then be prepared for future APDs within the oil and gas field, as long as the Field Development EA provides the site-specific analysis and the APD meets the DNA criteria and the criteria identified in the RMP/EIS. Where applicable, Statutory Categorical Exclusions (SCX) as authorized under Section 390 of the Energy Policy Act of 2005 is another NEPA compliance tool available under certain statutory conditions.

WELL DEVELOPMENT

Issuance of Rights-of-Way

Operations by a lessee or operator for the lease do not require issuance by the BLM of a right-of-way (ROW) grant for activities overlying the federal oil and gas lease being developed, or when the lease is part of a federal unit or communitization agreement (see later). However, ROW grants from the BLM are required for any and all well pads, tank batteries, pipelines, powerlines, and access roads that occupy federally owned land outside the lease or unit boundary associated with the particular oil and gas well. A ROW grant is also required when occupying federal surface for the purpose of developing private (non-federal) oil and gas leases, even if the surface facilities for the private well would be on a well pad also containing federal wells.

Access Road and Well Pad Construction

Upon receiving approval to drill a proposed well, the operator moves construction equipment over existing roads to the point where the access road will begin. Generally, the types of equipment include dozers (track mounted and rubber-tired), scrapers, and motor-graders. Moving equipment to the construction site requires moving several loads (some overweight and over width) over public and private roads. Existing roads and vehicle routes are improved in places and occasionally, culverts and cattle guards are installed as specified in the approved APD.

The length of the access road varies. Generally the shortest feasible route is selected to reduce the haul distance and construction costs. Environmental factors or the landowner's preference might dictate a longer route. In rough terrain, the type of construction is side casting (using the material taken from the cut portion of the road to construct the fill portion), slightly less than one-half of the road-bed is on a cut area, and the rest is on a fill area. Roads used for oil and gas operations require an average 35-foot-wide right-of-way. Roads are usually constructed with a l6-foot (single lane) or 25-foot (double lane) driving surface (in relatively level terrain). The total acreage disturbed for each mile of access road constructed varies significantly with the steepness of the slope. New roads to be developed for well pads on the plateau are assumed to need an average 75-foot right-of-way disturbance corridor, which accounts for road construction and pipeline installations.

When construction activities are initiated, vegetation is typically cleared and grubbed and set along the outside edge of the project, or removed with a brush clearing machine. Organic soil material or topsoil suitable for plant growth is then removed and typically windrowed around the perimeter of the pad

disturbance area, windrowed along the edge of a road or pipeline corridor, or, in areas with limited space, stockpiled in designated area(s). Afterward, the site is excavated with dozers and trackhoes to move the excavated or "cut" material to typically flatter terrain that supports the machine-compacted fill material. In optimal instances, the pad would be constructed with little or no excess material resulting in a project with "balanced" earthwork quantities.

The average disturbance footprint for 20-well pad as outlined in the Roan RFD, is 5 acres. Instances occur where balanced earthwork is not possible and excess material piles are created in proximity to the pad readily allowing the piled material to be later recovered for interim work on the pad. Earthwork related to interim reclamation would include reducing the pad to an average 2.5-acre footprint while reshaping the reclaimed pad its natural topography.

The amount of level surface required for safely assembling and operating a drilling rig varies with the type of rig and the number of wells that will share the same pad. The surface area required for a typical pad is about 5 acres and should be constructed so that the drill rig can be placed on the cut surface instead of fill material to prevent the derrick from leaning or toppling as a result of the settling of uncompacted soil.

Depending on the relationship of the location to natural drainages, it might be necessary to construct water bars or divert a short drainage segment with a constructed channel.. The area disturbed for pad construction depends largely on the steepness of the slope.

Drilling

Drilling activities usually begin within a week or two after the location and access road have been constructed. The drilling rig and associated equipment are moved to the location and erected. Moving a drilling rig might require moving 10 to 25 truckloads of equipment over public highways and private roads. The derrick, when erected, is roughly 160 feet high.

Water for drilling is hauled to storage tanks. Water sources are usually wells or commercial water sources permitted with the Colorado State Engineer for the use of surface or subsurface water for drilling. When drilling commences, and as long as it progresses, water is continually transported to the rig location. Roughly 2,000 barrels or 84,000 gallons of water are required to drill a natural gas well to the depth of 8,000 feet. More water would be required if circulation is lost.

Within 24-hours after commencing drilling of a federal oil and gas well, the operator must notify the BLM jurisdictional office. This is culled the "Spud Notice." If the well will be completed as a producer, the drilling rig is moved off after production casing is cemented and a smaller rig, called a completion or work over rig, is moved in and utilized for running casing identification logs, perforating and for running down hole pumps, if necessary, running production tubing in the well bore and setting the wellhead valves and controls. The rest of the fluid treating and handling systems are also installed at this time, such as production and storage tanks, dehydrators, separators, measuring systems, sales meters, and flow lines.

Drilling is accomplished by rotating the drill string and putting variable weights on the bit located at the bottom of the string. While drilling, the derrick and associated hoisting equipment bear a majority of the drill string's weight. The combination of rotary motion and weight on the bit causes rock to be gouged away at the bottom of the hole. The rotary motion is created by a square or hexagonal rod, called a kelly, which fits through a square or hexagonal hole in a large turntable, called a rotary table. The rotary table sits on the drilling rig floor and as the bit advances, the kelly slides down through it. When the kelly has

gone as deep as it can, it is raised, and a new piece of drill pipe, about 30 feet in length, is attached in its place. The drill pipe is then lowered, the kelly is reattached, and drilling recommences. When the bit becomes dull, it is necessary to "trip" the drill string and replace the bit. This is a time-consuming process of withdrawing 90-foot sections of the drill pipe until the bit is out of the hole. However, many operators utilize flex drilling rigs and fit-for-purpose drilling rigs, which have the capability of moving themselves without rigging down, and top drives which eliminates the need of a rotary and kelly. This technology reduces drilling time from 28 days to eight days to drill a well on a typical Mesa Verde well below the rim.

New bits constructed with modern metals and manufactured polycrystalline diamonds along with down hole mud motors have revolutionized drilling operations, whereby thousands of feet of hole can be drilled with one bit run. The mud motor is a turbine driven by high-pressure mud and is placed at the top of the bit to enable more rotational power to be transmitted to the bit and thus increase penetration rates. Drilling fluid (mud) is circulated through the drill pipe to the bottom of the hole, through the bit, up the annulus (i.e., the space around a pipe in a well bore) of the well, across a screen that separates the rock chips, and into holding tanks from which finer sediments settle from the mud before it is pumped back into the well. The mud is maintained at a required weight and viscosity to cool the bit, reduce the drag of the drill pipe on the sides of the hole, seal off any porous zones, contain formation fluids to prevent a blowout, and bring the rock chips to the surface for disposal. Various additives are used in maintaining the mud at the appropriate viscosity and weight. Most of the mud consists of bentonite. Some of the additives are caustic, toxic, or acidic, but these hazardous additives are used in small amounts during the drilling operations and later contained within the cuttings pit.

Within the planning area, drilling is usually accomplished with water or light mud to depths within about 1,000 feet of the prospective formation. Water and natural clays recovered during the drilling operation or light drilling mud, allow fast drilling rates and the attendant reduction in mud chemicals. Once the bit reaches the target depth, the mud system is gradually made more sophisticated by addition of bentonite, chemicals, and natural weight materials to reduce water loss to the potential producing zones and to control the subsurface pressure. In almost all cases, the subsurface pressure is higher than an equivalent water column, and it is necessary to increase the mud weights to control the pressure and prevent a blowout or uncontrolled flow of formation fluids. Wells are at balance or slightly overbalanced, which increases penetration rate and reduces the time on the well, or in the formations of interest. The wells are always overbalanced for safety requirements when a bit trip is made, the well is logged, or the casing is installed.

Drilling operations are continuous, 24 hours a day, 7 days a week. The crews usually work three 8-hour shifts or two 12-hour shifts a day. Pickup trucks or cars are used for workers' transportation to and from the site. On remote isolated sites, a camp might be established to house the crews, which will reduce the travel requirements. Other operations, such as cementing, running casing, and rig maintenance will require road travel, sometimes with heavy equipment.

Upon completion of drilling, a determination is made regarding the productive potential of the well by the operator. If oil or gas is not discovered in commercial quantities, the well is considered dry. The operator is then required to follow BLM procedures to properly plug the dry hole. The drill site and access road are then rehabilitated in accordance with the stipulations attached to the APD and the plugging approval. If the well is a producer, drilling rig operations continue until the production casing is cemented into the well before removing the drilling equipment from the location.

Logging

Geophysical logs are obtained by running various instruments into the hole on a wire cable. Logs are usually run at a depth point where casing will be installed. A log is not usually run before surface casing is set, but in most instances a log recording natural gamma radiation is run through the surface casing to determine the geology of that section. The logs can determine water resistivity, hydrocarbon saturations, natural gamma radiations, porosity of the rock by density, nuclear receptivity and sonic measurements, permeability, pressure, temperature, hole geometry, and subsurface track. Logs are used to evaluate whether the well is dry or has the potential for a satisfactory completion. Logs also delineate the various geologic horizons; hydrocarbon zones; fresh, usable, and unusable water; and sands, shales, limestones, coals, and other minerals.

The hydrocarbon intervals are usually randomly situated in each well, and logs are required to specify these intervals so that they can be perforated and stimulated during the completion program. Normally in the planning area, logs recording resistivity and a combined porosity log of density and nuclear receptivity are run in the well. Neutron and density porosity logs are indicators of natural gas by crossing over.

Casing

Various types of casing are placed in the drilled hole to provide a conduit for completion operations and production, hang subsequent strings, to nipple the BOP up on, keep hole stability, and for zonal isolation. Casing is a string of steel pipe composed of approximately 40-foot lengths of pipe that are threaded together. Casing is cemented into the well to protect against migration of fluids within the hole and to isolate the productive zones so they can be completed and produced without interference from other zones containing hydrocarbons or water. Hole deviation, depth, bore hole environment, placement of centralizers, and myriad other factors affect the integrity of the casing and cement job, and must be considered in the original design.

Surface casing that is properly set and cemented also protects surface aquifers from contamination by drilling and production operations. Surface casing should be set to a depth greater than the deepest fresh water aquifer that could be reasonably developed. Usable water could exist at great depths but these aquifers are not normally considered to be important water sources. Surface casing is designed to be large enough to allow subsequent strings of smaller casing to be set as the well is drilled deeper. Cement is placed in the annulus of the surface casing from casing shoe to ground level. The surface casing is the first string on which blowout prevention (BOP) equipment is installed. The BOP equipment allows the well to be shut in at any time that conditions warrant, protecting against unanticipated formation pressures and allowing safe control of the well. BOP equipment is tested and inspected regularly by both the rig personnel and the inspection and enforcement branch of BLM. Minimum standards and enforcement provisions are part of Onshore Order No. 2.

Usually, only the bottom few thousand feet of intermediate or production casing is cemented, which often leaves several thousand feet of open hole behind some casing strings. In the planning area, the annulus (i.e., the space around a pipe in a well bore) is required to be filled with sufficient cement to provide adequate protection from interzonal migration of unsuitable water and hydrocarbons. Production casing or production liner is designed to provide isolation of oil and gas formations, and a high-pressure conduit to the hydrocarbon zones that allows stimulation of these intervals to improve the productivity.

Completions

After drilling and casing of the well, a completion program is typically initiated to stimulate production of natural gas and to determine gas and water production characteristics. A mobile completion rig (also called a workover rig) similar to the drill rig may be used to complete each well. The well completion process typically includes perforating the well's steel casing and cement, hydraulically fracturing the producing formation(s), and installing a series of valves and fittings on the wellhead. Hydraulic fracturing does not always require the presence of a workover rig.

Wells are often treated during completion to improve resource recovery by increasing the rate and volume of hydrocarbons moving from the natural gas reservoir into the wellbore. These processes are known as well-stimulation treatments and include hydraulic fracturing, acidizing, and other mechanical and chemical treatments, often used in combination.

In the planning area, the low permeability character of the productive formations generally requires these zones to be hydraulically fractured or "fraced," which consists of using high pressure to force treated produced water, various chemical additives, and large quantities of sand (which serves to keep the fractures open). Hydraulic fracturing greatly improves the productivity to oil and gas wells, particularly when—as in the planning area—wells are very deep and completed in geologically tight formations.

Hydraulic fracturing is a 60-year-old process used to maximize the extraction of underground resources by allowing natural gas to move more freely from the rock pores to production wells that bring the gas to the surface. Fluids, commonly made up of water and chemical additives (e.g. recycled or fresh water, liquid carbon dioxide, sand, and chemical additives), are pumped into a geologic formation at high pressure during hydraulic fracturing. When the pressure exceeds the rock strength, the fluids open or enlarge fractures. After the fractures are created, a propping agent is pumped into the fractures to keep them from closing when the pumping pressure is released. After fracturing is completed, approximately 60 to 80 percent of the injected fracturing fluid returns to the wellbore (BLM 2014). The specific type and components of the fracturing fluid chemical vary based on geologic formation and by company, but may include constituents such as hydrochloric acid, anti-bacterial agents, corrosion inhibitors, and surfactants. Operators are required to post their disclosure of chemicals intentionally added to hydraulic fracturing fluids on FracFocus per COGCC Order No. 1R-114.

Hydraulic fracturing is now being used more commonly due to advances in technology. Groundwater is protected during the fracturing process by a combination of the casing and cement that is installed when the well is drilled and by the depth of the rock between fracture zone and any fresh-water bearing zones or aquifers (BLM 2014).

Generally, for a typical Mesa Verde well, approximately eight frac stages are done on each well to free up gas in multiple tight sand lenses. Roughly 50 percent of the stimulation fluid returns to the surface within a couple of days, and the rest over an extended period at low rates.Radioactive tracers show the fracs stay within the zone, which is important to maximize the effectiveness of the frac because fracture length and height are the primary factor in successfully stimulating a producing interval. After completion operations are finished, wellhead equipment, consisting of various valves and pressure regulators, is installed to control the oil or gas flow to the production facilities and to safely shut-in the well under any conditions.

FEDERAL UNITS

Surface use in an oil or gas field could be affected by the creation and approval of a Federal Unit or unitization of the leaseholds. In areas of federal and mixed mineral ownership, an exploratory unit can be formed before a wildcat exploratory well is drilled. The boundary of the unit is based on geologic data and attempts to consolidate the interests in an entire structure or geologic play. The developers of the unit enter into an agreement to develop and operate as a single entity, regardless of separate lease ownerships. Costs and benefits are allocated according to agreed-upon terms.

Development in a unitized field can proceed more efficiently than in a field composed of individual leases because competition between lease operators and drainage considerations is not a primary concern. Unitization also can reduce surface use requirements because all wells are operated as though under a single lease, and operations can be planned for more efficiency. Duplication of field processing facilities is eliminated, and consolidation of facilities into more efficient systems is probable. Unitization can also involve wider spacing than usual, or spacing based on reservoir factor rather than a set rule, which could result in fewer wells and higher recovery efficiency. Through planning, access roads are usually shorter and better organized, facilities are usually consolidated, and well efficiency is maximized to a degree not seen in individual lease operations.

PRODUCTION

Gas, oil, and produced water (water occurring naturally in the hydrocarbon-bearing formations) are being produced in the planning area by means of natural flow and artificial lift (plunger lift or poor boy gas lift).

During production, field operations are inspected by the BLM to assure accountability of royalties and compliance with the lease and permit safety and environmental requirements. Usually, the last evolution in the life of an oil or gas well is when it is depleted and cannot produce in paying quantities any longer. At this stage, the operator submits a plug and abandonment plan and it is reviewed, and if necessary, modified by the BLM petroleum engineer and approved. When the downhole plugging is completed, the operator submits a Subsequent Report of Abandonment which is review by the BLM. When surface reclamation is completed and the vegetation has had a chance to establish itself, usually in two to three growing seasons, the operator will submit another subsequent report of a Final Abandonment Notice (FAN). The BLM will inspect the location to determine if it was reclaimed properly, and if so, approve the FAN.

Natural Gas

A typical gas well facility may consists of methanol injection equipment (to keep production and surface lines from freezing), separator (which separates gas, oil, and water), dehydrator (uses glycol or calcium chloride to extract entrained water in the gas), and an orifice meter. An intermitter is sometimes used to either shut-in the well to build up pressure, or to aid conveying liquids to surface if the well bore is accumulating excessive quantities of liquids. If the gas well is producing some oil or condensate, oil tanks are used to store the oil or condensate until it is sold by truck or pipeline. Pipeline quality gas at the wellhead requires a minimum of processing equipment. As the quality of gas decreases with the increased presence of water, solids, or liquid hydrocarbons, the amount of processing equipment increases. Water or liquid hydrocarbons in the gas are removed before the gas is sold, usually in the separation equipment near the wellhead. If liquid hydrocarbons are present, storage facilities (tank batteries) are required to store the liquids until they accumulate in sufficient quantities to be hauled out by large trucks. Gas dehydration equipment might also be onsite to remove water entrained in the gas to a water content

defined by pipeline specifications. Gas production data can be found in the RFD scenario for oil and gas that was developed for the revised RMP.

Lighter ends of NGLs (C_{6+}) tend to go into a gaseous state when naturally heated in a stock tank and vent to atmosphere once enough pressure builds in the tank (typically 0.2 psi) , or it may be collected into feeder lines leading to a flare stack where it is thermally destroyed.

Natural Gas Liquids (NGLs)

In the planning area, condensate is associated with natural gas production. The production equipment, such as separator, tank battery, and holding facility for production water, are either placed on a portion of the location (on cut rather than fill) and located a safe distance from the wellhead, or placed offsite as a centralized facility. Tanks are surrounded by earthen dikes or lined corrugated barriers to contain accidental spills. Production facility colors are required to be from the standard color chart and are specified in the APD COAs.

Each well on location produces a mix of fluids, which is separated at the separators. A single separator is designated for each well and is usually located on the same pad as the well. Two types of separators are utilized in the field office area: three phase separators and two phase separators. Three phase separators separate the condensate, water, and gas into three different lines. Two phase separators separate the natural gas and combined liquid into two different lines. Gas is measured immediately after separation and the condensate and water is stored in stock tanks either on the pad or at a different location, where the condensate is sold and the produced water is hauled to a treatment facility. The produced water is typically treated with bleach and aerated to kill bacteria, evaporated to some extent, used for frac operations, or injected into permitted disposal wells.

Produced Water

Associated water produced with the natural gas and liquid condensate is disposed of by trucking or piping the water to an authorized disposal pit, placing the water into lined pits, where the water is treated with biocides, aerated, condensate skimmed, and utilized in frac operations or disposed of in an authorized disposal well. The COGCC has been granted primacy over class II injection wells by the Environmental Protection Agency (EPA); therefore, they control all aspects of disposal wells. The BLM authorizes produced water, from federal wells, to be disposed of in an authorized disposal facility.

PLUGGING AND ABANDONMENT OF WELLS

The purpose of plugging and abandoning a well is to prevent fluid migration between zones, to protect minerals from damage, and to restore the surface area. Each well must be handled individually because of a combination of factors, including geology, subsurface well design, and specific rehabilitation concerns; therefore, only minimum requirements can be established, and these must be modified for individual wells.

The first step in the plugging process is the filing of the Notice of Intent to Abandon. This notice is reviewed by both the SMA and planning area petroleum engineer and geologist. The notice must be filed and approved before plugging a previously producing well. Verbal plugging instructions can be given for plugging current drilling operations, but a notice must be filed after the work is completed. If usable fresh water was encountered while the well was being drilled, the SMA may be allowed, if interested, to assume future responsibility for the well, and the operator will be reimbursed for the attendant costs. This assumption of responsibility becomes effective after the deeper zones are plugged back to the usable

water zone. Usually the operator is more than satisfied to remove the surface reclamation liability and will not charge for the remaining well equipment.

The operator's plan for securing the hole is reviewed. The minimum requirements, as stated in Onshore Order No. 2, are as follows: In open hole situations, cement plugs must extend at least 50 feet above and below zones that have fluid with the potential to migrate, zones of lost circulation (this type of zone could require an alternate method to isolate it), and zones of potentially valuable minerals. Thick zones may be isolated using cement plugs across the top and bottom of the zone. In the absence of productive zones and minerals, long sections of open hole may be plugged with cement plugs placed every 3,000 feet. In cased holes, cement plugs must be placed opposite perforations and extending 50 feet above and below, except where limited by plug back depth. The length of the plug is 100 feet plus 10 percent per 1,000 feet (i.e., at 10,000 feet). The plug will be at a minimum 200 feet long.

Cement plugs could be replaced with a cement retainer, if the retainer is set 50 feet above the open perforations and the perforations are squeezed with cement. A bridge plug could also be used to isolate a producing zone and must be capped, if placed through tubing, with a minimum of 50 feet of cement. If the cap is placed using a dump bailer, a minimum of 35 feet of cement is required. A dump bailer is an apparatus run on wire line to convey the cement to the bottom of the hole. In the event that the casing has been cut and recovered, a plug is placed 50 feet within the casing stub, and the 100 feet plus 10 percent per 1,000 feet rule is used for the space above the cutoff point. In all cases, a plug is set at the bottom of the surface casing that has a volume of cement using the 100 feet plus 10 percent per 1,000 feet rule. This could require perforating the casing and circulating or squeezing cement behind the production casing if that casing is not removed. Annular space at the surface will be plugged with 50 feet of cement using small-diameter tubing or by perforating and circulating cement.

If the integrity of a plug is questionable, or the position is extremely vital, it can be tested with pressure or by tagging the plug with the tubing or drill string. Tagging the plug involves running a pipe into the hole until the plug is encountered, and placing a specified amount of weight on the plug to verify its placement and competency. The surface plug within the casing must be a minimum of 50 feet. The interval between plugs must be filled with mud that will balance the subsurface pressures, and if this balance point is unknown, a minimum of 9 pounds per gallon is specified. After the casing has been cut off below the ground level, any void at the top of the casing must be filled with cement. A metal marker plate is welded over the top of the casing, 3' below surface. A permanent abandonment marker is required on all wells.

The SMA is responsible for establishing and approving methods for surface rehabilitation, and determining when this rehabilitation has been satisfactorily accomplished. With satisfactorily rehabilitation, a Subsequent Report of Abandonment is approved, and the well bond released.

Form 3100-11
(October 2008)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial Number

OFFER TO LEASE AND LEASE FOR OIL AND GAS

The undersigned (page 2) offers to lease all or any of the lands in Item 2 that are available for lease pursuant to the Mineral Lands Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351-359), or _____(other).

READ INSTRUCTIONS BEFORE COMPLETING

1. Name
   Street
   City, State, Zip Code

2. This application/offer/lease is for: *(Check Only One)* ☐ PUBLIC DOMAIN LANDS ☐ ACQUIRED LANDS (percent U.S. interest _____)

   Surface managing agency if other than Bureau of Land Management (BLM): _____ Unit/Project _____

   Legal description of land requested: *Parcel No.: _____ *Sale Date (mm/dd/yyyy): _____

   ***See Item 2 in Instructions below prior to completing Parcel Number and Sale Date.**

T.	R.	Meridian	State	County

Total acres applied for _____

Amount remitted: Filing fee $ _____ Rental fee $ _____ Total $ _____

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T.	R.	Meridian	State	County

Total acres in lease _____

Rental retained $ _____

This lease is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas (except helium) in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon for the term indicated below, subject to renewal or extension in accordance with the appropriate leasing authority. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance, and to regulations and formal orders hereafter promulgated when not inconsistent with lease rights granted or specific provisions of this lease.

NOTE: This lease is issued to the high bidder pursuant to his/her duly executed bid form submitted under 43 CFR 3120 and is subject to the provisions of that bid and those specified on this form.

Type and primary term:

☐ Noncompetitive lease (ten years)

☐ Competitive lease (ten years)

☐ Other _____

THE UNITED STATES OF AMERICA

by _____
(BLM)

_____
(Title) (Date)

EFFECTIVE DATE OF LEASE _____

(Continued on page 2)

4. (a) Undersigned certifies that (1) offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or Territory thereof, (2) all parties holding an interest in the offer are in compliance with 43 CFR 3100 and the leasing authorities; (3) offeror's chargeable interests, direct and indirect, in each public domain and acquired lands separately in the same State, do not exceed 246,080 acres in oil and gas leases (of which up to 200,000 acres may be in oil and gas options or 300,000 acres in leases in each leasing District in Alaska of which up to 200,000 acres may be in options, (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located; (5) offeror is in compliance with qualifications concerning Federal coal lease holdings provided in sec. 2(a)2(A) of the Mineral Leasing Act; (6) offeror is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (7) offeror is not in violation of sec. 41 of the Act. (b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms conditions, and stipulations of which offeror has been given notice, and any amendment or separate lease that may include any land described in this offer open to leasing at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or in part unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments.

Duly executed this _____ day of _____ , 20 ____ _____

(Signature of Lessee or Attorney-in-fact)

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212 make it a crime for any person knowingly and willfully to make to any department or Agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

LEASE TERMS

Sec. 1. Rentals--Rentals must be paid to proper office of lessor in advance of each lease year. Annual rental rates per acre or fraction thereof are:

(a) Noncompetitive lease, $1.50 for the first 5 years; thereafter $2.00;

(b) Competitive lease, $1.50; for the first 5 years; thereafter $2.00;

(c) Other, see attachment, or

as specified in regulations at the time this lease is issued.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties must be paid on the production allocated to this lease. However, annual rentals must continue to be due at the rate specified in (a), (b), or (c) rentals for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) must automatically terminate this lease by operation of law. Rentals may be waived, reduced, or suspended by the Secretary upon a sufficient showing by lessee.

See. 2. Royalties--Royalties must be paid to proper office of lessor. Royalties must be computed in accordance with regulations on production removed or sold. Royalty rates are:

(a) Noncompetitive lease, 12 1/2%;

(b) Competitive lease, 12 1/2 %;

(c) Other, see attachment; or

as specified in regulations at the time this lease is issued.

Lessor reserves the right to specify whether royalty is to be paid in value or in kind, and the right to establish reasonable minimum values on products after giving lessee notice and an opportunity to be heard. When paid in value, royalties must be due and payable on the last day of the month following the month in which production occurred. When paid in kind, production must be delivered, unless otherwise agreed to by lessor, in merchantable condition on the premises where produced without cost to lessor. Lessee must not be required to hold such production in storage beyond the last day of the month following the month in which production occurred, nor must lessee be held liable for loss or destruction of royalty oil or other products in storage from causes beyond the reasonable control of lessee.

Minimum royalty in lieu of rental of not less than the rental which otherwise would be required for that lease year must be payable at the end of each lease year beginning on or after a discovery in paying quantities. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced, for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

An interest charge will be assessed on late royalty payments or underpayments in accordance with the Federal Oil and Gas Royalty Management Act of 1982 (FOGRMA) (30 U.S.C. 1701). Lessee must be liable for royalty payments on oil and gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator, or due to the failure to comply with any rule, regulation, order, or citation issued under FOGRMA or the leasing authority.

(Continued on page 3)

Sec. 3. Bonds - A bond must be filed and maintained for lease operations as required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage - Lessee must exercise reasonable diligence in developing and producing, and must prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of area, field, or pool embracing these leased lands. Lessee must drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection - Lessee must file with proper office of lessor, not later than 30 days after effective date thereof, any contract or evidence of other arrangement for sale or disposal of production. At such times and in such form as lessor may prescribe, lessee must furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs. In the form prescribed by lessor, lessee must keep a daily drilling record, a log, information on well surveys and tests, and a record of subsurface investigations and furnish copies to lessor when required. Lessee must keep open at all reasonable times for inspection by any representative of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee must maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that supports costs claimed as manufacturing, preparation, and/or transportation costs. All such records must be maintained in lessee's accounting offices for future audit by lessor. Lessee must maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section will be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations - Lessee must conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee must take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses must be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee must contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee must immediately contact lessor. Lessee must cease any operations that would result in the destruction of such species or objects.

Sec. 7. Mining operations - To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 8. Extraction of helium - Lessor reserves the option of extracting or having extracted helium from gas production in a manner specified and by means provided by lessor at no expense or loss to lessee or owner of the gas. Lessee must include in any contract of sale of gas the provisions of this section.

Sec. 9. Damages to property - Lessee must pay lessor for damage to lessor's improvements, and must save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 10. Protection of diverse interests and equal opportunity - Lessee must pay, when due, all taxes legally assessed and levied under laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; and take measures necessary to protect the health and safety of the public.

Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. If lessee operates a pipeline, or owns controlling interest in a pipeline or a company operating a pipeline, which may be operated accessible to oil derived from these leased lands, lessee must comply with section 28 of the Mineral Leasing Act of 1920.

Lessee must comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractors must maintain segregated facilities.

Sec. 11. Transfer of lease interests and relinquishment of lease - As required by regulations, lessee must file with lessor any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which will be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 12. Delivery of premises - At such time as all or portions of this lease are returned to lessor, lessee must place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

Sec. 13. Proceedings in case of default - If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease will be subject to cancellation unless or until the leasehold contains a well capable of production of oil or gas in paying quantities, or the lease is committed to an approved cooperative or unit plan or communitization agreement which contains a well capable of production of unitized substances in paying quantities. This provision will not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver will not prevent later cancellation for the same default occurring at any other time. Lessee will be subject to applicable provisions and penalties of FOGRMA (30 U.S.C. 1701).

Sec. 14. Heirs and successors-in-interest - Each obligation of this lease will extend to and be binding upon, and every benefit hereof will inure to the heirs, executors, administrators, successors, beneficiaries, or assignees of the respective parties hereto.

(Continued on page 4)

A. General:

1. Page 1 of this form is to be completed only by parties filing for a noncompetitive lease. The BLM will complete page 1 of the form for all other types of leases.

2. Entries must be typed or printed plainly in ink. Offeror must sign Item 4 in ink.

3. An original and two copies of this offer must be prepared and filed in the proper BLM State Office. See regulations at 43 CFR 1821.2-1 for office locations.

4. If more space is needed, additional sheets must be attached to each copy of the form submitted.

B. Special:

Item 1 - Enter offeror's name and billing address.

Item 2 - Identify the mineral status and, if acquired lands, percentage of Federal ownership of applied for minerals. Indicate the agency controlling the surface of the land and the name of the unit or project which the land is a part. The same offer may not include both Public Domain and Acquired lands. Offeror also may provide other information that will assist in establishing title for minerals. The description of land must conform to 43 CFR 3110. A single parcel number and Sale Date will be the only acceptable description during the period from the first day following the end of a competitive process until the end of that same month, using the parcel number on the List of Lands Available for Competitive Nominations or the Notice of Competitive Lease Sale, whichever is appropriate.

Payments: The amount remitted must include the filing fee and the first year's rental at the rate of $1.50 per acre or fraction thereof. The full rental based on the total acreage applied for must accompany an offer even if the mineral interest of the United States is less than 100 percent. The filing fee will be retained as a service charge even if the offer is completely rejected or withdrawn. To protect priority, it is important that the rental submitted be sufficient to cover all the land requested. If the land requested includes lots or irregular quarter-quarter sections, the exact area of which is not known to the offeror, rental should be submitted on the basis of each such lot or quarter-quarter section containing 40 acres. If the offer is withdrawn or rejected in whole or in part before a lease issues, the rental remitted for the parts withdrawn or rejected will be returned.

Item 3 - This space will be completed by the United States.

NOTICES

The Privacy Act of 1974 and the regulations in 43 CFR 2.48(d) provide that you be furnished with the following information in connection with information required by this oil and gas lease offer.

AUTHORITY: 30 U.S.C. 181 et seq.; 30 U.S.C 351-359.

PRINCIPAL PURPOSE: The information is to be used to process oil and gas offers and leases.

ROUTINE USES: (1) The adjudication of the lessee's rights to the land or resources. (2) Documentation for public information in support of notations made on land status records for the management, disposal, and use of public lands and resources. (3) Transfer to appropriate Federal agencies when consent or concurrence is required prior to granting a right in public lands or resources. (4)(5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION: If all the information is not provided, the offer may be rejected. See regulations at 43 CFR 3100.

Appendix C

Stipulations

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Resource Management Decision Stipulations for New Oil and Gas Leases and Other Lands Uses and Management Actions for the Roan Plateau Planning Area Draft RMPA/SEIS

Introduction

Oil and gas leases issued pursuant to approval and implementation of any of the alternatives analyzed under this RMPA/EIS grant the lessee the right to extract the oil and gas resource on affected BLM lands within the Planning Area. Section 6 of the lease document terms (see Appendix B) restricts the lease rights granted by requiring that the lessee conduct operations in a manner that minimizes adverse [environmental] impacts and take reasonable measures deemed necessary by the lessor (BLM) to accomplish this intent. These prudent measures are applied through a Condition of Approval (COA) during the permit process for oil and gas development.

If BLM deems it necessary to place additional restrictions on the rights of lessees in order to protect environmental resources, stipulations are appended to the lease. Stipulations clarify BLM's intent to protect known resources or resource values. Stipulations that would be applied to new oil and gas leases under the four alternatives are listed and described in Tables C-1, C-2, C-3, and C-4, respectively. Areas included within the various stipulations under each alternative are shown on Maps 1 to 8 (Appendix A) to this Draft RMPA/SEIS. The location and areas of specific stipulations under each alternative are shown in figures appended to Tables C-1 through C-4, respectively.

Due to the supplemental nature of this process, the four alternatives to be analyzed are either based upon alternatives developed and analyzed for the now-remanded FEIS (Alternative I, No Action, and Alternative II, FEIS Proposed Plan), or have their basis in direction from the Judicial Order and Settlement Agreement (Alternative III, Community Alternative, and Alternative IV, Settlement Alternative, respectively). The stipulations associated with each alternative were developed for the protection of resources, as managed by the specifics of that alternative. Therefore, the names and definitions of stipulations associated with each alternative are derived from different sources, as summarized below:

- Alternative I, No Action – stipulations taken from the 1999 FSEIS (BLM 1999b). These are listed in Table C-1, below, followed by figures illustrating the spatial extent and location of each stipulation.
- Alternative II, FEIS Proposed Plan – stipulations from the FEIS ROD (BLM 2007), spatial allocations updated to integrate new and significant information and resource mapping. These are listed in Table C-2, below, followed by figures illustrating the spatial extent and location of each stipulation.
- Alternative III, Community Alternative – stipulations from the CRVFO Proposed Plan/Final EIS (BLM 2014) when available and applicable, otherwise from the FEIS ROD (BLM 2007). These are listed in Table C-3, below, followed by figures illustrating the spatial extent and location of each stipulation.
- Alternative IV, Settlement Alternative – stipulations from the FEIS ROD (BLM 2007), but not updated for new information and resource data, where overlapped with potential leasing areas under this alternative. These are listed in Table C-4, below, followed by figures illustrating the spatial extent and location of each stipulation. Additional conditions of the Settlement Agreement are a limit on the number of well pads atop the plateau, colocation of pipelines,

restrictions on road use, and a requirement for developing a master development plan (MDP) for BLM approval.

In prior planning efforts, BLM has explicitly stated the criteria for which exceptions, modifications, or waivers to a specific stipulation would apply. For the Roan Plateau RMPA/FEIS, BLM no longer planned for exception to stipulations. Instead the conditions under which each stipulation would apply, and standards that must be met for their application, were explicitly stated in the stipulation. Exceptions may still be applied should unforeseen circumstances arise or new information become available. Likewise, these standards may be modified, as necessary, to provide the protections to resources for which they were intended. A waiver may still be applied, but only after following the rigorous testing process described below. Stipulation descriptions from other sources than the FEIS ROD do contain additional descriptions for exceptions, modifications, and waivers. Regulations covering exceptions, modifications, and waivers are found in 43 CFR 3101.1-4. The terms included in this discussion are defined in greater detail in the following:

- **Stipulation** – A condition of lease issuance (or other land use approval) that provides protection for other resource values or land uses by establishing authority for substantial delay or site changes or the denial of operations within the terms of the lease contract.
- **Standard Exception** – An exception is a one-time exemption for a particular site within the leasehold or within a land use authorization. Exceptions are determined on a case-by-case basis, and if granted, suspend the restrictions of a stipulation for a specified period, location, or activity. The stipulation continues to apply to all other sites within the leasehold or authorized use area. In situations where a land use activity is excepted, the activity could be subject to additional conditions of approval, reclamation measures, or BMPs. Measures applied would be based on the nature, extent, and values potentially affected by the surface-disturbing activity. Excepted surface disturbing activities/lease stipulations are given on a one-time, case-by-case basis and will not necessarily constitute subsequent approvals. Exceptions that conform to an RMP do not require public notice. Non-conforming exceptions are granted only upon RMP amendment and following public notice.

  Hypothetical Example: During a mild winter, mule deer have not moved into some low-elevation, low-quality winter range because adequate and higher quality winter range is available at higher elevations. BLM may grant an exception to the seasonal restriction (Timing Limitation) for all or part mule deer winter range if it determines that *de facto* loss of that habitat in that year would not adversely affect the population. Even if an exception to the 5-month Timing Limitation is granted, BLM could still require a 2-month seasonal avoidance during the coldest months, and the stipulation would be reapplied the following winter unless data indicated a similar situation.

- **Standard Modification** – A fundamental change to the provisions of a lease/land use authorization stipulation, either temporarily or for the term of the lease/land use authorization. Modifications may be temporary or permanent and apply to a specific site or to all sites within the stipulation areas. Depending on the specific modification, the stipulation may or may not apply to other sites within the leasehold /land use authorization to which the stipulation applies. Modifications are made if it is determined that the stipulation is no longer required as written, such as based on the results of monitoring data. While the underlying purpose of the stipulation continues, it can be met with less restrictive means. Modifications require an environmental assessment to determine potential impacts and evaluate whether an RMP amendment is needed. If deemed substantial, a modification requires a 30-day public notice period prior to implementation.

  Hypothetical Example: Monitoring data and an area analysis indicate that the No Surface Occupancy stipulation excluding long-term ground-disturbing activities within 0.5 mile of the Colorado River is unnecessarily stringent. This conclusion is based (hypothetically) on a

determination that intervening vegetation, topography, and other land uses are such that a narrower buffer would adequately protect the hydrologic, aquatic, riparian, visual, and other resource values. BLM may modify the stipulation, either temporarily or permanently, to reduce the buffer width to 0.25 miles and rely on other stipulations to provide the necessary protection.

- **Standard Waiver** – A waiver permanently exempts a leasehold/land use authorization from a stipulation attached to the lease/authorization; that is, the stipulation no longer applies to that leasehold/authorization. No waivers are authorized unless BLM staff has verified that the areas mapped as possessing the attributes to which the stipulation applies do not possess those attributes. Waivers apply to an entire stipulation area and are applied only after preparation of an environmental assessment and subsequent decision that a stipulation is no longer required to protect a specific resource. The decision to waive a substantial stipulation requires a plan amendment and a 30-day public notice period prior to waiver.

  Hypothetical Example: Monitoring data indicate that a particular Controlled Surface Use (CSU) stipulation for the protection of sensitive plant species and significant plant communities associated with drainages is not needed. Because of other stipulations that provide the same or higher level of protection along the actual stream corridor, standard stipulations are adequate to protect the specific vegetation resources. BLM could, after preparing an environmental assessment and plan amendment involving a 30-day public comment period, waive that stipulation throughout the area where it previously applied.

For the purposes of this RMPA/SEIS, the stipulations and associated bases for granting exceptions, modifications, and waivers apply to all land uses and management actions for which BLM has approval responsibility, and not only to oil and gas development. Restrictions on these other lands uses or management activities would be imposed at the time of issuance of a specific permit or other approval, while stipulations for oil and gas activities are attached to the lease document.

- **No Surface Occupancy (NSO) –** The NSO stipulation is intended for application only when other stipulations are deemed insufficient to achieve the level of resource protection necessary to protect the public interest. An NSO stipulation is not needed if the desired level of protection can be accomplished by relocating a proposed facility or activity or avoiding that activity for a specified period.

  The equivalent of an NSO for land uses and activities other than oil and gas development is NGD (No Ground Disturbance).

- **Controlled Surface Use (CSU) –** The CSU stipulation is intended for application where standard lease terms and permit-level decisions are deemed insufficient to achieve the level of resource protection necessary to protect the public interest, but where an NSO is deemed overly restrictive.

  A CSU stipulation allows BLM to require that a proposed facility or activity be relocated by more than 200 meters from the proposed location if necessary to achieve the desired level of protection. A CSU is not needed if relocating the proposed facility or activity by up to 200 meters would be sufficient.

  The equivalent of a CSU for land uses and activities other than oil and gas development is SSR (Site Specific Relocation).

- **Timing Limitation (TL) –** This stipulation limits activity during a specified period of the year. A TL stipulation is intended for application where standard lease terms are deemed insufficient to achieve the level of resource protection necessary to protect the public interest, but where an NSO is deemed overly restrictive. The scope of the TL stipulation goes beyond ground-disturbing activities to

encompass any source of protracted or high-intensity disturbance that could interfere with normal wildlife behavior and adversely affect habitat use. The limitation is applied annually for a specified period lasting more than 60 days.

Under the Action Alternatives, TLs may also be applied to land uses and activities other than oil and gas development. Similarly, note also that equivalent levels of protection would be applied to other land uses and management actions as a condition of their approval. Other protective measures such as special mitigation requirements could also be applied to land uses and management actions other than oil and gas (as described above, they could be required for oil and gas as a COA during the permitting process).

Throughout the text of the Draft RMPA/SEIS, reference is made to existing stipulations that would be applied, extended, retained, or dropped with regard to new leases. While leases issued prior to 2007 will remain subject to their existing terms, leases issued under this plan will be subject to whatever stipulations are directed by the selected alternative. . However, many of the leases are based on, and vary only slightly or not at all from, some of the existing stipulations for current leases.

In the following tables and in Chapter 4 of the Draft RMPA/SEIS, new stipulations are designated as to which type they are (NSO, CSU, or TL) and described by the specific resource to which they apply.

Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
No Surface Occupancy (NSO) Stipulations		
NSO-15: Steep Slopes (>50%), 8,720 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Maintain soil stability and productivity and minimize impacts of soil erosion on other resources.	No ground-disturbing activities on slopes steeper than 50%. [Note: This differs from the existing condition in that pipeline construction is no longer exempted.]	An exception or modification may be granted on areas with slopes less than 50% that are entirely or partially surrounded by slopes steeper than 50% if the less steep area (a) is at least 10 acres in size and (b) can be reached by road, pipeline, powerline, or other required access without crossing any slope steeper than 50%. No exceptions will be granted in areas of steep slopes that also are designated as wildlife movement corridors
NSO-12: Threatened or Endangered Species, 440 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect occupied habitat, or other habitat crucial for the maintenance or recovery, of species listed at the Federal or State levels as threatened or endangered, and proposed or candidate species at the Federal level.	No ground-disturbing activities within occupied habitat or habitat necessary for maintenance or recovery of the species.	An exception or modification may be granted, following Section 7 consultation with USFWS or consultation with CPW for State-listed species, and after considering the behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance, relative extent of available habitat; relationship to topography and vegetation screening; and other factors that may affect maintenance or recovery of the species. If a species affected by this stipulation is removed from the Federal listed (”delisted”), this stipulation would be modified to exclude that species.
NSO-11: Wildlife Seclusion Areas, 3,440 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect important seclusion (security) for wildlife, especially deer and elk.	No ground-disturbing activities in areas that provide high-value habitats along and below the base of the Roan Cliffs.	An exception or modification may be granted if: (a) BLM determines, following consultation with CPW, that the specific activity or requested change would not impair habitat quality due to habitat loss or fragmentation or disturbance from human activity; or (b) the activity would have a duration within the seclusion area of less than one day. The

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
		BLM's determination would consider the vegetation, topography, existing habitat impacts, and other site specific or activity-specific factors and the amount, type, and exact location of the surface disturbance.
NSO-7: Raptor Nesting Areas, 220 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect nesting of raptors not protected by the Endangered Species Act or other species specific stipulation.	No ground-disturbing activities within 0.125 mile of an active nest (i.e., containing eggs or young or being attended by adults in preparation for nesting).	An exception or modification may be granted if: (a) the BLM determines, following consultation with CPW, that the specific activity or requested change would not impair behaviors, habitat use and quality, and reproductive success of raptor species present within the specific NSO area; (b) the activity would have a duration within the buffer zone of an active nest of less than one day; and (c) no suitable alternative is available. The BLM's determination would consider the vegetation, topography, existing habitat impacts, and other site-specific or activity-specific factors and the amount, type, and exact location of the surface disturbance in relation to the nest and vegetation or topographic screening.
NSO-8: Bald Eagle Nest Areas, 380 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect nesting or winter roosting for bald eagle.	No ground-disturbing activities within 0.25 mile of designated bald eagle nesting or roosting habitat.	An exception or modification (e.g., reduced buffer zone width) may be granted depending on the status of the nest or roost (active or inactive); the location of the activity in relation to the nest and areas of topographic or vegetation screening; conservation measures if required by USFWS; and the amount, type, and duration of surface disturbance. An exception or modification granted in one year would not necessarily be granted in subsequent years.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
NSO-9: Peregrine Falcon Cliff Nesting Complex, 120 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect nesting of this State-listed threatened species.	No ground-disturbing activities within 0.25 mile of the cliff-nesting complex along the Roan Cliffs from March 15 through July 31.	An exception or modification (e.g., reduced buffer zone width) may be granted following consultation with CPW and after considering the status of the nest (active or inactive), its relationship to areas of topographic or vegetational screening, and the type, amount, and duration of the surface disturbance. No exception would be granted for an activity with a duration longer than one when the cliff-nesting complex is occupied by breeding by peregrine falcons. An exception or modification granted in one year would not necessarily be granted in subsequent years.
NSO-18: 1-70 Viewshed, 8,300 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect areas with high visual sensitivity within 5 miles of I-70.	No ground-disturbing activities on slopes steeper than 30% with high visual sensitivity in the I-70 viewshed. These are lands within 5 miles of the highway, of moderate to high visual exposure, where details of vegetation and landform are readily discernible, and changes in contrast can be easily noticed by the casual observer on I-70.	An exception or modification may be granted if protective measures can be designed to accomplish VRM Class II objectives, viz., that the overall landscape character is retained on a site-specific and cumulative basis. Such measures would be designed to blend the disturbance with the natural landscape.
NSO-19: Anvil Points Claystone Cave, 120 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect the scientific and wildlife values of these caves.	No ground-disturbing activities in the area encompassing the cave opening, subsurface features, and watersheds overlying the caves.	An exception or modification would require that the proponent demonstrate by monitoring or other method, and with a high degree of scientific reliability, that the activity would not impair the cave values being protected. Any exception or modification would be approved only after consultation with CPW and considering the type, amount, duration, and timing of the activity.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
NSO-2: Riparian and Wetland Zones, 80 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Maintain proper hydrologic function and protect adjacent riparian and wetland areas that provide habitat for fish and wildlife species, waterfowl and shorebird production, and amphibian breeding/feeding or that provide important water quality, scenic, or recreation values.	Ground-disturbing activities, roads, electric transmission lines, and other sources of surface disturbance are limited to areas beyond the outer edge of riparian or wetland vegetation.	An exception or modification may be granted if (a) the activity will cause no loss of riparian vegetation or, if riparian is lost, that the loss is limited to no more than 0.1 acre, and 100 linear feet, per mile of stream; (b) any temporarily disturbed areas are revegetated with the same or similar species, including use of "nursery stock" rather than seeds to replace woody plants on a one-to-one basis (trees) or area-for-area basis (shrubs); (c) revegetation success can be achieved within 2 years; (d) the activity will not impair water quality, flow regime, aquatic habitat quality, and channel and bank stability; and (e) no suitable alternative is available.
NSO-3: Colorado River Corridor, 440 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect high-quality habitats and wildlife areas, water quality benefits, and scenic qualities along the Colorado River.	No ground-disturbing activities within 0.5 mile of high water mark on either side of river.	An exception or modification (e.g., reduced buffer zone width) may be granted if the BLM determines that (a) the specific activity or requested change would not impair water quality, high-quality habitats, and scenic qualities after considering the vegetation, topography, existing habitat impacts, and other site-specific or activity-specific factors and the amount, type, and duration of surface disturbance proposed; and (b) any lost vegetation would be replaced with the same or similar species within 3 to 5 years.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
Controlled Surface Use (CSU) Stipulations		
CSU-3: Sensitive Species Populations and Significant Plant Communities, 8,930 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect plant species, significant plant communities, and fish and wildlife species listed by BLM as sensitive, including protection of occupied habitat or of other areas needed to support the species.	The BLM may require special design, construction, operation, mitigation, or reclamation measures, relocation by more than 200 meters to protect specified species, plant communities, or associated ecological functions. Measures required will be based on the nature, extent, and value of the area potentially affected.	The BLM may determine that the level of protection available under a CSU stipulation is not required to ensure the values associated with occupied habitat or ecological functioning needed to support BLM sensitive species are adequately protected. The BLM's determination would be based on site-specific conditions, species-specific behaviors and habitat requirements, and the type, amount, and duration of the associated impacts.
CSU-4: Erosive Soils on Slopes Steeper than 30%, 6,690 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Maintain soil stability and productivity and minimize impacts of soil erosion on other resources.	The BLM may require special design, construction, operation, mitigation, or reclamation measures, relocation by more than 200 meters to protect the soil resource, minimize impacts to other resources, and ensure reclamation success in areas of highly erosive soils on slopes steeper than 30% Highly erosive soils are those in the "severe" and "very severe" erosion classes based on NRCS mapping. This stipulation also applies to the Trapper Creek Watershed Management Area.	The BLM may determine that the level of protection available under a CSU stipulation is not required to preserve soil stability and productivity and minimize adverse impacts from soil erosion. The BLM's determination would be based on site-specific conditions and the type, amount, and duration of the associated impacts.
CSU-5: VRM Class II Areas, 14,670 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Preserve the existing character of the landscape to meet VRM Class II objectives in all areas designated at this class.	The BLM may require special design, construction, operation, mitigation, or reclamation measures, or relocation by more than 200 meters to retain the existing landscape character and allow only limited changes.	The BLM may determine that the level of protection available under a CSU stipulation is not required to meet VRM Class II objectives based on preserve soil stability and productivity and on site-specific conditions, visibility of the site; the type, amount, and duration of the associated impacts; and the effectiveness of standard stipulations in a given situation.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
CSU-6: Sharrard Park Paleontological Area, 1,020 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect, preserve, or recover the scientifically fossil resources in this area.	The BLM may require special survey, design, construction, operation, and reclamation measures, or relocation by more than 200 meters in identified portions of Wasatch Formation outcrops in Sharrard Park. Prior to any ground-disturbing activity, the operator shall have the paleontological resources surveyed within 200 feet of the proposed disturbance, to be performed by a BLM-approved paleontologist. Other special measures will include a requirement that onsite personnel are informed about the potential for fossils and instructed to notify the BLM if any fossils are found and to leave any vertebrate fossils in place.	The BLM may determine that the level of protection available under a CSU stipulation is not required to protect, preserve, or recover the fossil resources at specific sites or for specific activities within this area. The BLM's determination would be based on site-specific conditions and the type, amount, and duration of the associated impacts.
CSU-2: Riparian and Wetland Habitat Below the Rim, 2,620 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Maintain proper hydrologic function and protect adjacent riparian and wetland areas that provide habitat for special- status fish and wildlife species, waterfowl and shorebird production, and amphibian breeding/feeding or that provide important water quality, scenic, or recreation values.	The BLM may require special design, construction, operation, mitigation, or reclamation measures, relocation by more than 200 meters for any ground-disturbing activities, electric transmission lines, and other sources of disturbance within 500 feet of riparian or wetland vegetation to protect the values and functions of these areas. Measures required will be based on the nature, extent, and value of the area potentially affected.	The BLM may determine that the level of protection available under a CSU stipulation is not needed to ensure that values associated with proper hydrological and ecological functioning are not impaired, and that adjacent riparian and wetland areas that support the specified fish and wildlife resources are adequately protected. The BLM's determination would be based on site-specific conditions and on the type, amount, and duration of the associated impacts.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
Timing Limitations (TL) Stipulations		
TL-1: Big Game Winter Habitat, 20,230 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect winter habitat for deer and elk, including severe winter range, winter concentration areas, and critical habitat/winter range,	No activities or other sources of disturbance. Applied annually from December 1 through April 30.	The BLM may grant an exception for a winter season (typically following consultation with CPW) if (a) monitoring studies indicate that, due to mild weather or other natural conditions, deer/elk are not occupying the winter range; (b) (b) deer/elk are occupying the winter range, but the proposed activity would be transitory (duration of one day or less per month), and unlikely to significantly affect behavior or habitat quality in more than 1% of the winter range. The BLM will also consider the exact location, nature, and timing of the proposed activity and availability of a suitable alternative. A modification may be granted if monitoring data indicate that the TL is not needed to maintain appropriate populations of deer and elk.
TL-6: Raptor Nesting, 970 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect nesting and fledging habitat for raptors not protected by species-specific measures. Includes owls, northern harrier, accipiters, buteos, golden eagle, osprey, and falcons except the American kestrel.	Within a 0.125-mile radius of a nest, no activities or other sources of disturbance with the potential to cause the nest not to be used or lead to nest failure, abandonment, or mortality of fledglings. Applied annually from February 1 through August 15.	An exception or modification may be granted (a) if the BLM determines, in consultation with CPW, that the requested activity could be performed during the period of the TL without impairing behavior, nesting, or fledging success, and (b) the permitted disturbance would have a duration within the buffer zone of less than one day. BLM's determination would be based on based on species-specific behaviors, sensitivities, and habitat needs and on meteorological, ecological, or hydrological conditions during that period.

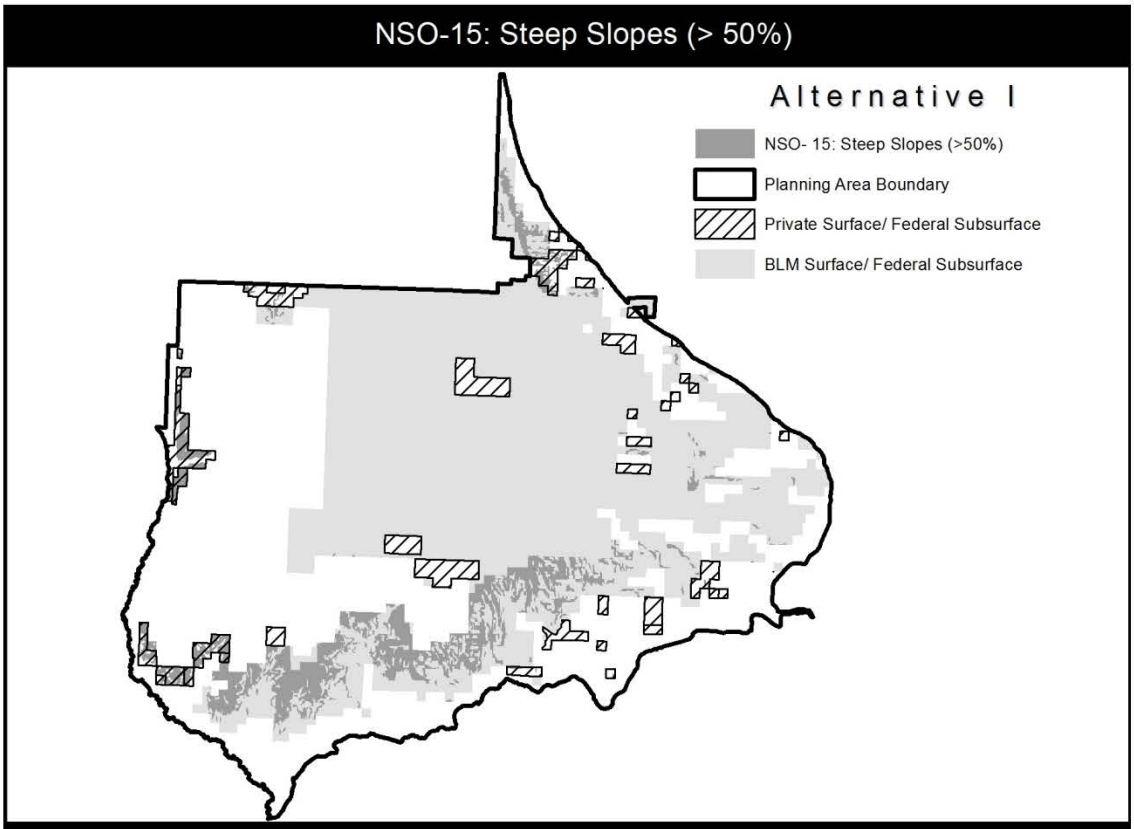
[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

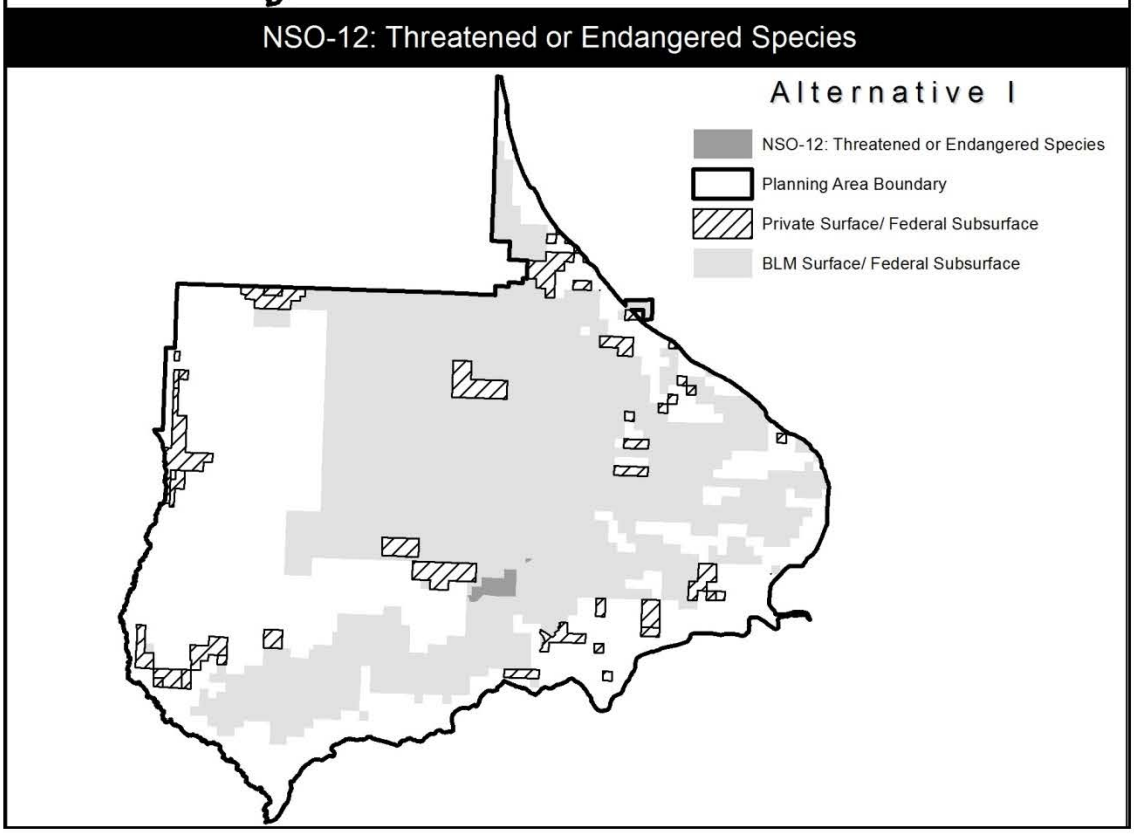
Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
TL-10: Bald Eagle Nesting, 510 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect winter roosts of this species.	Within a 0.5-mile radius of a winter roost, no activities or other sources of disturbance that could cause the roost not to be used or to be abandoned after roosting has begun. Applied annually, November 15 through April 15.	An exception or modification may be granted if the BLM determines that the requested activity could be performed during the period of the TL in a manner that would not impair behavior, habitat use, or winter survival. The BLM's determination would be based on specific meteorological or ecological conditions during the period requested; the status of the roost (active or inactive); the exact location of the activity relative to the roost site and any vegetation or topographic screening; the type, intensity, and duration of disturbance; and measures required by USFWS.
TL-12: Peregrine Falcon Cliff Nesting Complex, 360 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect nesting and fledging habitat of this State-listed threatened species.	Within a 0.5-mile radius of the cliff-nesting complex on the Roan Cliffs, no activities or other sources of disturbance that could cause abandonment of a nest or established territory. Applied annually, March 15 through July 31.	An exception or modification may be granted if BLM determines, in consultation with CPW, that the requested activity could be performed during the period of the TL without impairing behavior, nesting, or fledging success. The BLM's determination would be based on specific meteorological or ecological conditions during the period requested; the status of the roost (active or inactive); the exact location of the activity relative to the roost site and any vegetation or topographic screening; the type, intensity, and duration of disturbance; and availability of suitable options.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

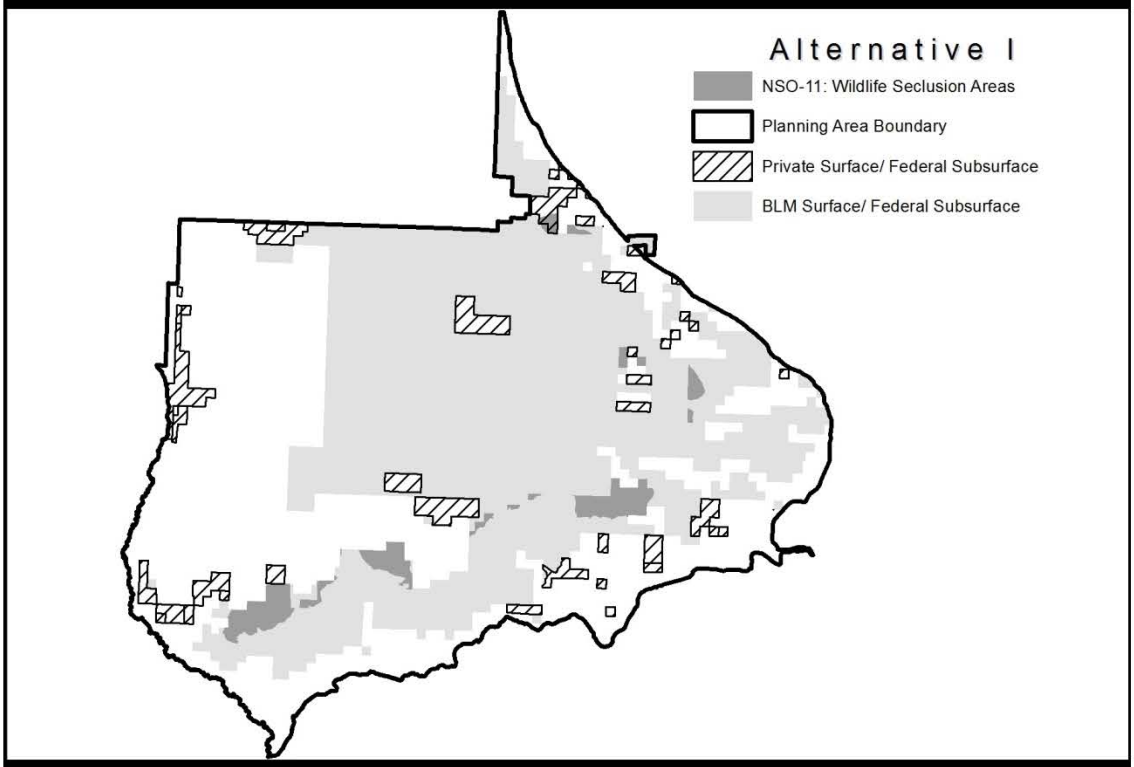
Appendix Table C-1. Descriptions of Surface-Use Stipulations Applicable to No Action Alternative[1]		
TL 13: Waterfowl and Shorebird Nesting Areas, 40 acres		
Objective	**Measures and Areas Applied**	**Exception or Modification Criteria**
Protect nesting and brood-rearing habitats at the Fravert Reservoir Watchable Wildlife Area.	Within 0.25-mile of the nesting and production area of Fravert Reservoir, no activities or other sources of disturbance that could cause waterfowl and shorebirds not to nest or lead to nest failure or abandonment. Applied annually, April 15 through July 15 or until all young have hatched and dispersed from the production area.	An exception may be granted if BLM determines, in consultation with CPW, that the requested activity could be performed during the period of the TL without impairing behavior, nesting, or fledging success. An exception could be based on species-specific behaviors, sensitivities, and habitat needs and on meteorological, ecological, or hydrological conditions during that period.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

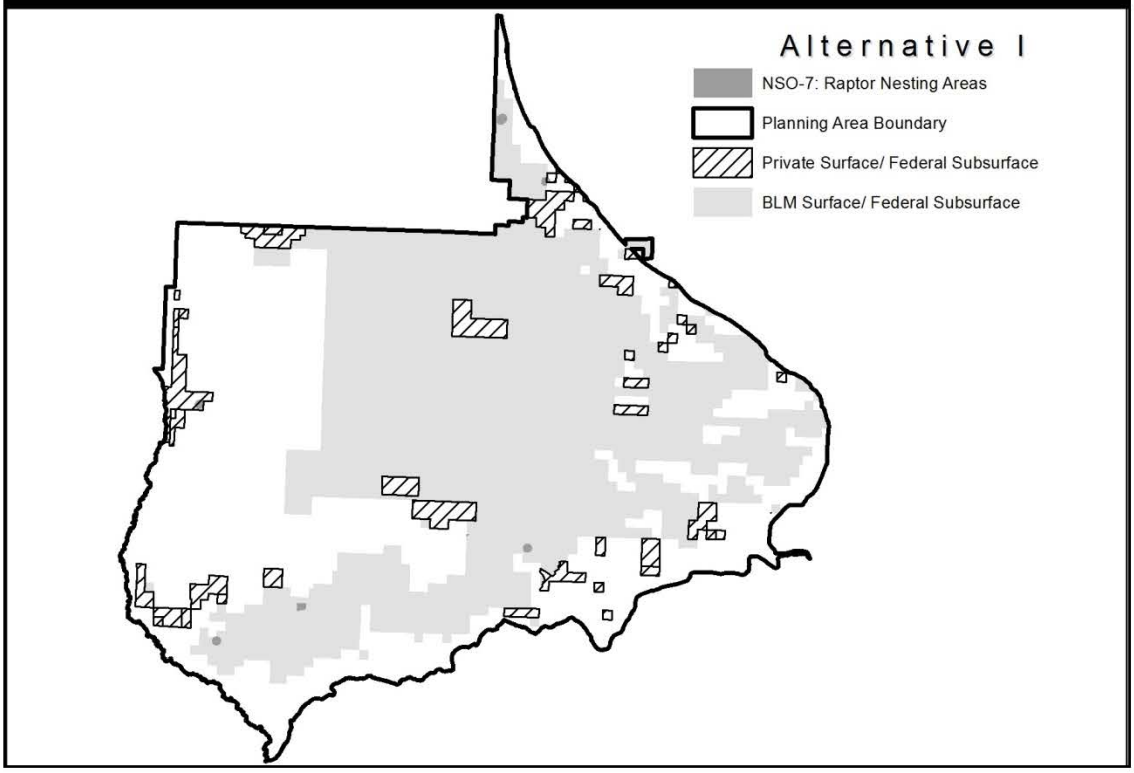

NSO-15: Steep Slopes (> 50%)
Alternative I
NSO- 15: Steep Slopes (>50%)
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


NSO-12: Threatened or Endangered Species
Alternative I
NSO-12: Threatened or Endangered Species
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

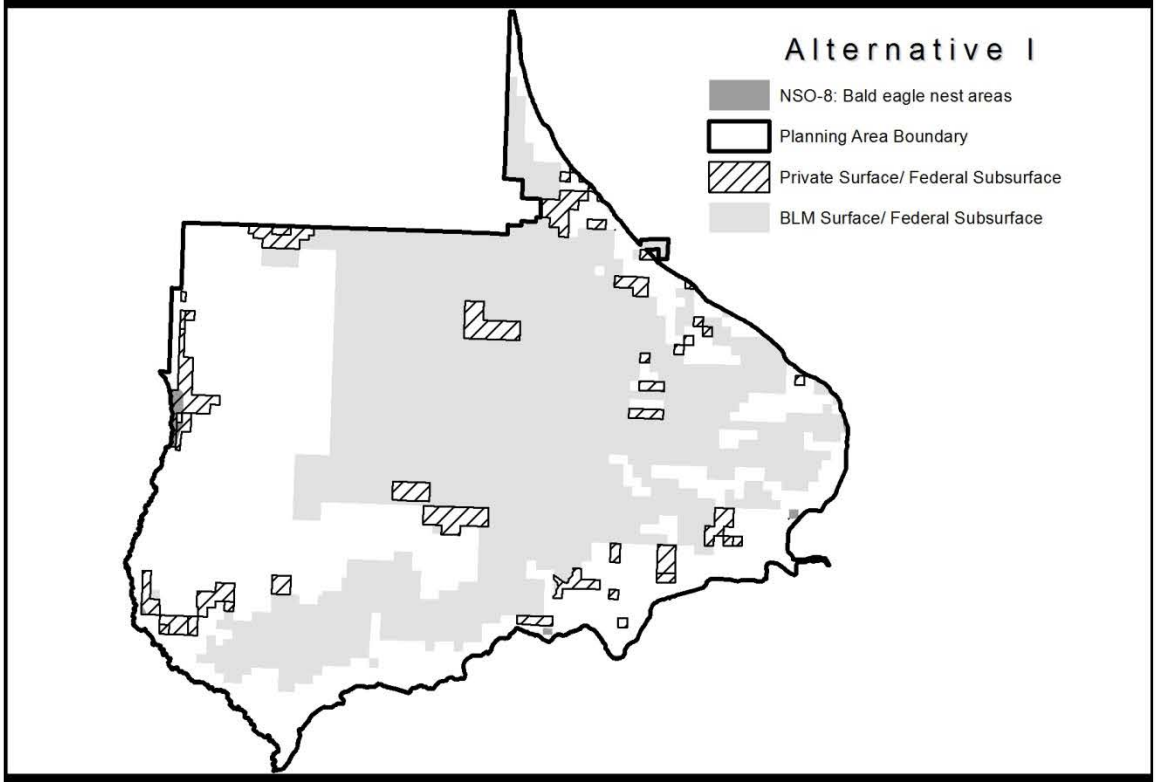
NSO-11: Wildlife Seclusion Areas



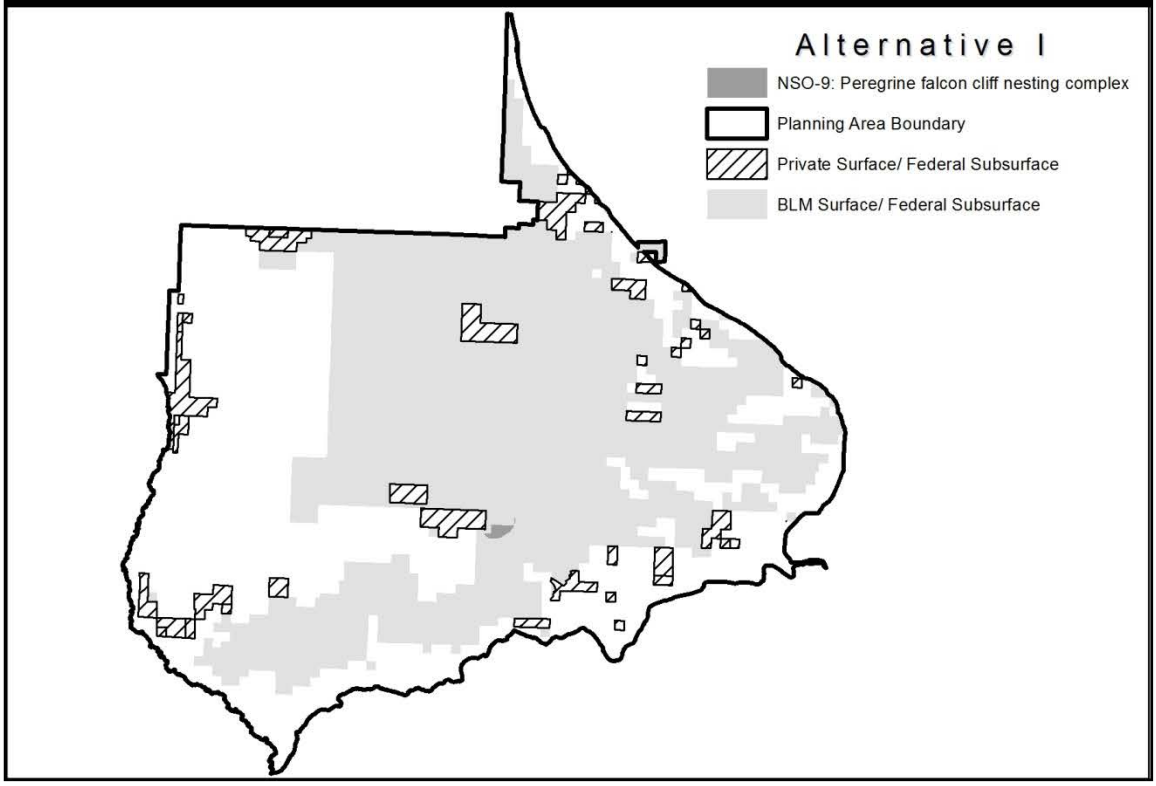
NSO-7: Raptor Nesting Areas



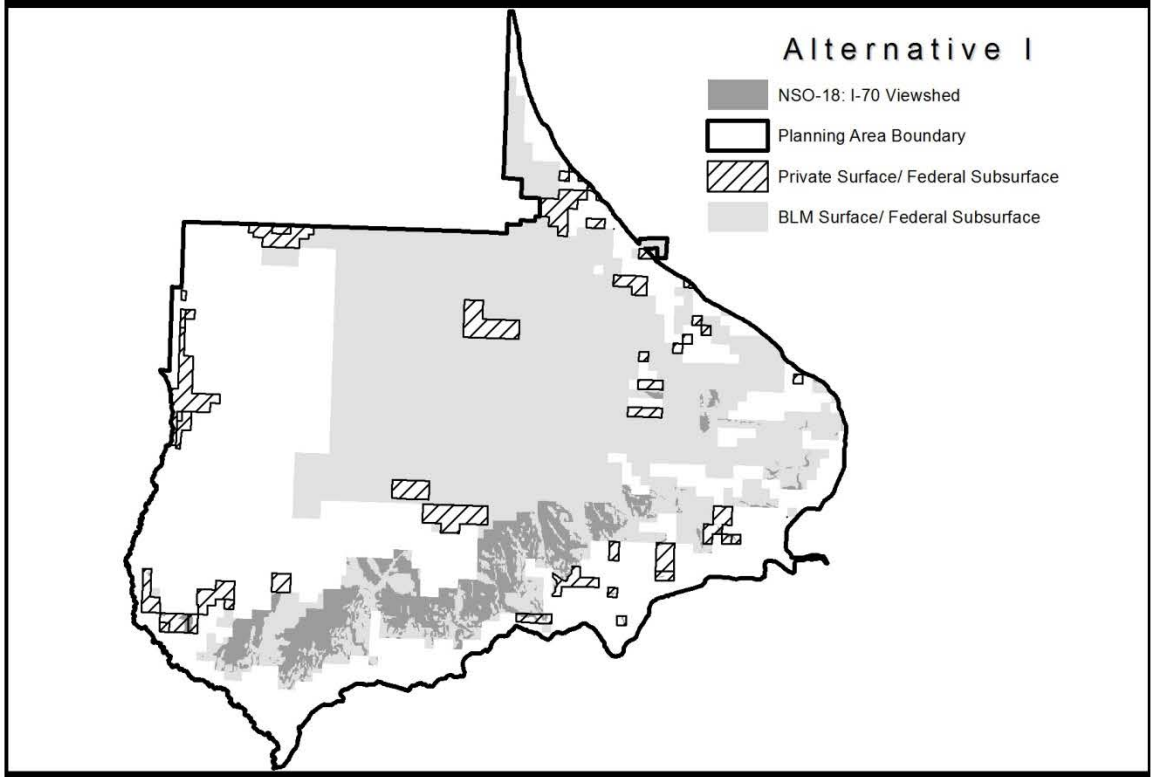
NSO-8: Bald Eagle Nest Areas



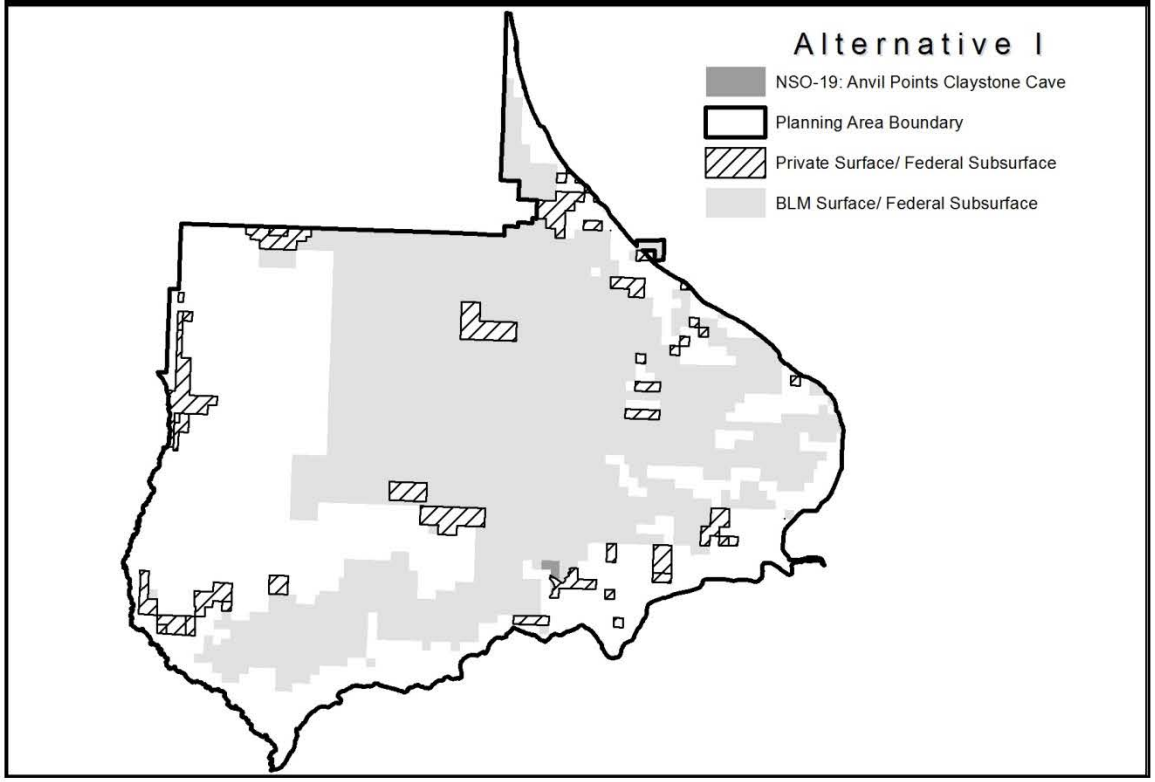
NSO-9: Peregrine Falcon Cliff Nesting Complex



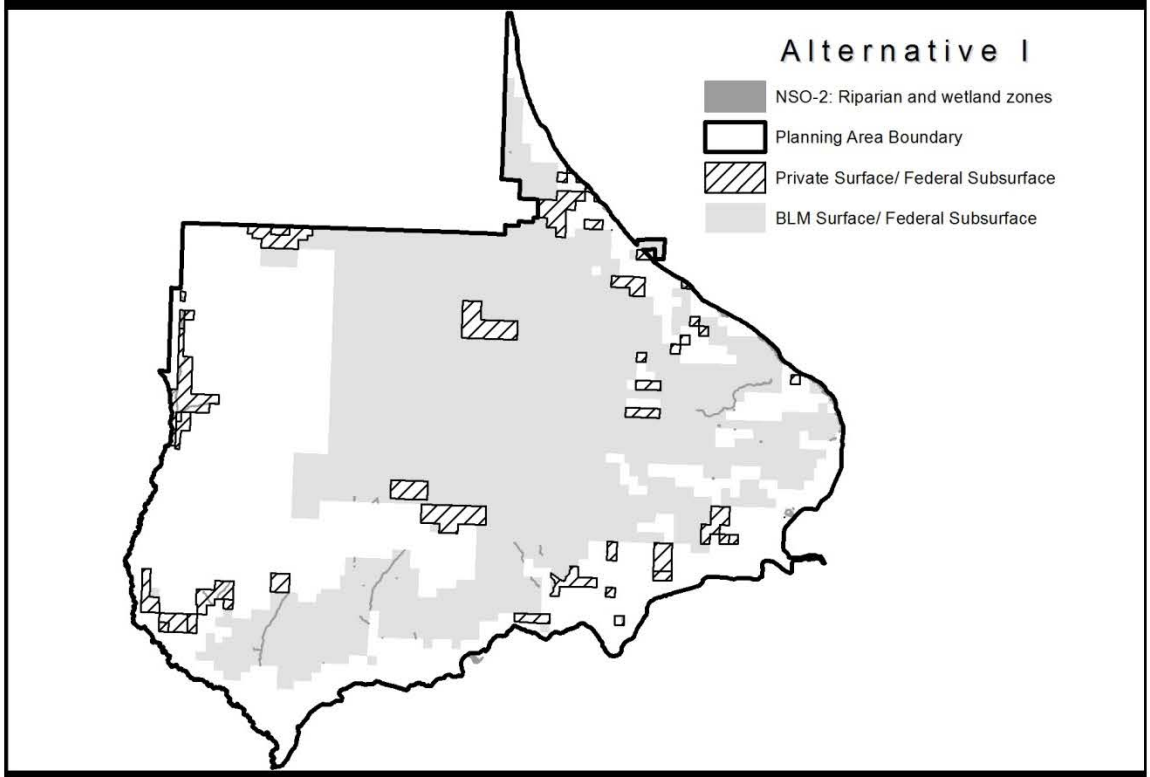
NSO-18: I-70 Viewshed



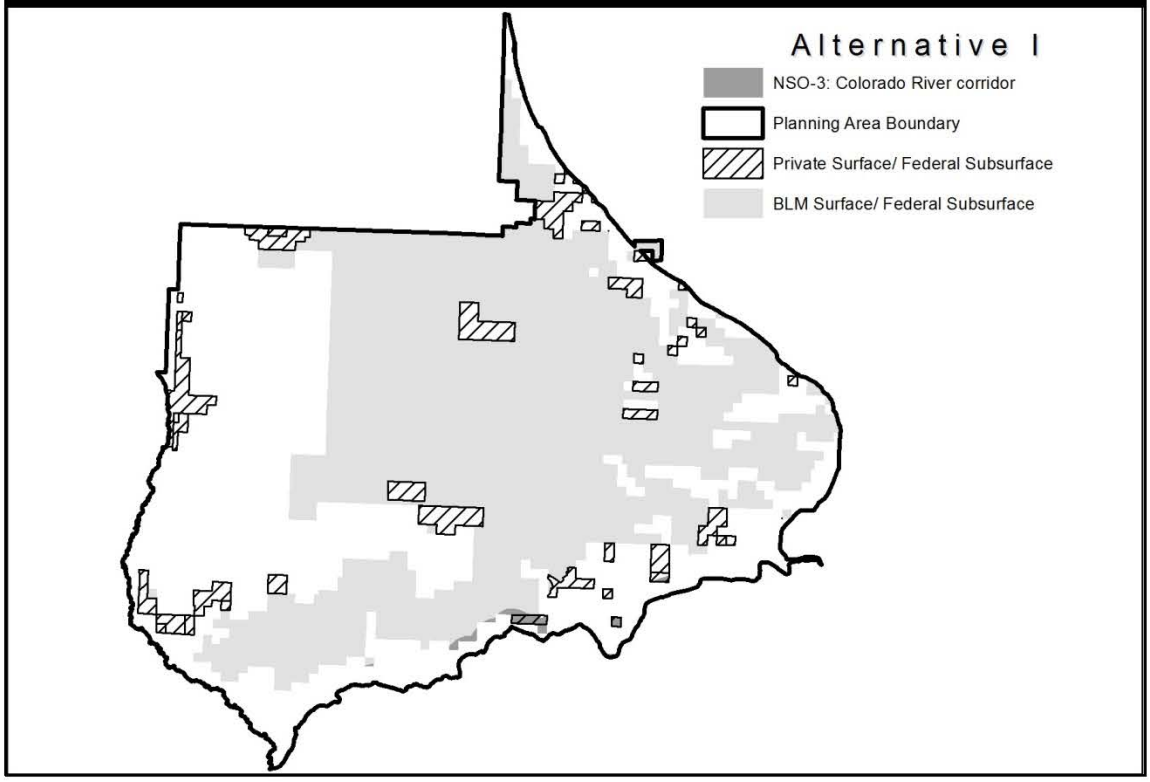
NSO-19: Anvil Points Claystone Cave



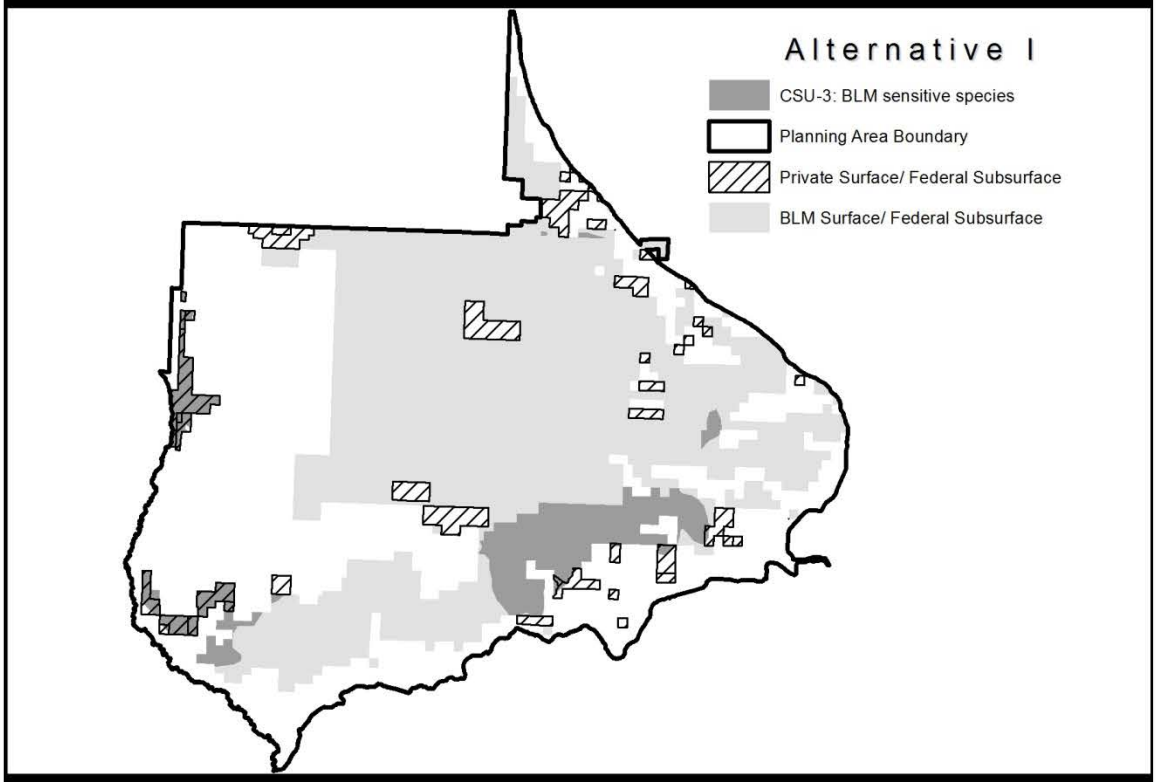
NSO-2: Riparian and Wetland Zones



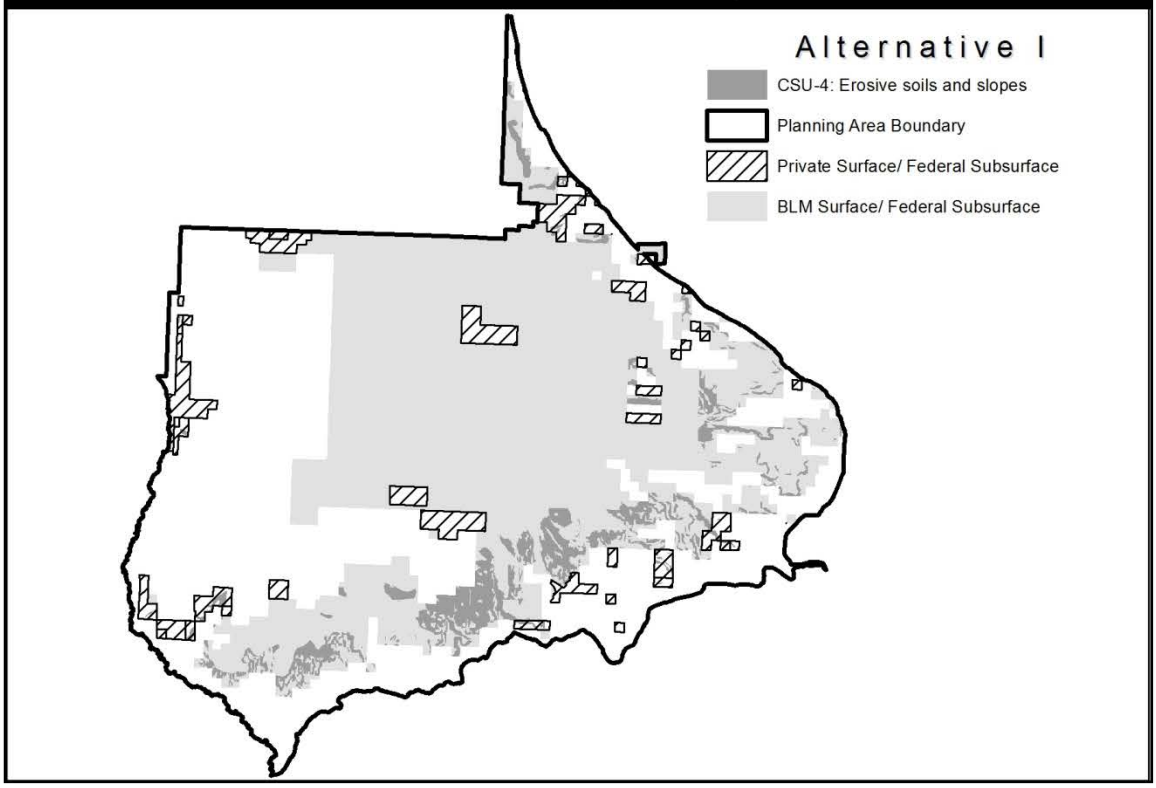
NSO-3: Colorado River Corridor



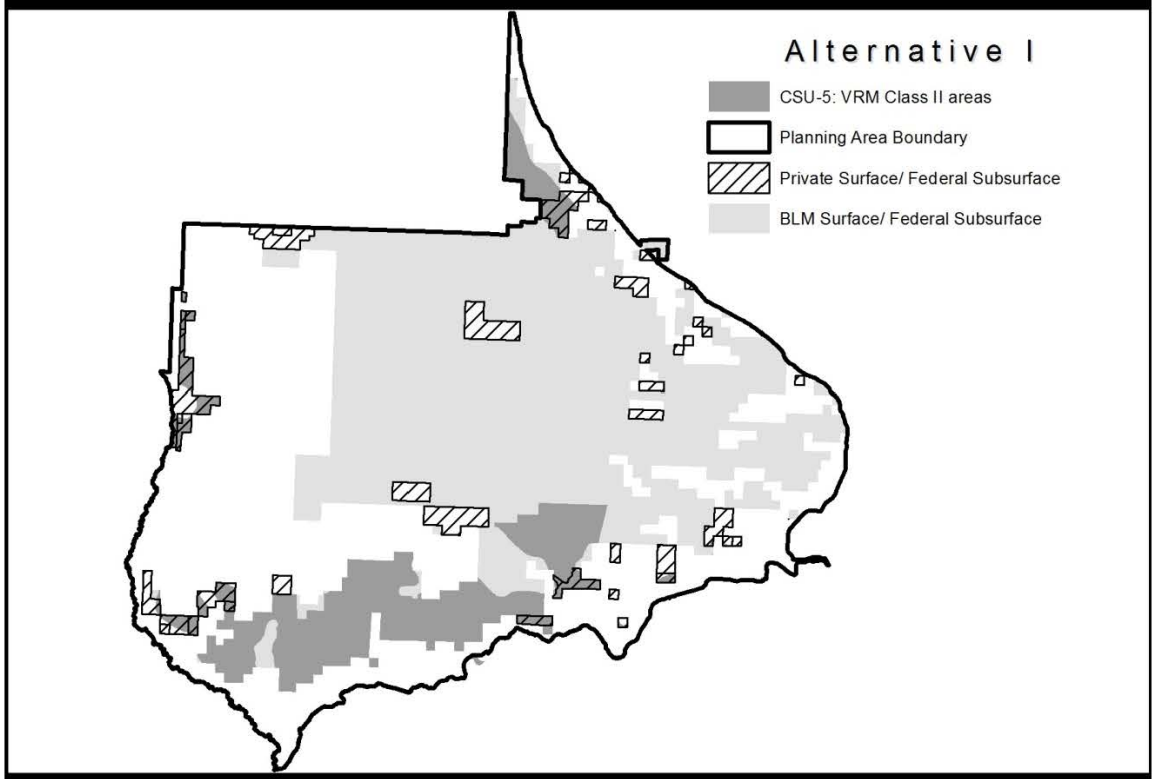
CSU-3: Sensitive Species Populations and Significant Plant Communities



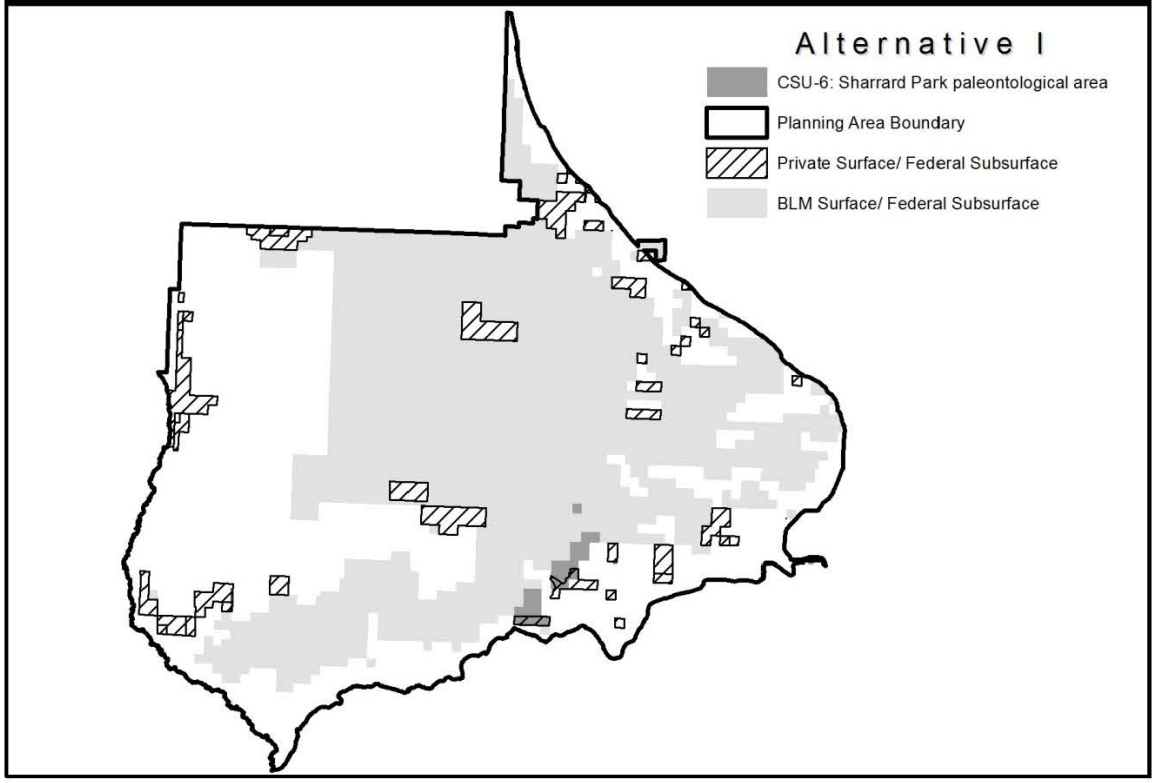
CSU-4: Erosive Soils on Slopes Steeper than 30%



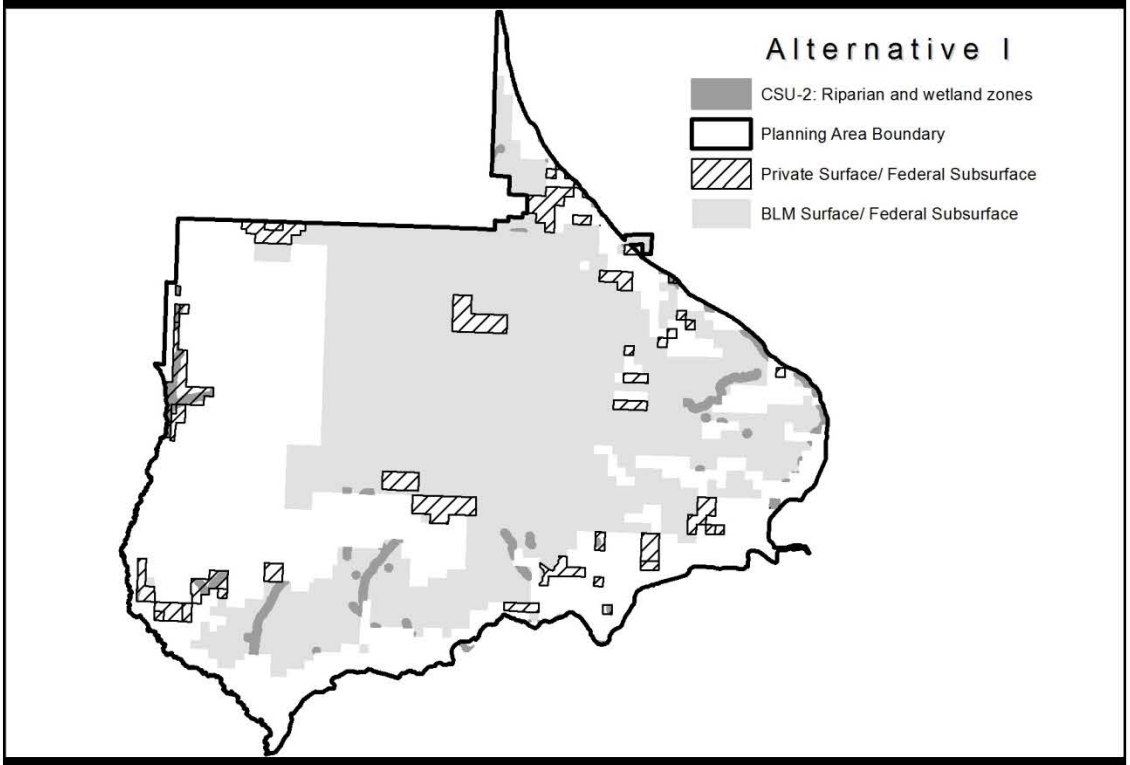
CSU-5: VRM Class II Areas



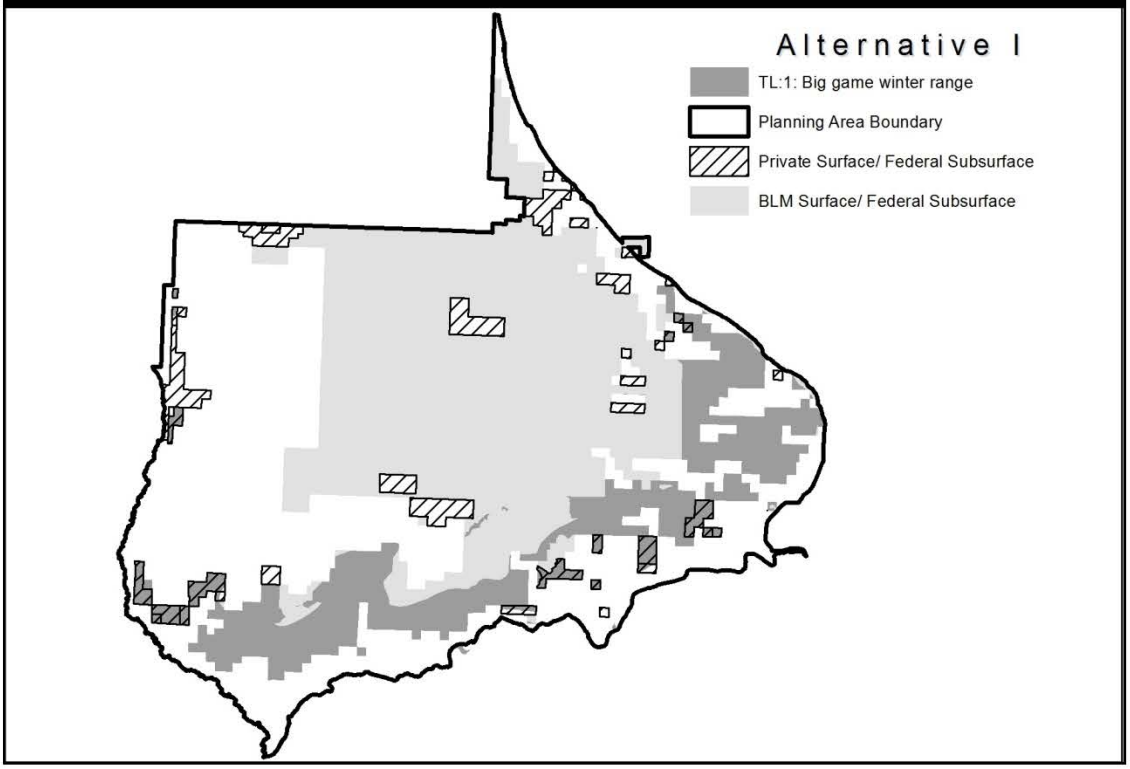
CSU-6: Sharrard Park Paleontological Area



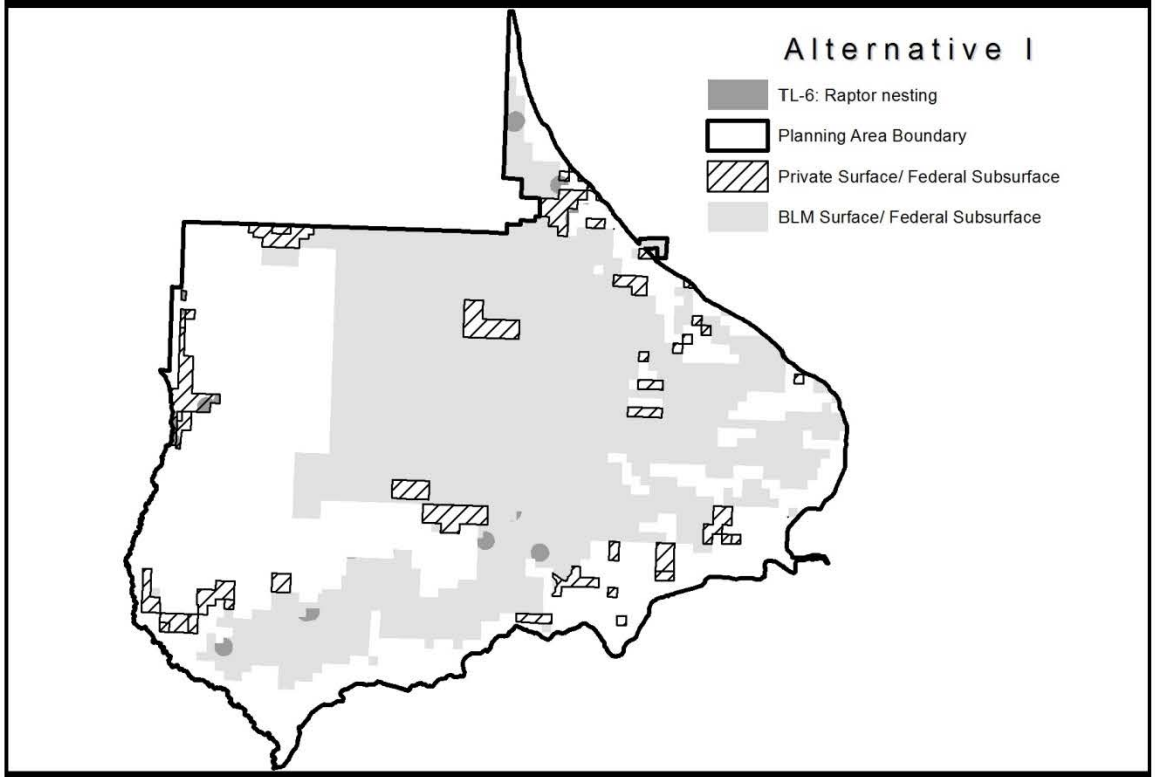
CSU-2: Riparian and Wetland Habitat Below the Rim



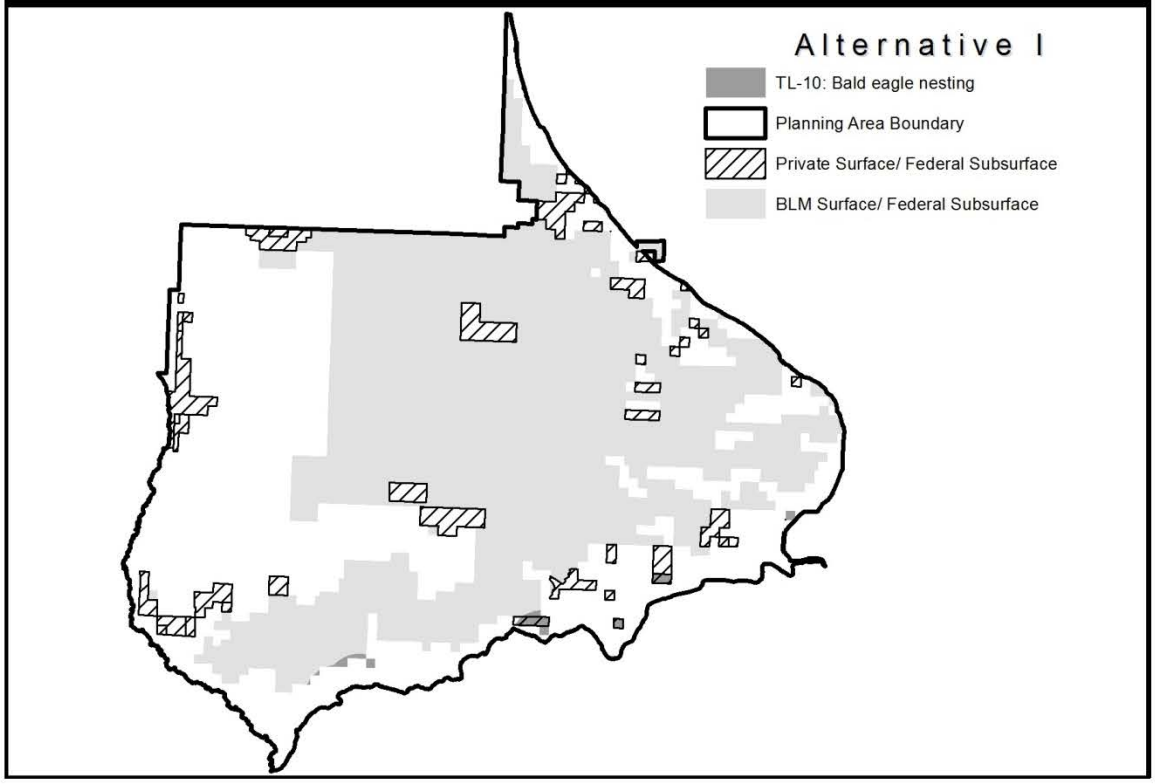
TL-1: Big Game Winter Habitat



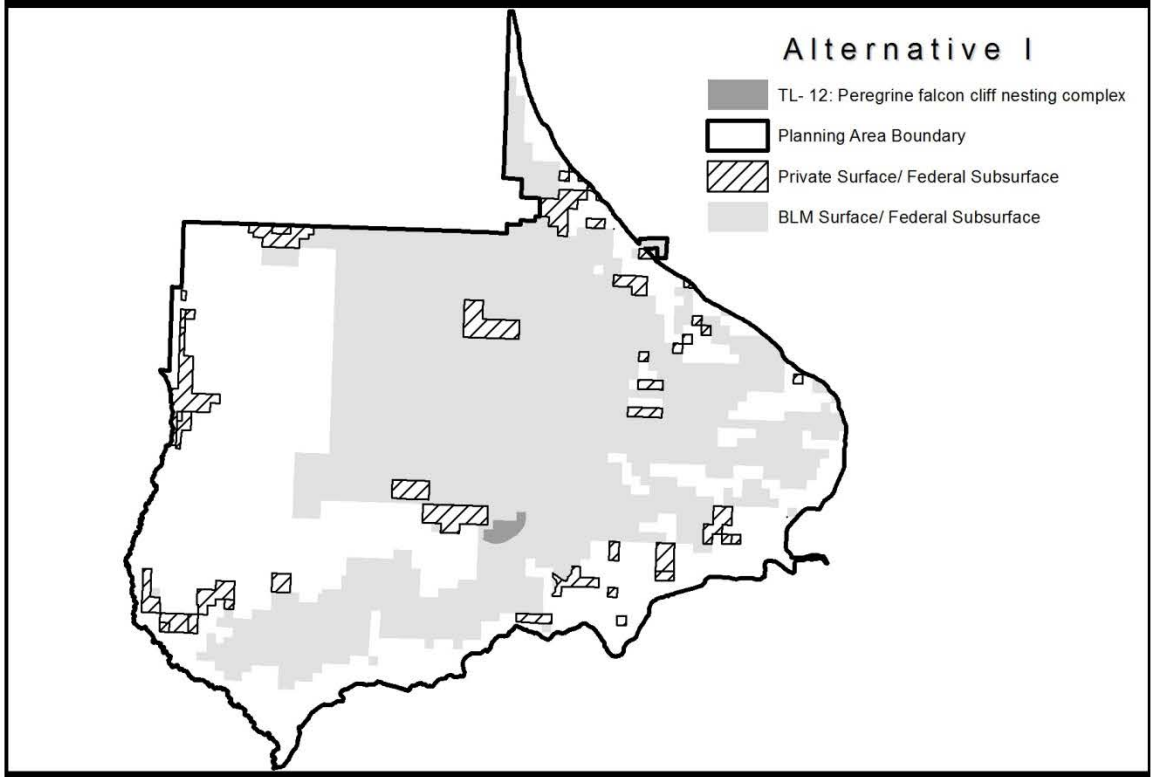
TL-6: Raptor Nesting



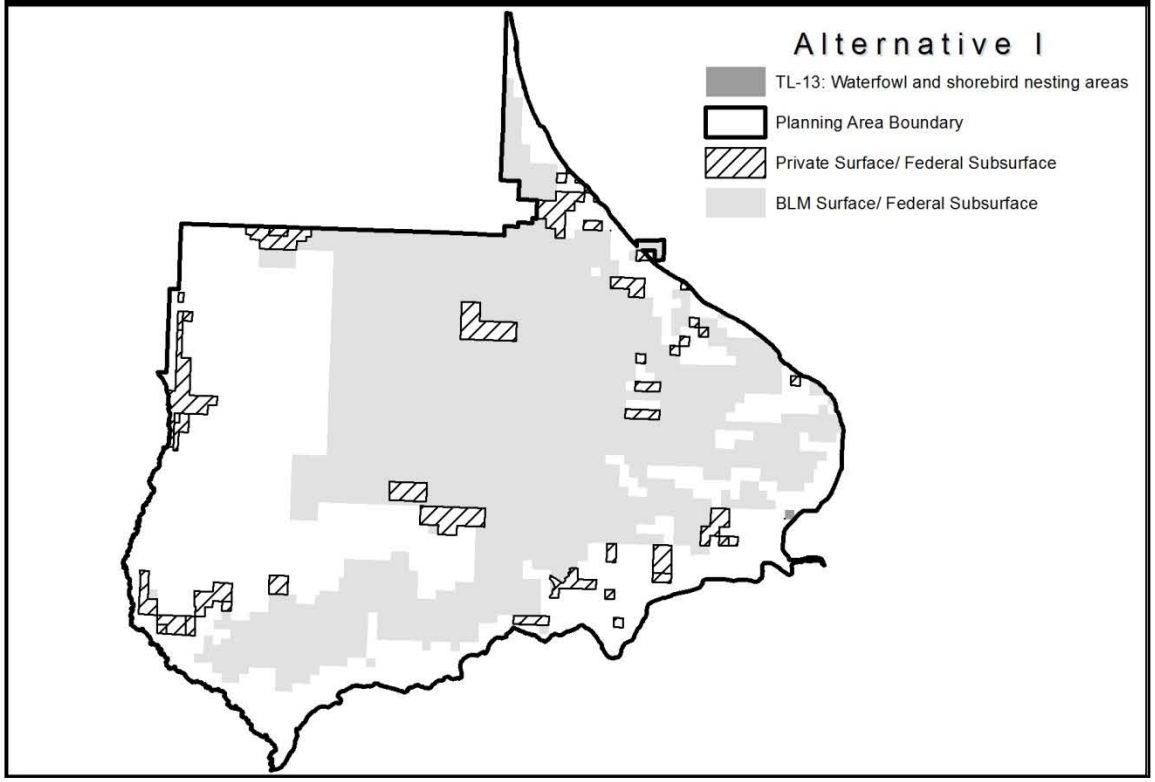
TL-10: Bald Eagle Nesting



TL-12: Peregrine Falcon Cliff Nesting Complex



TL-13: Waterfowl and Shorebird Nesting Areas



Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
No Surface Occupancy (NSO) Stipulations	
CRVFO-NSO-Roan-22: Steep Slopes (>50%), 27,620 acres	
Stipulation	**Standards**
NSO on slopes greater than 50 percent. No ground-disturbing activities on the 27,620 acres of slopes steeper than 50 percent.	1. No ground-disturbing activities will be granted in areas of steep slopes that also are designated as wildlife movement corridors. 2. Ground-disturbing activities in areas with slopes steeper than 50 percent will not be granted for access to areas with slopes less than 50 percent. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards detailed in Appendix I.
CRVFO-NSO-Roan-24: Threatened, Endangered, or Candidate Species Habitat, 3,670 acres	
Stipulation	**Standards**
NSO to protect occupied and immediately adjacent potential habitat crucial for the maintenance or recovery of species listed under the Endangered Species Act (ESA) or by the State of Colorado as threatened or endangered (including proposed or candidate species under the ESA). No ground-disturbing activities within approximately 25 acres of habitat currently mapped as occupied or immediately adjacent to potential habitat.	1. Ground-disturbing activity may be permitted if the BLM determines, following Section 7 consultation with USFWS or with CPW for State-listed species, that the requested activity would not impair values associated with maintenance or recovery of the species. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Ground-disturbing activities must avoid a 0.25-mile buffer around Mexican spotted owl nest sites year-round, with seasonal avoidance of active nests and a 0.5-mile buffer from February 1 - August 15.

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	3. If species affected by this stipulation is removed from the federal list, this stipulation would not apply to that species. Other requirements, however, will apply if the species remains classified as sensitive, or is otherwise protected. 4. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be promptly notified, and corrective measures, as approved by the BLM, must be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 5. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-25: Raptor Nest Sites, 910 acres	
Stipulation	**Standards**
NSO to protect approximately 910 acres around raptor nest areas not protected by the ESA or other species-specific stipulation. No ground-disturbing activities within 0.125 mile of an active nest (i.e., containing eggs or young or being attended by adults in preparation for nesting).	1. Site-specific ground-disturbing activity near active raptor nest sites will not be allowed between February 1 and August 15 unless the BLM determines, following consultation with CPW, that the requested activity would not impair values, behaviors, or habitat associated with nesting and fledging. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; potential to cause the nest not to be used or lead to nest failure; abandonment of the nest; mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species, or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-

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	disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-26: Bald Eagle Nest or Winter Roost Sites, 380 acres	
Stipulation	**Standards**
NSO to protect approximately 380 acres of bald eagle nest, winter roost sites, and winter range. No ground disturbing activities within 0.25 mile of designated bald eagle nesting or roosting habitat, within bald eagle winter range, or within 0.25 mile of Fravert Reservoir (subject to valid existing rights and authorizations).	1. Ground-disturbing activity may be permitted if the BLM determines, following Section 7 consultation with USFWS or with CPW for State-listed species, that the requested activity would not impair values associated with maintenance or recovery of the species. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values

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	protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-27: Wildlife Seclusion Areas Below the Rim, 11,410 acres	
Stipulation	**Standards**
NSO to protect important wildlife security areas below the rim, especially those for deer and elk. No ground-disturbing activities in approximately 11,410 acres that provide high-value habitats along and below the base of the Roan Cliffs.	1. Ground-disturbing activity may be permitted if BLM determines, following consultation with CPW, that the requested activity would not impair values associated with maintenance or recovery of the species. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors.

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	2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-28: High-value Special Status Fish Species Habitat, 15,820 acres	
Stipulation	**Standards**
NSO to protect Colorado River cutthroat trout from direct and indirect impacts in high-value habitat. No ground-disturbing activities in approximately 15,820 acres that would result in loss or degradation of areas designated as high-value habitat for Colorado River cutthroat trout.	1. Prior to implementing any ground-disturbing activity or other project component in areas designated as high-value habitat for Colorado River cutthroat trout, the proponent must provide an assessment of potential impacts if any, to this resource value. The assessment will be based on current baseline data, collected by the proponent as approved by the BLM; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. 2. Ground-disturbing activity may be permitted if the BLM determines, following consultation with CPW, that the requested activity would not impair values associated with maintenance of the species of interest. In making this determination, the BLM will consider the following resource factors: habitat conditions needed for feeding, spawning, survival of eggs and larvae, and refugia during high or low flow. Impairment could include siltation of substrate; changes in flow regime (e.g., localized damming); loss of overhanging vegetation canopy; reduction in bank stability; reduction in water quality; and direct mortality of trout or trout eggs; behavioral and ecological relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species of interest or cause habitat to become unusable. Approval of ground-disturbing activities granted in

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	any given year will not constitute approval for subsequent years; in such cases, approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that: (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 3. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 4. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-23: Riparian and Wetland Habitat, 490 acres	
Stipulation	**Standards**
NSO to protect approximately 490 acres of riparian or wetland vegetation. Ground-disturbing activities including oil and gas facilities, roads, pipelines, electric transmission lines, communication facilities, and other sources of surface disturbance are limited to areas beyond the outer edge of riparian or wetland vegetation.	1. A ground-disturbing activity may be permitted only if BLM determines that (a) the activity will not cause loss of riparian vegetation or, if riparian vegetation is lost, that the loss is limited to no more than 0.1 acre, and 100 linear feet, per mile of stream; (b) any temporarily disturbed areas must be revegetated with existing or similar species, including use of containerized nursery stock rather than seeds to replace woody plants on a one-to-one basis (trees) or area-for-area basis (shrubs); (c) revegetation success will be achieved within 2 years; (d) the activity will not impair water quality, flow regime, aquatic habitat quality, and channel and bank stability; and

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	(e) no practicable alternative is available. Resource factors include topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or enhancement of the resource values. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; in such instances approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-30: I-70 Viewshed (VRM Class II), 13,770 acres	
Stipulation	**Standards**
NSO to protect 13,770 acres of the Visual Resource Management (VRM) Class II, Interstate (I)-70 viewshed. No ground-disturbing activities on slopes steeper than 30 percent with high visual sensitivity in the I-70 viewshed. These are lands within 5 miles of the highway, of moderate to high visual exposure, where details of vegetation and landform are readily discernible, and changes in contrast can be easily noticed by the casual observer on I-70.	1. A ground-disturbing activity may be permitted if the BLM determines that the requested activity would not impair values associated with VRM Class II objectives or degrade the visual characteristics of the viewshed below Class II standards. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the

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	type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-31: East Fork Falls Viewshed (VRM Class I), 1,620 acres	
Stipulation	**Standards**
NSO to protect East Fork Falls Viewshed (VRM Class II).	1. A ground-disturbing activity may be permitted if the BLM determines that the requested activity would not impair values associated with VRM Class II objectives or degrade the visual characteristics of the viewshed below Class II standards. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential

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	adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-21: Anvil Points Claystone Cave, 120 acres	
Stipulation	**Standards**
NSO to protect 120 acres encompassing the Anvil Points Claystone Cave. No ground disturbing activities in the area encompassing the cave opening, subsurface features, and watersheds overlying the caves.	1. Prior to implementing any ground-disturbing activity or other project component in the area covered by this stipulation, the proponent must provide an assessment of potential impacts to this resource value. The assessment will be based on current baseline data; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. 2. A ground-disturbing activity may be permitted only if the BLM determines that a proposed activity would not impair the cave values, supported by a demonstration of such, based on monitoring data or another method with a high degree of scientific reliability, and considering the type, amount, duration, and timing of the activity; and after consultation with CPW regarding wildlife habitat values.

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	3. During and subsequent to the ground-disturbing activities covered by this provision, ongoing monitoring data will be collected using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified; and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 4. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-29: Colorado River Corridor, 440 acres	
Stipulation	**Standards**
NSO to protect approximately 440 acres of high-quality habitat and wildlife areas, water quality benefits, and scenic qualities along the Colorado River. No ground-disturbing activities within 0.5 mile of high-water mark on either side of river.	1. A specific activity may be allowed if the BLM determines that (a) the specific activity or requested change would not impair water quality, high-quality habitat, and scenic qualities after considering the vegetation, topography, existing habitat impacts, and other site-specific or activity-specific factors and the amount, type, and duration of surface disturbance proposed, and (b) any lost vegetation would be replaced with the same or similar species within 3 to 5 years. 2. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-NSO-Roan-32: Anvil Points Spent Shale Repositories, 10 acres	
Stipulation	**Standards**
Prohibit surface occupancy and surface-disturbing activities for spent shale repositories.	1. Propose revocation of the current oil shale withdrawal affecting the transferred lands, but maintain withdrawal on Anvil Points Facility Repositories 1 and 2 to limit mineral development and for consistency with perpetual ROW on repositories”

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	2. Propose revocation of the current Oil Shale Withdrawal affecting the transferred lands, but retain Oil Shale Withdrawal for Anvil Points Facility Repositories 1 and 2. 3. Retain BLM ROWs on Anvil Points Facility Repositories 1, 2, and 3.
GRSG-NSO-46e1: *NSO within 2 miles of active GRSG leks, in GRSG ADH, no exceptions anticipated*	
Stipulation incorporates stipulation NSO-46e(1) from the NCGSG Proposed LUPA/FEIS by reference	
GRSG-NSO-46e2: *Exceptions, modifications, and waivers on the remainder of PHMA. Authorized Officer could grant and exception or modification in consultations with the State of Colorado.*	
Stipulation incorporates stipulation NSO-46e(2) from the NCGSG Proposed LUPA/FEIS by reference	
Controlled Surface Use (CSU) Stipulations	
CRVFO-CSU-Roan-12: Habitat for Special Status Plant Species Populations and Significant Plant Communities, 17,840 acres	
Stipulation	**Standards**
CSU to protect approximately 17,840 acres of special status plant species or significant plant communities. The BLM may require special design, construction, operation, mitigation, or reclamation measures, and/or relocation by more than 200 meters for any ground-disturbing activities, electric transmission lines, and other sources for disturbance within a watershed that would disturb, alter, or interrupt the hydrologic or ecological processes that support special status plant species or significant plant communities. Special status plants include the following: DeBeque milkvetch (*Astragalus debequaeus*), DeBeque phacelia (*Phacelia submutica*), hanging garden sullivantia (*Sullivantia hapemanii*), Parachute penstemon (*Penstemon debilis*), Piceance bladderpod (*Lesquerella parviflora*), Roan Cliffs blazingstar (*Mentzelia rhizomata*), sun-loving meadowrue *(Thalictrun heliophilum*), and Utah fescue (*Argillochloa dasyclada*).	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. If the BLM determines that a proposed surface-disturbing activity will unacceptably impair resource values associated with species health and ecological function of associated habitat, the BLM will modify or relocate the proposed activity. In making this determination, the BLM will consider the status of the population; ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of the population or community; the effects on both individuals of the species and populations; the relationship to topography and other vegetation; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or community. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or nonimpairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are

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	noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I
CRVFO-CSU-Roan-07: Riparian and Wetland Habitat, 11,440 acres	
Stipulation	**Standards**
CSU to protect 11,440 acres of riparian and wetland habitat. The BLM may require special design, construction, operation, mitigation, or reclamation measures, and/or relocation by more than 200 meters for any ground-disturbing activities, electric transmission lines, and other sources of disturbance within 500 feet of riparian or wetland vegetation to protect the values and functions of these areas. Measures required will be based on the nature, extent, and value of the area potentially affected.	1. The BLM will consider the following resource factors: proper hydrological and ecological functioning; protection of habitat supporting fish and wildlife resources; ecological requirements to maintain the riparian area; the type, amount, and duration of the surface disturbance; the relative extent and condition of the riparian area; the relationship to topography and surrounding vegetation; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or condition of the riparian area. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
	which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-CSU-Roan-08: Peregrine Falcon Cliff Nesting Complex, 370 acres	
Stipulation	**Standards**
CSU to protect approximately 370 acres of peregrine falcon cliff nesting complex. Ground-disturbing activities may be relocated outside of the cliff-nesting complex along the Roan Cliffs.	1. A site-specific ground-disturbing activity may be allowed within the CSU only if, following consultation with CPW, the BLM determines that the specific activity or requested change would not impair behaviors, habitat use and quality, and reproductive success of the peregrine falcon present within the area. In making this determination, the BLM will consider the status of the nest (active or inactive); behavioral and ecological requirements of the species; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; in such cases approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
CRVFO-CSU-Roan-09: Wildlife Security Areas Above the Rim, 11,410 acres	
Stipulation	**Standards**
CSU to protect important wildlife security areas above the rim, especially deer and elk. Ground disturbing activities may be relocated more than 200 meters to avoid approximately 11,410 acres of wildlife security areas above the rim.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines, following consultation with CPW, that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Authorized ground-disturbing activities will be reviewed annually; if needed BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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CRVFO-CSU-Roan-10: Big Game Migration Corridors, 1,560 acres	
Stipulation	**Standards**
CSU to protect contiguity and extent of big game migration corridors. Ground-disturbing activities may be relocated more than 200 meters to avoid approximately 1,560 acres of big game migration corridors.	1. A site-specific ground-disturbing activity may be permitted if BLM determines, following consultation with CPW, that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of big game species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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CRVFO-CSU-Roan-11:Sensitive Bat Species Habitat, 120 acres	
Stipulation	**Standards**
CSU to protect and preserve bat habitat values of the Anvil Points Claystone Cave. Special design, construction, implementation, and/or mitigation measures including relocation of operations by more than 200 meters to protect approximately 120 acres of habitat may be required for those species listed as sensitive by the BLM.	1. If the BLM, in consultation with CPW, determines that a proposed surface disturbing activity will unacceptably impair resource values associated with sensitive bat species habitat, the BLM will modify or relocate the proposed activity. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of sensitive bat species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
CRVFO-CSU-Roan-04: Erosive Soils and Slopes (>30%), 24,300 acres	
Stipulation	**Standards**
CSU for erosive soils with slopes greater than 30 percent. The BLM may require special analysis, design, construction, operation, mitigation, reclamation measures, monitoring, and/or relocation by more than 200 meters to protect the soil resource, minimize impacts to other resources, and ensure reclamation success in the 24,300 acres with highly erosive soils on slopes steeper than 30 percent.	1. Prior to implementing any ground-disturbing activity or other project component in the area covered by this stipulation, the proponent must provide an assessment of potential impacts to this resource value. The assessment will be based on current baseline data; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. The BLM will determine the level of protection available under this stipulation required to preserve soil stability and productivity and minimize adverse impacts from soil erosion. The BLM's determination will be based on site-specific conditions and the type, amount, and duration of the associated impacts. 2. Prior to, during, and subsequent to ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through adaptive management to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. BMPs (Appendix H) and reclamation standards (Appendix I will be used to mitigate soil impacts. 4. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-CSU-Roan-13: Parachute Creek High Value Watershed and Watershed Management Area, 33,010 acres	
Stipulation	**Standards**
CSU to protect 33,010 acres within the Parachute Creek high-value watershed and Watershed Management Area (WMA). Provide resource protections through actions that minimize disturbance and habitat fragmentation, and protect key habitats from disturbance.	1. Prior to exploration and/or lease development within the Planning Area, the operator must submit a Master Development Plan (MDP) identifying projected activity (including well locations, pipelines, and facilities) during the next 2 to 5 years and appropriate monitoring and methodologies to ensure compliance with the BLM identified standards (including limitations on surface disturbance).

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
	2. All oil and gas operations and activities on top of the plateau will be under the control of a single operator; the BLM will directly control and manage the timing, location, and type of all operations by that single operator in accordance with the following decisions: 2.1 Oil and gas development activities (well pads and facilities) will be restricted to six specific development areas along ridge tops on slopes less than 20 percent. Access routes and pipelines will be allowed on slopes less than 50 percent. The least percent slope will be used to the extent practicable. 2.2 Operations, excluding exploration activities, will be staged and sequenced over time from one geographic area to the next with each area being substantially developed prior to moving to the next. 2.3 Surface disturbance associated with development and production activities will be allowed on only one of six development areas at a time; exploratory wells may be drilled in other areas in a non-sequential area-by-area manner sufficient to plan future drilling operations. Activities will be subject to the disturbance limitations identified in Section 2.4. Production (the flow of gas) will be allowed from multiple areas at any one time. Re-entry into existing wells or drilling of new wells will be subject to phasing and sequencing by area. In order to progress from one geographic area to the next, the lessee must first demonstrate and document compliance with the standards associated with the various stipulations and requirements of this plan. 2.4 Total unreclaimed surface disturbance because of exploration, development, and production activities will be limited to 350 acres at any given time with the exceptions as provided below in Section 2.4.2. For purposes of this stipulation, areas will be considered reclaimed only if they meet the requirements of the five-year reclamation standards outlined in Appendix I. 2.4.1 Unreclaimed surface disturbance associated with construction of the following would accrue toward the 1-percent limit: 2.4.1.1. Disturbance associated with well pads above a threshold of 1 acre per pad; 2.4.1.2. Pipelines, whether for oil, gas, or water; 2.4.1.3. Compressors, dehydration units, storage tanks, maintenance buildings, and other surface facilities; 2.4.1.4. Borrow ditches, water diversion structures, and cut/fill slopes on any route used for oil and gas access; and 2.4.1.5. Construction of new routes and realignment, widening, or other improvement of existing routes used for oil and gas access.

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	2.4.2 Unreclaimed surface disturbance associated with the following would not accrue toward the 1-percent limit: 2.4.2.1. The existing driving surface (or improvements to the driving surface) on existing routes designated as open (not to exceed a total of 96 miles atop the plateau); 2.4.2.2. The existing driving surface (or improvements to the driving surface) on existing routes to be designated as administrative use only (not to exceed a total of 47 miles atop the plateau); and 2.4.2.3. Up to one acre per well pad to accommodate unavoidable long-term disturbance associated with production activities at operating wells. 2.5 Five-year interim reclamation standards must be met on 90 percent or more of disturbed lands within any given development area, as determined by the BLM, prior to development operations being allowed in another development area. For purposes of this stipulation, areas will be considered reclaimed only if they meet the requirements of the five-year reclamation standards outlined in Appendix I. 2.6 Drilling pads will be a minimum of approximately 2,640 feet apart, and development and production facilities will be clustered and designed to minimize surface impacts. Where practicable, centralize pads for frac material storage. 2.7 Open and administrative motorized routes will be limited to approximately 191 miles. 2.8 Exceptions will be allowed only where necessary to reduce impacts, such as using a longer route to avoid a sensitive resource or reduce visual impacts and direct habitat loss. 2.9 Innovative reclamation and performance-based monitoring standards will be implemented. 2.10 Roads and natural gas production facilities, pipelines, and staging areas along roadways, will be consolidated to minimize disturbance and associated disruption of wildlife habitat. 2.10.1 To the fullest extent practicable, the use of pipelines and other methods to transport drilling and produced water, as well as fracing and other fluids will be incorporated. 2.10.2 Where practicable, pipelines to remove condensate and gas will be utilized. 2.10.3 Specific roadways and consolidation locations will be approved by the

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	BLM during the MDP process. 2.11 Before any on-the-ground lease operations are considered for approval by the BLM on top of the plateau, lessees will reach formal agreement on one operator to conduct all operations on behalf of all the lessees. All lessees/leases will join a Federal Unitization Agreement, approved by the BLM. The Unitization Agreement will be non-contracting. The agreement will allow the BLM to directly control and manage the timing, location, and type of all operations occurring on the entire top of the plateau. In effect, all of the leases will act administratively as a single lease; the BLM will work with just one operator for the life of all oil and gas operations occurring on top of the plateau. The Federal Unitization Agreement will (among other things) identify the agreed-upon single operator, and provisions on how to allocate the benefits of gas and/or production to all of the leases. 3. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with the WMA, or relocation or modification of such activity is found to be acceptable If the BLM determines that a proposed surface-disturbing activity will unacceptably impair resource values, the BLM will modify or relocate the proposed activity. The BLM will consider the following resource factors: protection of ecological, hydrological, and habitat functions and resources; the type, amount, and duration of the surface disturbance; relationship to naturally occurring conditions; topography; type, location, duration, and intensity of potential adverse effects; mitigation measures to avoid, minimize, or offset any adverse effects; and other factors that may affect the paleontological resource. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity will provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. The BLM will determine what level of protection available under this stipulation is required to protect Colorado River cutthroat trout and habitat, rare and/or significant natural plant communities, and municipal water supply and quality. The BLM's determination would be based on site-specific conditions and the type, amount, and duration of the associated impacts. 4. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. This monitoring may specifically include but not be

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	limited to monitoring of surface and groundwater. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through adaptive management to refine the project components and associated mitigation measures to be applied to future proposed activities. 5. Short-term (reclaimed within two years of initiation) activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-CSU-Roan-14: VRM Class II Areas Below the Rim, 29,560 acres	
Stipulation	**Standards**
CSU to protect approximately 29,560 acres in VRM Class II areas. The BLM may require special design, construction, operation, mitigation, or reclamation measures, or relocation by more than 200 meters in VRM Class II areas below the rim to retain the existing landscape character and allow only limited changes.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with VRM Class II objectives, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Authorized ground disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually or as required by the BLM. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be

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	identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project component. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-CSU-Roan-15: VRM Class III Areas Above the Rim, 32,880 acres	
Stipulation	**Standards**
CSU to protect 32,880 acres of VRM Class III areas on top of the plateau. The BLM may require special design, construction, operation, mitigation, or reclamation measures, or relocation by more than 200 meters in VRM Class III areas.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with VRM Class III objectives, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Authorized ground disturbing activities will be reviewed annually; if needed BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project component.

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	3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-CSU-Roan -16: Hubbard Mesa Open OHV Riding Area, 2,330 acres	
Stipulation	**Standards**
CSU to protect recreation opportunities and settings in the Hubbard Mesa Off-Highway Vehicle (OHV) Riding Area 2,330-acre Special Recreation Management Area (SRMA). The BLM may require special design, construction, operation, mitigation, and reclamation measures, including relocation by more than 200 meters.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values with OHV opportunities within the Hubbard Mesa area, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: existing OHV use; existing OHV riding opportunities; anticipated future use; management of OHV use; type, amount, and duration of the surface disturbance; the relative extent of OHV use and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect OHV riding opportunities. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from

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	which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I
CRVFO-CSU-Roan-18: Sharrard Park Paleontological Resources, 1,020 acres	
Stipulation	**Standards**
CSU to protect 1,020 acres of the Sharrard Park paleontological resource. The BLM may require special survey, design, construction, operation, and reclamation measures, or relocation by more than 200 meters in identified portions of Wasatch Formation outcrops in Sharrard Park. Prior to any ground disturbing activity, the operator must have the paleontological resources surveyed within 200 feet of the proposed disturbance by a BLM approved paleontologist. Other special measures include requirements that (a) on-site personnel are informed of the potential for fossils, (b) the proponent will notify the BLM if any fossils are found, and (c) activities do not disturb fossils in any way.	1. Prior to implementing any ground-disturbing activity or other project component in the area covered by this stipulation, the proponent must provide an assessment of potential impacts to this resource value. The assessment will be based on current baseline data; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. The BLM will determine the level of protection available under this stipulation required to protect, preserve, and/or recover the fossil resources at specific sites or for specific activities within this area. The BLM determination will be based on site specific conditions and the type, amount, and duration of the associated impacts. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through adaptive management to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Timing Limitation (TL) Stipulations	
CRVFO-TL-Roan-13:Big Game Winter Range, 38,430 acres	
Stipulation	**Standards**
TL to protect and maintain physical and biological components important to deer and elk winter range (approximately 38,430 acres) and the obligate species, both on federal lands and across the landscape as a whole, as opportunities present. This includes reducing or eliminating stress induced impacts to deer and elk associated with human activity during critical winter months when animals are already stressed by environmental factors and concentrated on limited winter range. Surface disturbance and human activities that lessen the quality of the deer and elk winter range will not be allowed from December 1 to April 30. Ongoing drilling and other activities and operations will be designed and implemented such that the well bore is adequately secured and that all drilling and surface-disturbing operations cease by December 1 in important and critical deer and elk winter habitats. In the event of unforeseeable and unplanned events, extensions not exceeding two weeks in duration may be authorized to ensure safe shutdown of drilling operations, and conservation of mineral resources. Human activities including visitations for production activities and well monitoring from December 1 to April 30 will be designed and carried out to minimize impacts. This includes well monitoring through telemetry, scheduling of all nonemergency well maintenance activities outside the December 1 to April 30 timeframe, conducting unavoidable and necessary on-the ground visits between the hours of 10:00 a.m. and 3:00 p.m., and minimizing on-the-ground visitations.	1. Site-specific ground-disturbing activity in big game winter range may be allowed between December 1 and April 30 if the BLM determines, following consultation with CPW, that the requested activity would not impair values associated with the quantity and quality of the winter range for the species of interest. In making this determination, the BLM will consider the following resource factors: minimization of the footprint of activities; fragmentation; impacts to winter range across the Planning Area as a whole; effectiveness of voluntary off-site mitigation of habitat with respect to quantity, quality, and duration of both the surface-disturbing activity and mitigation; the relative extent of available winter range; relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the winter range or cause winter range to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; in such cases approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. The big game winter range TL may not apply, and the restriction may be considered to be met, if the BLM determines, following consultation with CPW, that animals are not using the habitat, are not likely to use the habitat in a particular season, and that activities will not lessen overall habitat quality in future years. 3. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
CRVFO-TL-Roan-14: Raptor Nest Sites, 3,550 acres	
Stipulation	**Standards**
TL to protect approximately 3,550 acres of nesting and fledging habitat for raptors not protected by species-specific measures. This includes owls, northern harriers, accipiters, buteos, golden eagle, osprey, and falcons except the American kestrel. Within a 0.25-mile radius of a nest, no activities or other sources of disturbance with the potential to cause the nest not to be used or lead to nest failure, abandonment, or mortality of fledglings will be allowed. Stipulations will be applied annually from February 1 through August 15.	1. Site-specific ground-disturbing activity near active raptor nest sites may be allowed between February 1 and August 15 if the BLM determines, following consultation with CPW that the requested activity would not impair values, behaviors, or habitat associated with nesting and fledging. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; potential to cause the nest not to be used or lead to nest failure, abandonment of the nest, or mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.
CRVFO-TL-Roan-15: Bald Eagle Nest or Winter Roost Sites, 510 acres	
Stipulation	**Standards**
TL to protect approximately 510 acres of nesting, fledging, and winter roost habitat of the bald eagle. Within a 0.5-mile radius of a nest, no activities or other sources of disturbance that could cause the nest not to be used or lead to nest abandonment, failure, or mortality of fledglings will be allowed. Stipulations will	1. Site-specific ground-disturbing activity at bald eagle nests or winter roost sites may be allowed between November15 and June 15 if the BLM determines, following Section 7 consultation with the USFWS that the requested activity would not impair values associated with maintenance or recovery of the species; behaviors associated with winter roosting, nesting, and

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
be applied annually from November 15 through June 15.	fledging; or fledging habitat. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; the status of the nest (active or inactive); the type, intensity, and duration of disturbance; measures required by the USFWS; potential for the activity to cause the roost or nest not to be used; potential for nest failure, abandonment of the roost or nest, or mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect roosting or nesting success. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. This TL will be applied to wells that are drilled directionally from private surface into Federal minerals for the Federal lease being developed. Where the Federal lease does not include a relevant TL stipulation (and a nest or roost site falls within the identified buffer), BLM would not approve any permits for Federal wells or grant a right-of-way across BLM land unless the proponent has agreed to a voluntary TL (allowing a determination of “No Effect”) or until Section 7 consultation on proposed action has been completed and any associated terms and conditions agreed to by the proponent. 3. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
CRVFO-TL-Roan-16: Peregrine Falcon Cliff Nesting Complex, 920 acres	
Stipulation	**Standards**
TL to protect approximately 920 acres of nesting and fledging habitat of the State-listed threatened peregrine falcon. Within a 0.5-mile radius of the cliff-nesting complex on the Roan Cliffs, no activities or other sources of disturbance that could cause abandonment of a nest or established territory will be allowed. Stipulations will be applied annually, from March 15 through July 31.	1. Site-specific ground-disturbing activity at the peregrine falcon cliff-nesting complex may be allowed between March 15 and July 31 if the BLM determines, following consultation with CPW that the requested activity would not impair values, behaviors, or habitat associated with nesting and fledging. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; the status of the nest (active or inactive); potential to cause the nest not to be used or lead to nest failure, abandonment of the nest, or mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.
CRVFO-TL-Roan-17: Waterfowl and Shorebird Nesting Areas, 90 acres	
Stipulation	**Standards**
TL to protect approximately 90 acres of nesting and brood-rearing habitats at the Fravert Reservoir Watchable Wildlife Area. No ground-disturbing activities or other sources of disturbance, from April 15 through July 15, or until all young have hatched and dispersed from the production area, or that could cause	1. Site-specific ground-disturbing activity at the Fravert Reservoir Watchable Wildlife Area may be allowed between April 15 and July 15 if the BLM determines, following consultation with CPW that the requested activity would not impair values, behaviors, or habitat associated with nesting and fledging. In

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
waterfowl and shorebirds not to nest or lead to nest failure or abandonment within 0.25- mile of the nesting and production area of Fravert Reservoir will be allowed.	making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; the status of the nest (active or inactive); hatching and dispersal of young from the production or nesting area; potential to cause the nest not to be used or lead to nest failure, abandonment of the nest, or mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.
GRSG-TL-46e: *No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood rearing (March 1- July 15).*	
Stipulation incorporates stipulation GRSG-TL-46e from the NCGSG Proposed LUPA/FEIS by reference.	
GRSG-TL-PHMAPHMA-ROW-TL: *Prohibit surface occupancy and surface disturbing activities associated with BLM ROW permits within 4 miles from active leks during lekking, nesting, and early brood rearing (March 1- July 15).*	
Stipulation incorporates stipulation GRSG-TL-PHMA-ROW-TL from the NCGSG Proposed LUPA/FEIS by reference.	

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
CRVO-TL- Roan 1: Migratory Bird Nesting Season	
Stipulation: Prohibit surface occupancy and surface-disturbing activities from May 15 to July 15. The stipulation would be applied based on biological surveys and species habitat preferences. **Purpose:** To protect use of nesting and fledgling habitat for birds of conservation concern (BCC). **Exception:** Standard exceptions apply. The application of the timing limitation would consider: the type of equipment to be used, the scale, and the duration of the project; species potentially present; habitat types present; breeding phenology; weather conditions; elevation; distance to known nests; and terrain.. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.	
CRVO-TL- Roan 2: Elk Production Area, 24,400 acres	
Stipulation: Prohibit surface occupancy and surface disturbing activities from April 15 to June 30 in mapped elk production areas to reduce behavioral disruption during parturition and early young rearing period. This stipulation does not apply to operation and maintenance of production facilities. **Exception:** The Field Manager may grant an exception if an environmental analysis indicates that the proposed action can be conditioned so as not to interfere with habitat function or compromise animal condition within the project vicinity. An exception may also be granted if the proponent, Bureau of Land Management, and Colorado Division of Wildlife negotiate compensation that would satisfactorily offset anticipated impacts to big game production or habitat condition, or an agreement can be reached where by a COGCC wildlife mitigation plan can be accommodated consistent with established RMP objectives and decisions. An exception may also be granted for actions intended to enhance the long term utility for availability of suitable habitat. **Modification:** The Field Manager may modify the size and time frames of this stipulation if Colorado Division of Wildlife monitoring information indicates that current animal use patterns are inconsistent with dates established for animal occupation. **Waiver:** This stipulation may be waived if Colorado Division of Wildlife determines that the area is no longer utilized by big game for production purposes.	
Lease Notices (LN) Stipulations	
CRVFO-LN-Roan-14: Master Development Plan (MDP)	
Stipulation	**Standards**
A MDP will be required of oil and gas operators prior to exploration or development activities.	1. For all activities in each of the geographic areas atop the plateau (see Map 1), and in areas being actively explored or developed below the rim, the operator must submit a MDP. The MDP must include all anticipated activities for a minimum of 2 years following the date of submission, for all operator-controlled federal leases or units. A longer term is encouraged and would be allowed under this standard to expedite the permitting process, provide for efficiencies as provided for in Standard 6 of this stipulation, and reduce costs to the operator for MDP preparation. 2. The boundaries of the geographic areas to be addressed atop the plateau, as identified by the BLM, may be modified with approval from the BLM. The

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
	boundaries of all other geographic areas must be proposed by the operator and must be approved by the BLM. 3. The MDP must identify all anticipated exploration, development, and production activities on federal leases within the area, identifying well locations, roads, pipelines, and any other exploration or production disturbance or facilities. 4. The MDP must include all specific measures needed to comply with standards associated with all stipulations and any other decisions of this RMPA. 5. The MDP must include an analysis of site-specific and cumulative environmental effects and mitigation. The MDP must also address reasonable alternatives, and other information sufficient to satisfy the requirements of the National Environmental Policy Act (NEPA). The extent of the analysis will be dependent on the extent of surface ownership, extent of lease holdings, topography, access, resource concerns, and the ability to tier to the Roan Plateau Environmental Impact Statement (EIS), consistent with 40 CFR § 1500. The extent of the analysis needed to comply with 40 CFR § 1500 may appropriately vary when considering individual wells or small groups of exploratory wells or for directional wells drilled on previously developed wellpads. 6. To the extent practicable, the activities identified in the MDPP must be presented in such a manner as to support the orderly and efficient exploration and development of mineral resources in an environmentally responsible manner. 7. MDPs may be modified by operators as needed, and shall be reviewed by the operators not less than annually. As appropriate, either a statement documenting that the MDP is current or a modified MDP shall be provided to the BLM.
CRVFO-LN-Roan-34: ESA Consultation	
Stipulation	**Standards**
Endangered Species Act, Section 7 Consultation Stipulation.	1. The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not

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Appendix Table C-2. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative II, FEIS Proposed Plan	
	approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended, 16 USC § 1531 et seq., including completion of any required procedure for conference or consultation.
GRSG PHMA LN-46e: *Any lands leased in PHMA are subject to the restrictions of 1 disturbance per 640 acres calculated by CO management zone to allow clustered development.*	
Stipulation incorporates stipulation NSO-46e(1) from the NCGSG Proposed LUPA/FEIS by reference	
GRSG PHMA LN -54e: *Within PHMA, operators would be encouraged to complete Master Development Plans in consultation with the State of Colorado, instead of single well Applications for Permit to Drill for all exploratory wells.*	
Stipulation incorporates stipulation NSO-46e(1) from the NCGSG Proposed LUPA/FEIS by reference	
CRVFO-LN-Roan-35: Emergency Response Plan	
The operator is required to prepare and maintain a current emergency response plan. The plan shall be provided to the BLM, Colorado State Patrol, the affected county and communities, and the general public. The plan shall contain information sufficient to describe the potential for emergency incidents related to fluid minerals development that pose an immediate danger to human health and safety and would normally require immediate actions by the operator to remove the threat, such as for hazardous materials spills; actions to be taken by the operator in the event of such an incident; and a communications plan to inform appropriate authorities and potentially affected citizens.	

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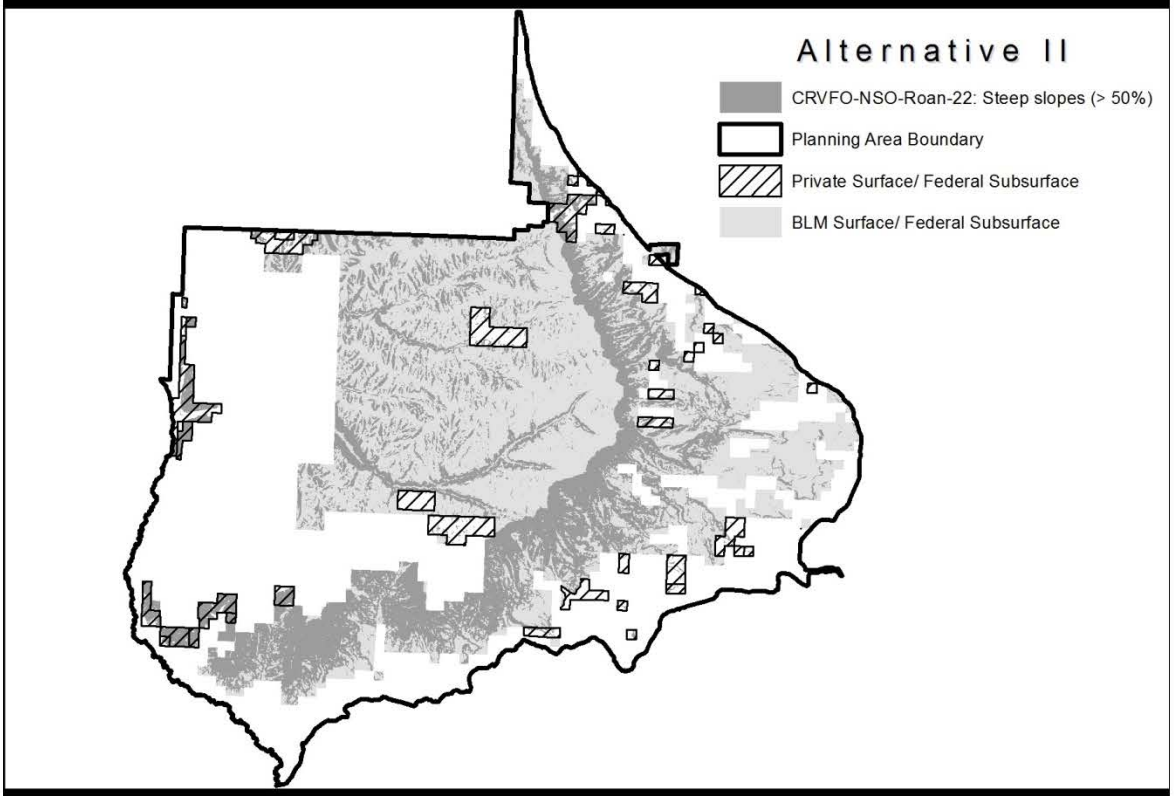
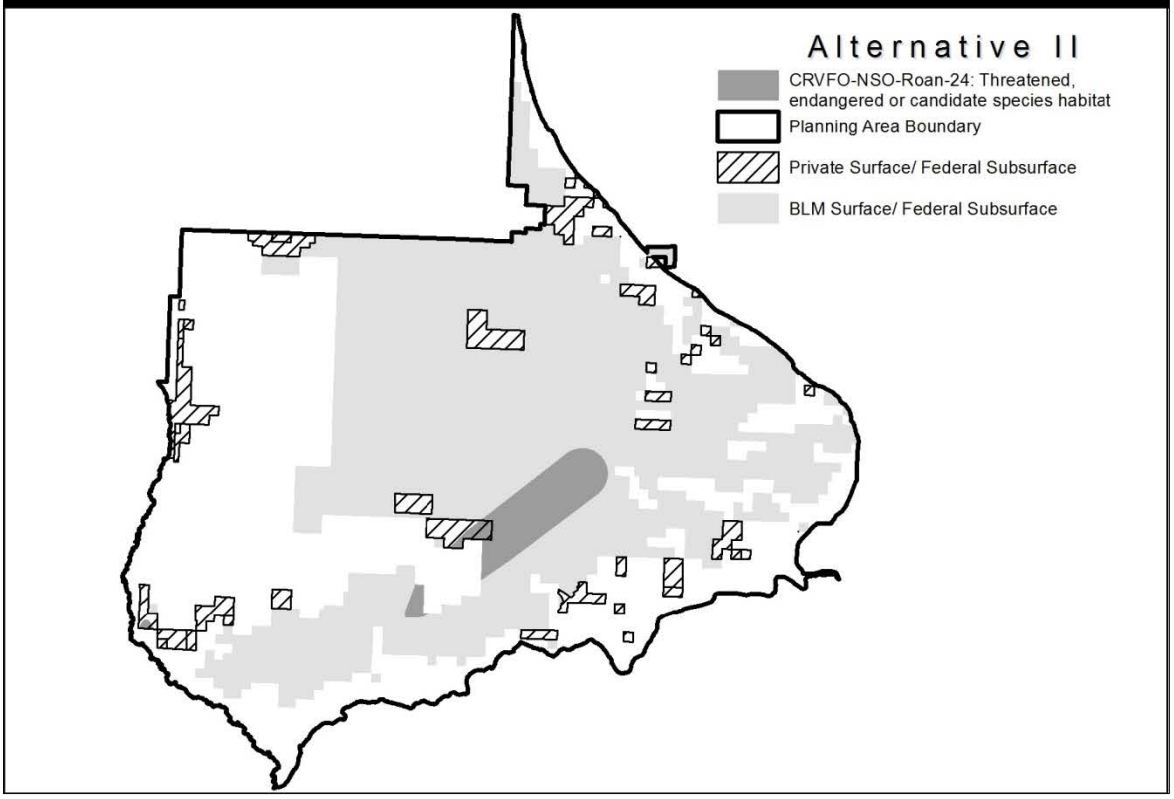
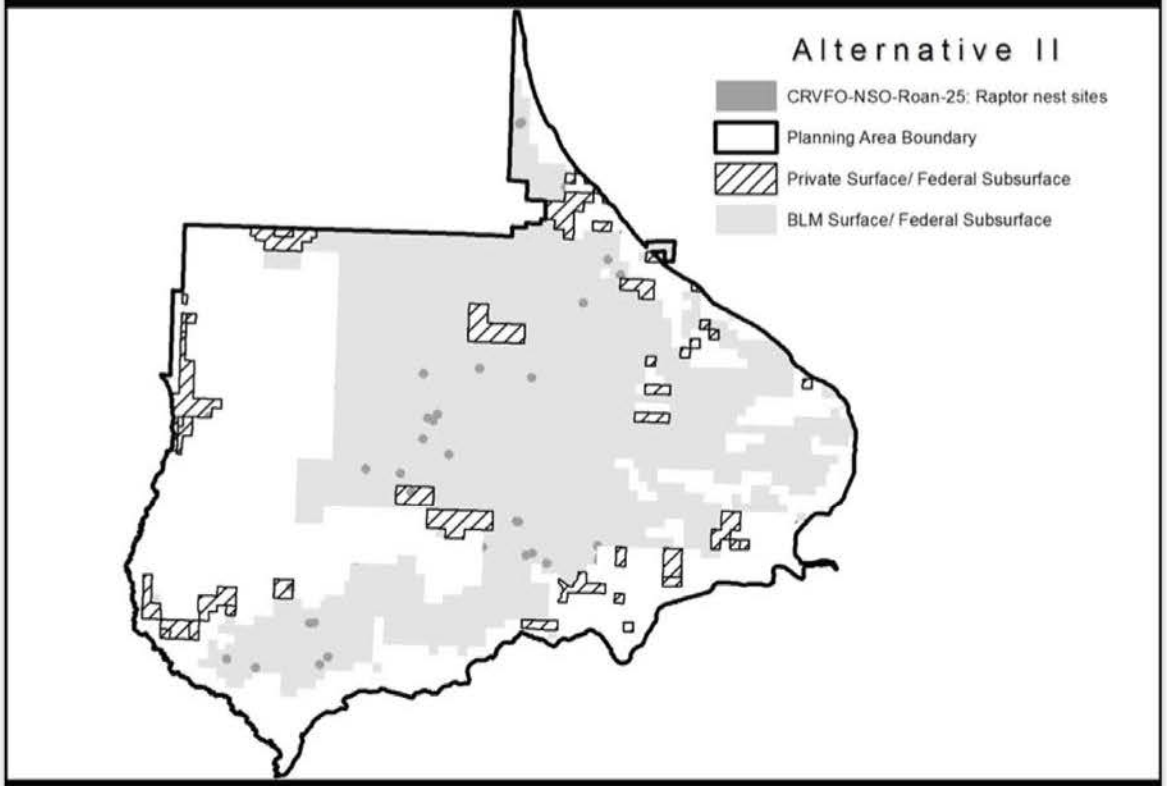
CRVFO-NSO-Roan-22: Steep Slopes (> 50%)



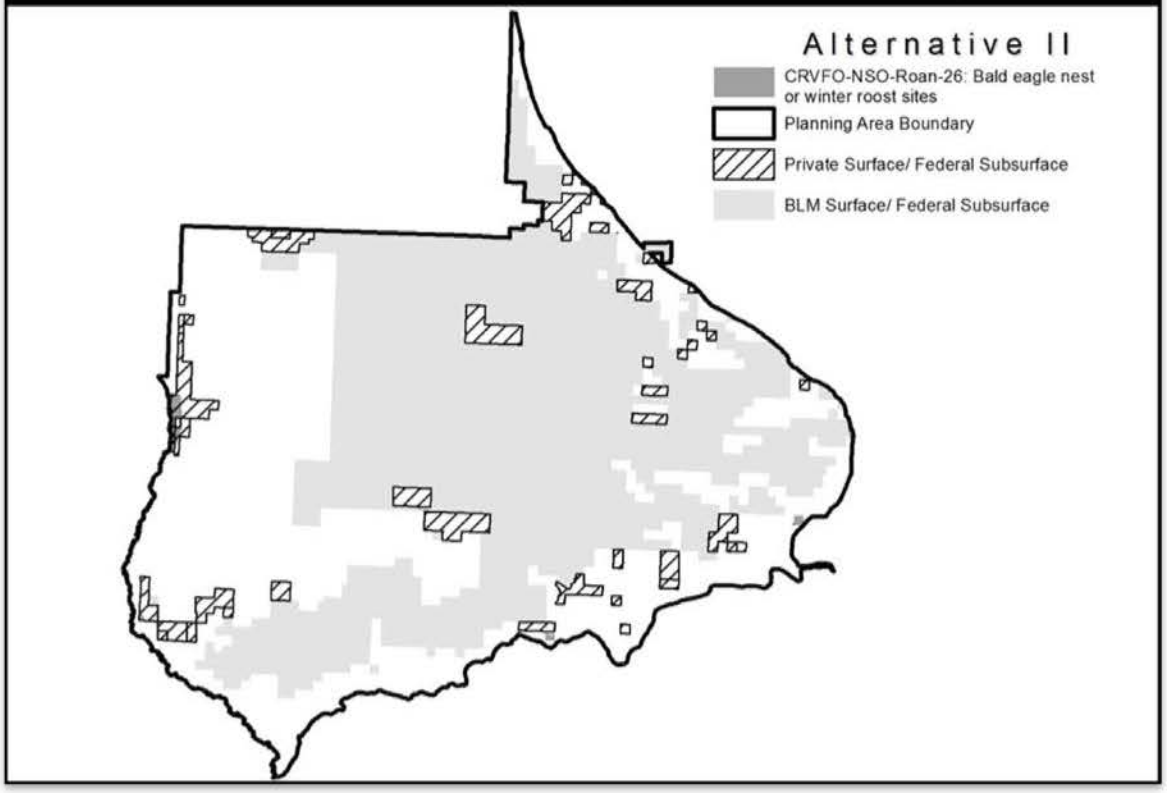
CRVFO-NSO-Roan-24: Threatened, endangered or candidate species habitat



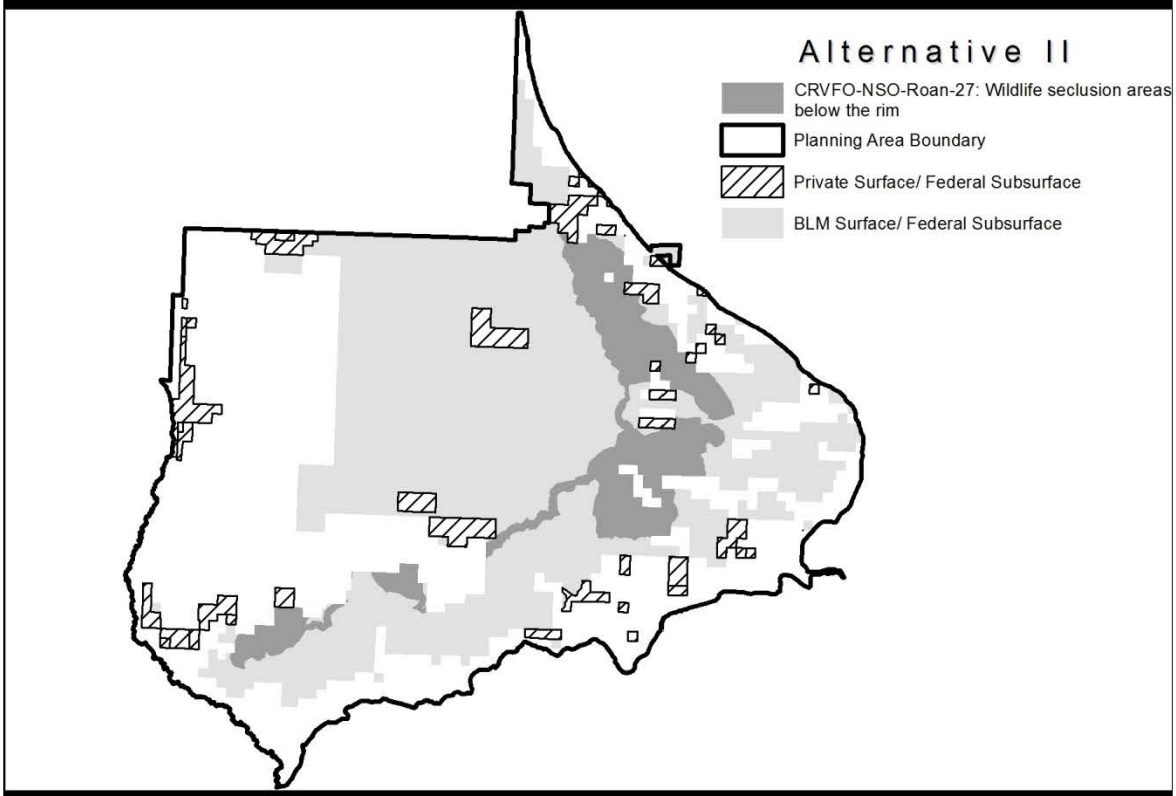
CRVFO-NSO-Roan-25: Raptor Nest Sites



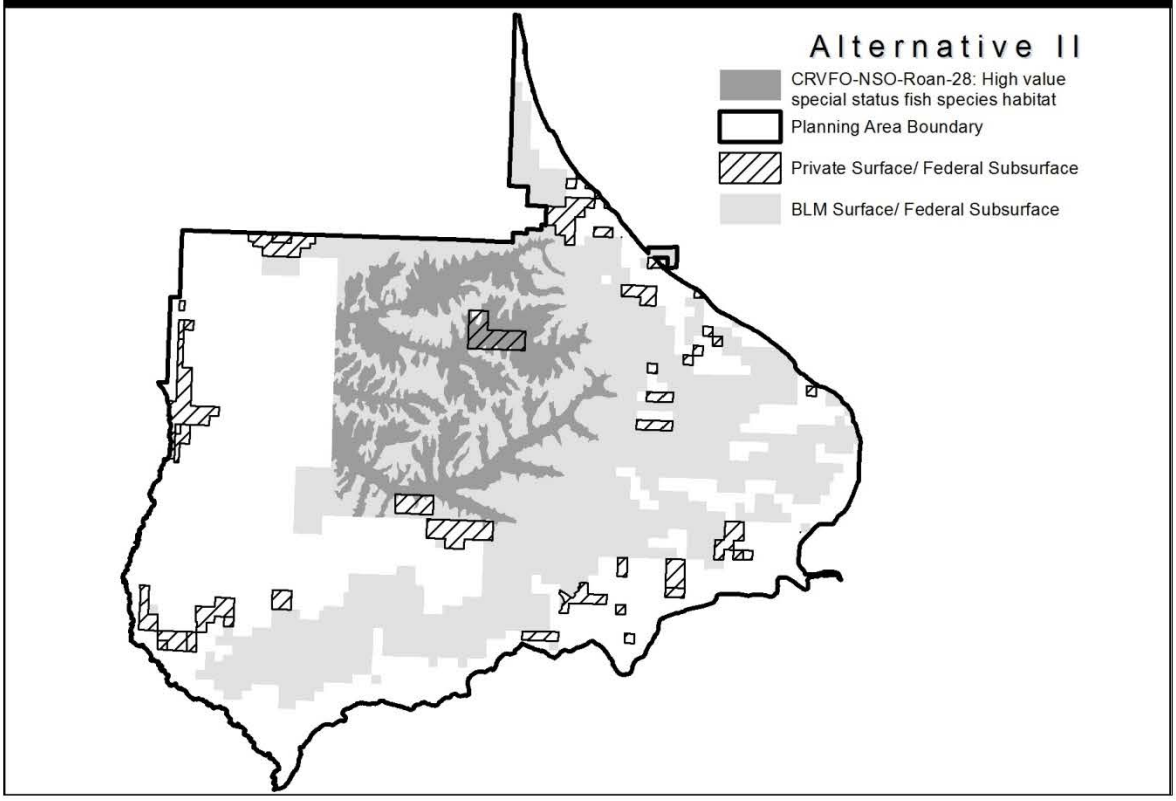
CRVFO-NSO-Roan-26: Bald Eagle Nest or Winter Roost Sites



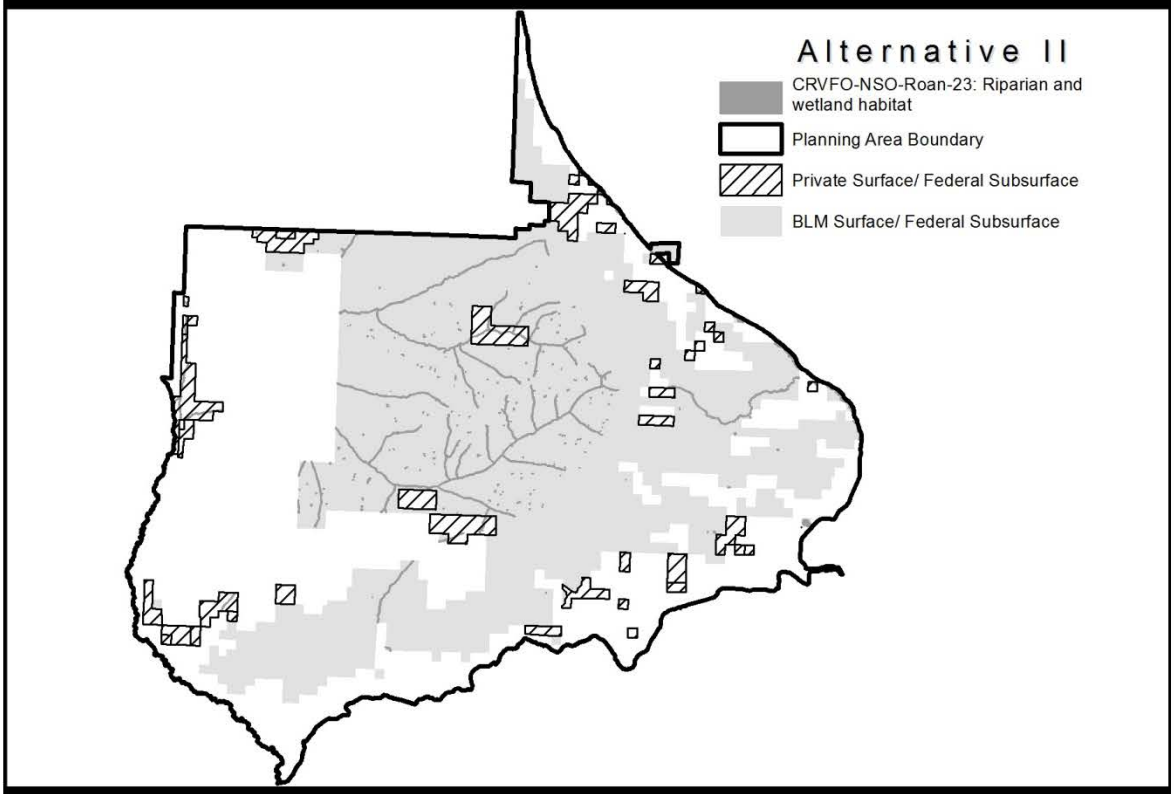
CRVFO-NSO-Roan-27: Wildlife seclusion areas below the rim



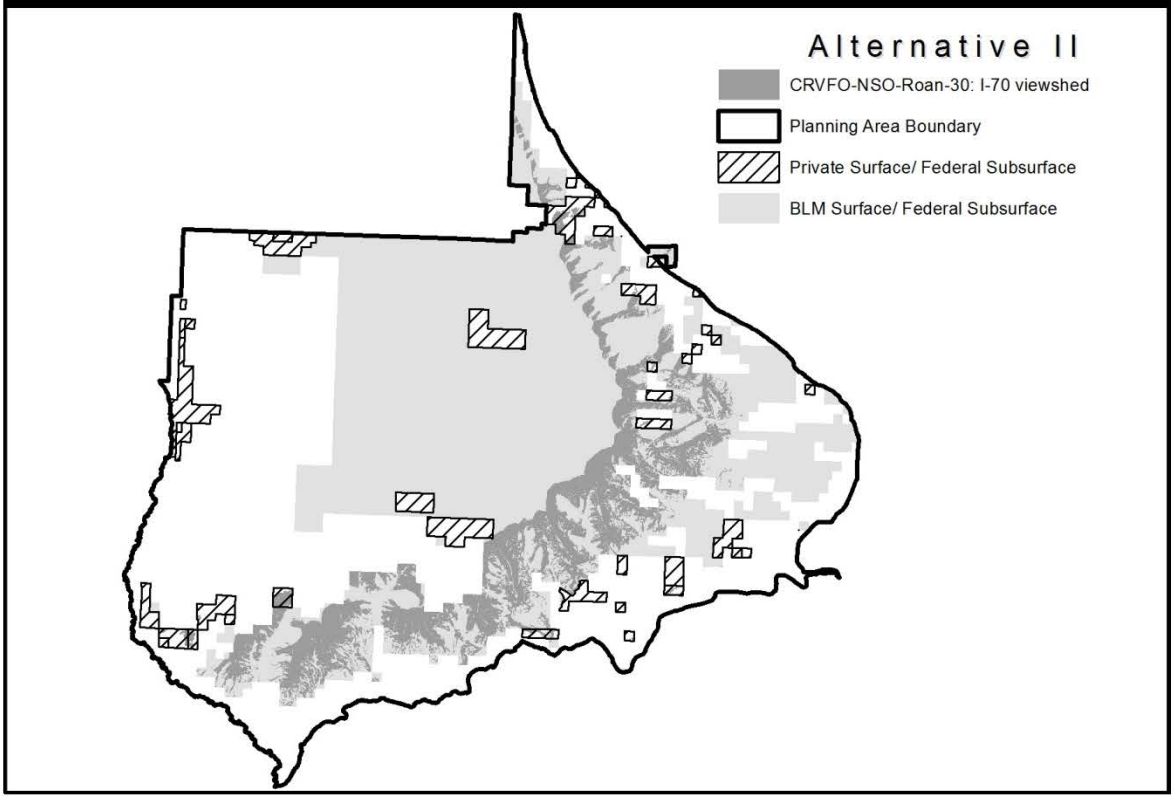
CRVFO-NSO-Roan-28: High value special status fish species habitat



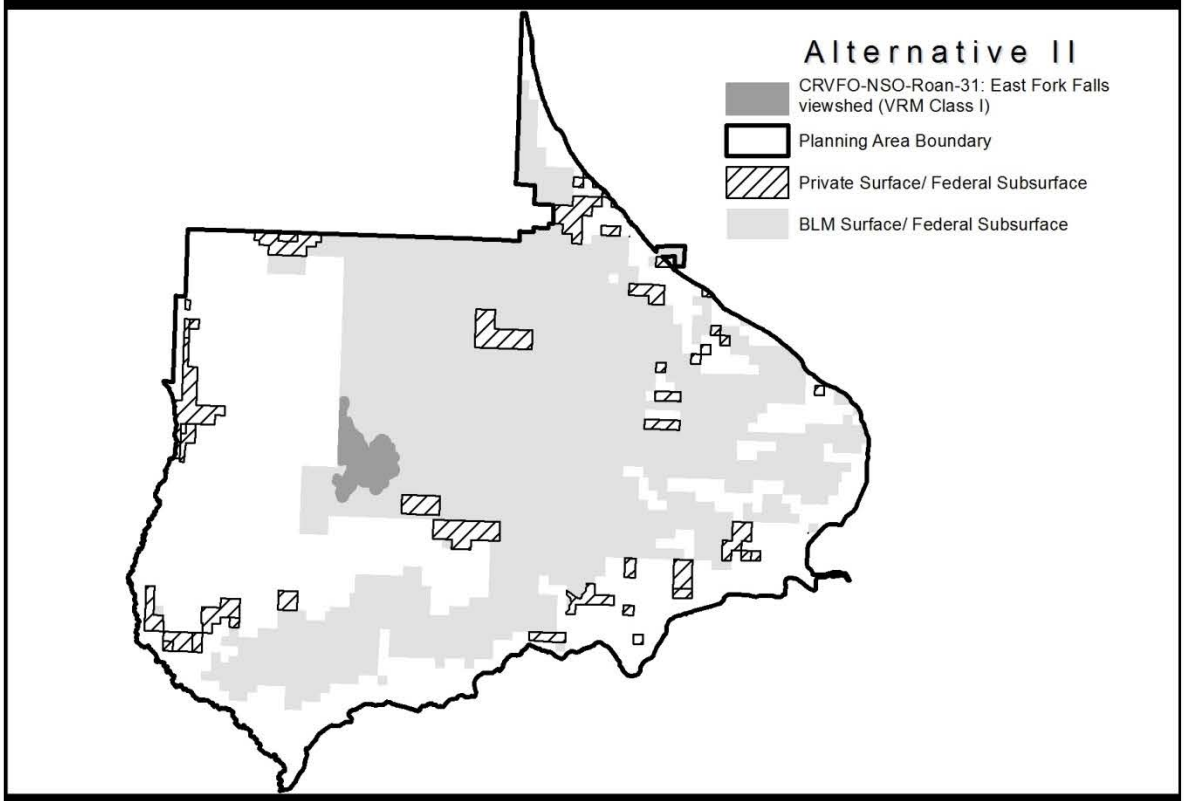
CRVFO-NSO-Roan-23: Riparian and wetland habitat



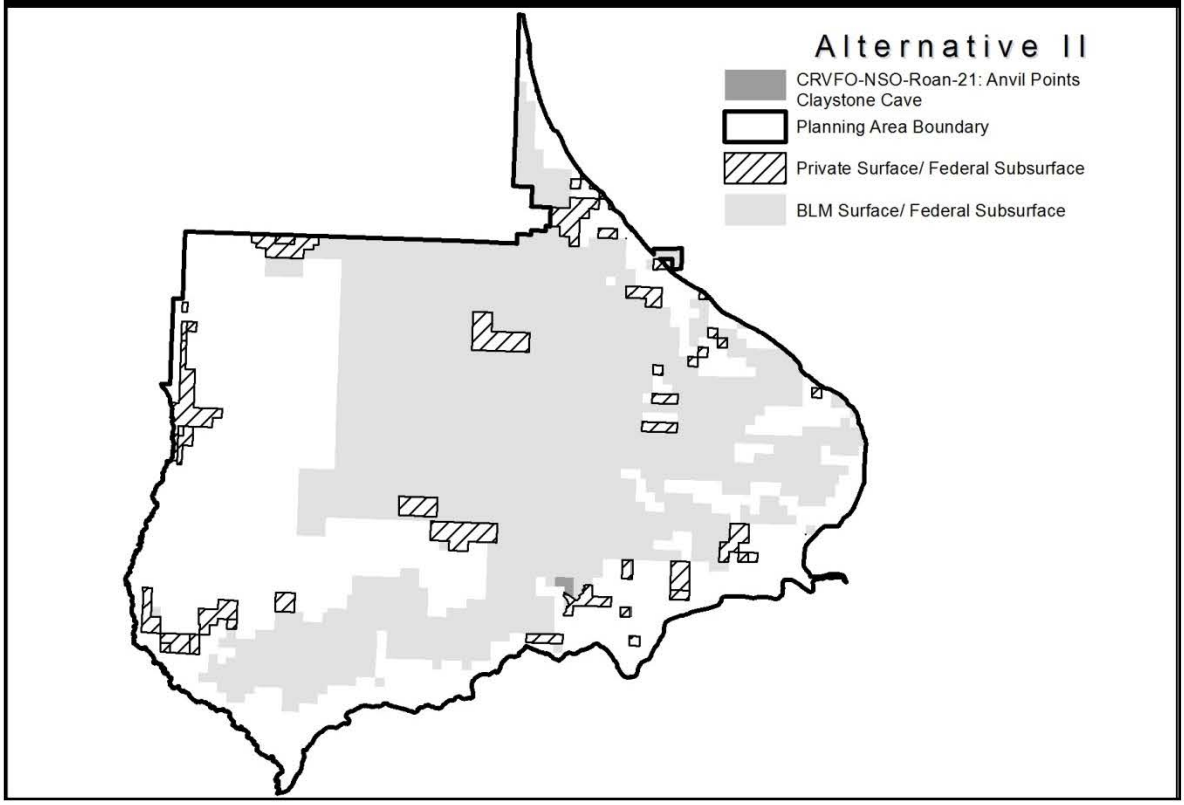
CRVFO-NSO-Roan-30: I-70 Viewshed (VRM Class II)

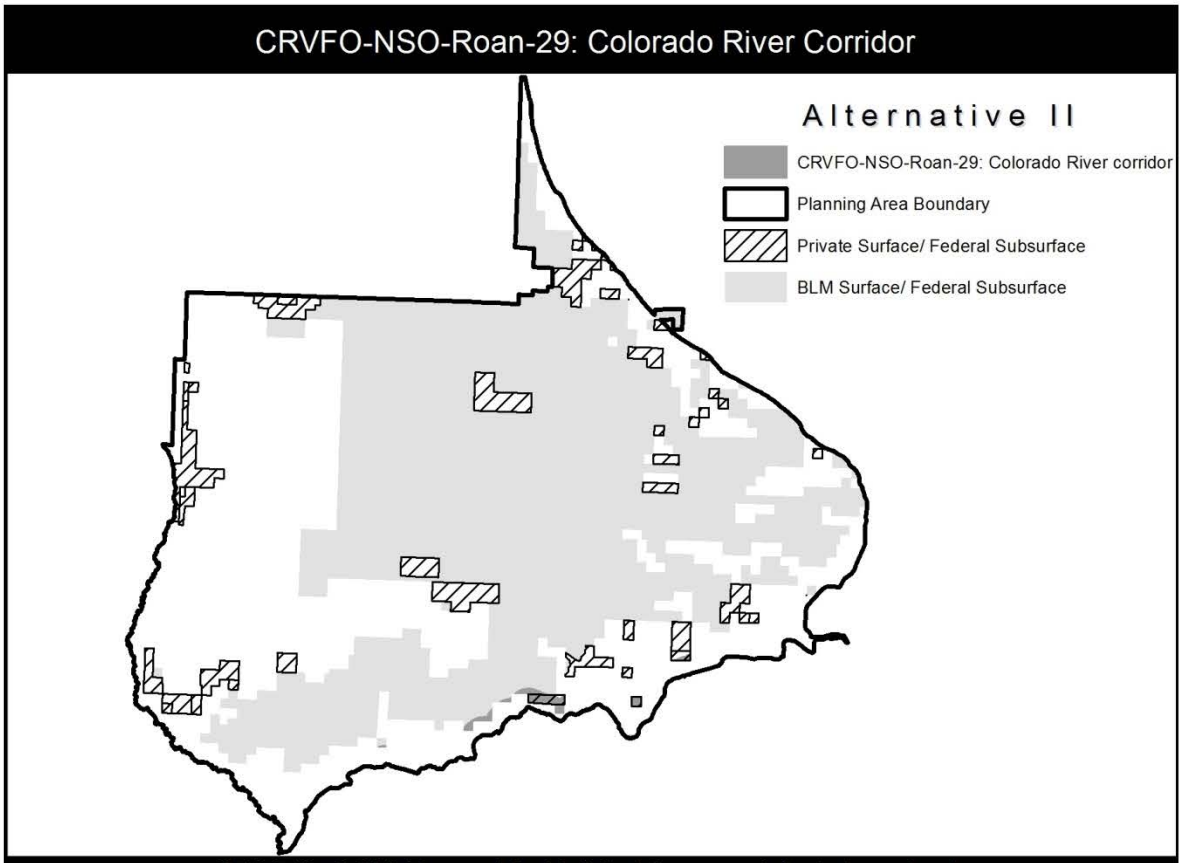


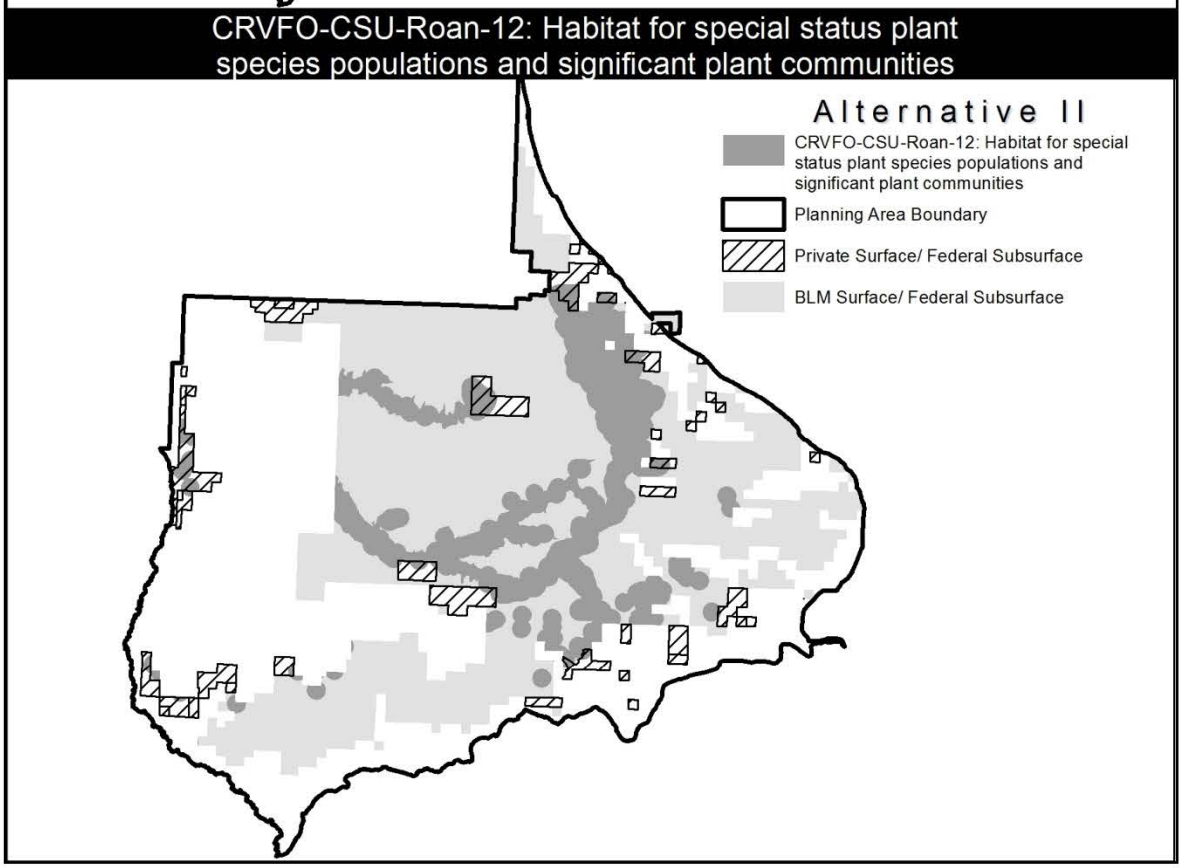
CRVFO-NSO-Roan-31: East Fork Falls Viewshed (VRM Class I)



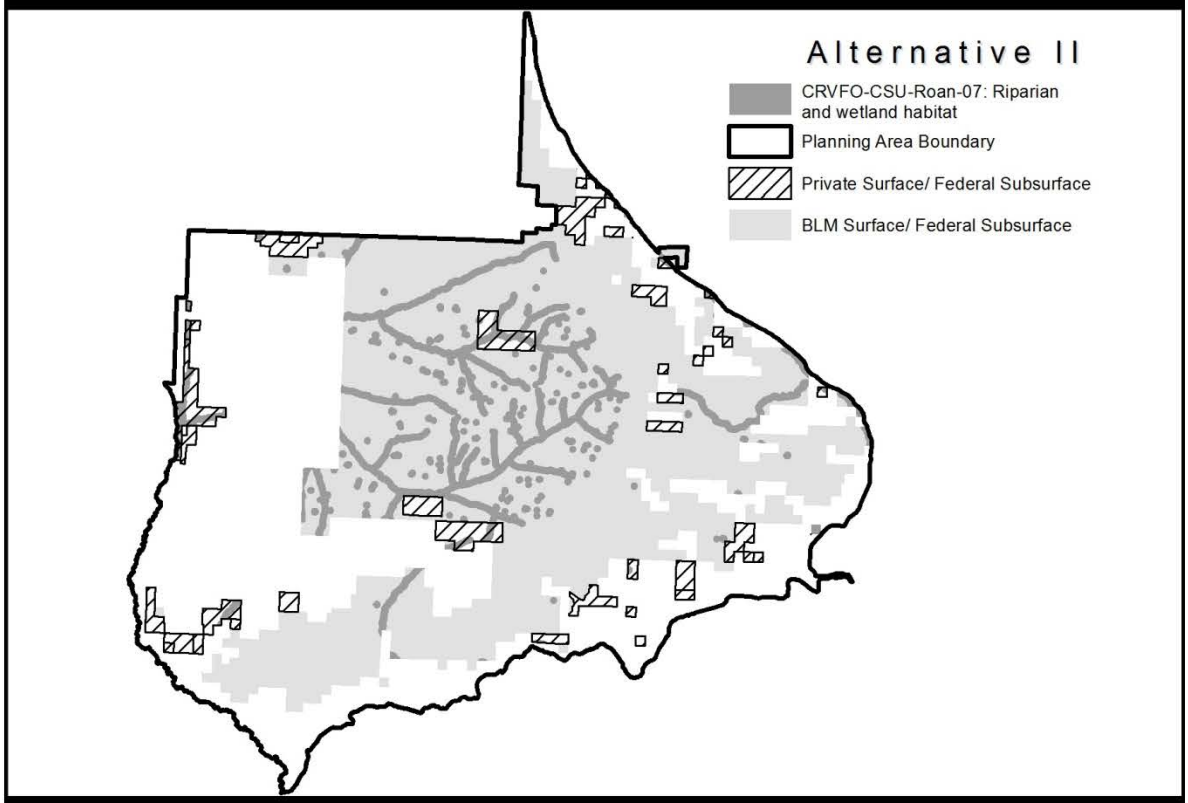
CRVFO-NSO-Roan-21: Anvil Points Claystone Cave



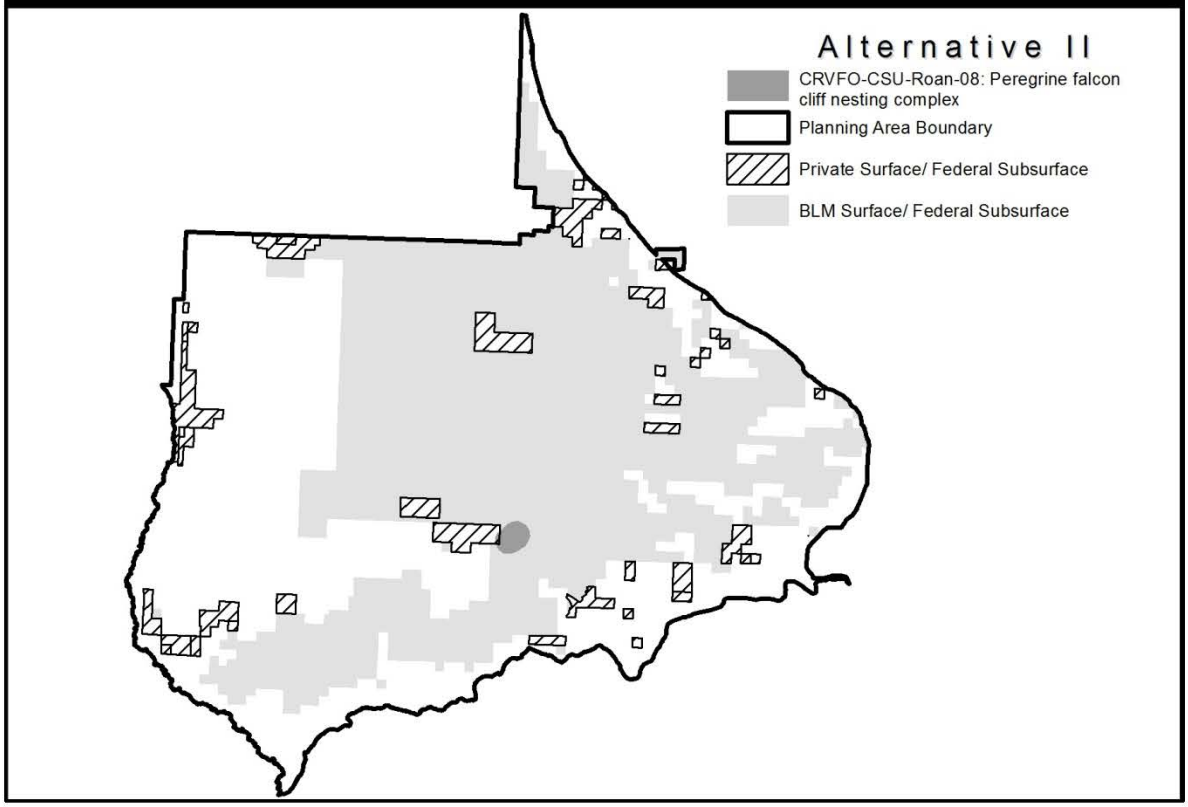

CRVFO-NSO-Roan-29: Colorado River Corridor
Alternative II
CRVFO-NSO-Roan-29: Colorado River corridor
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


CRVFO-CSU-Roan-12: Habitat for special status plant species populations and significant plant communities
Alternative II
CRVFO-CSU-Roan-12: Habitat for special status plant species populations and significant plant communities
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

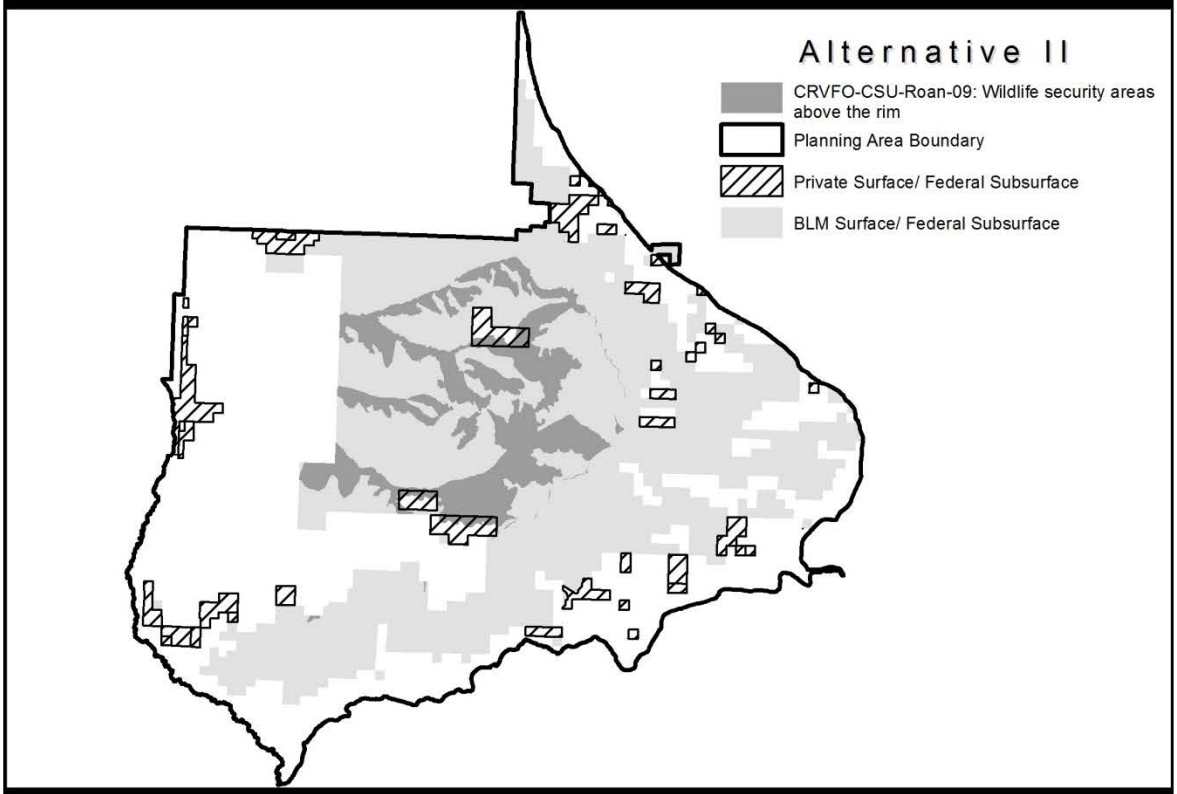
CRVFO-CSU-Roan-07: Riparian and Wetland Habitat



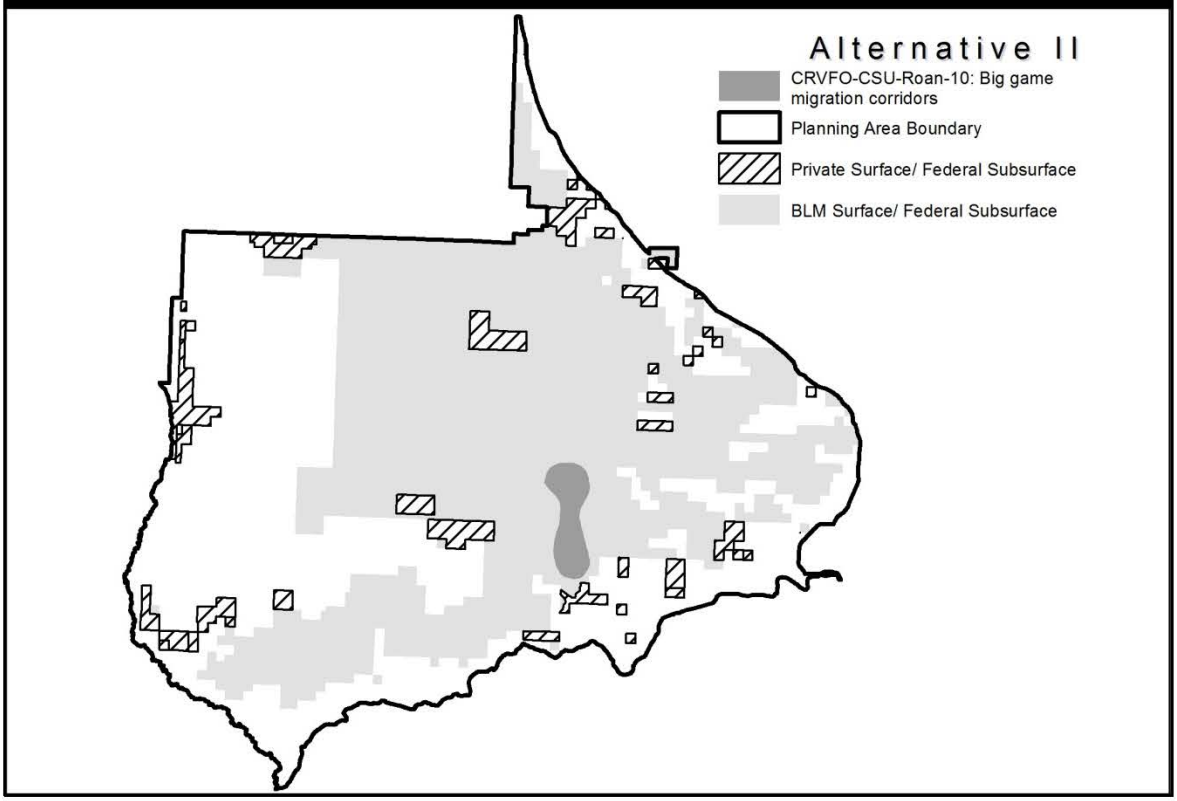
CRVFO-CSU-Roan-08: Peregrine Falcon Cliff Nesting Complex



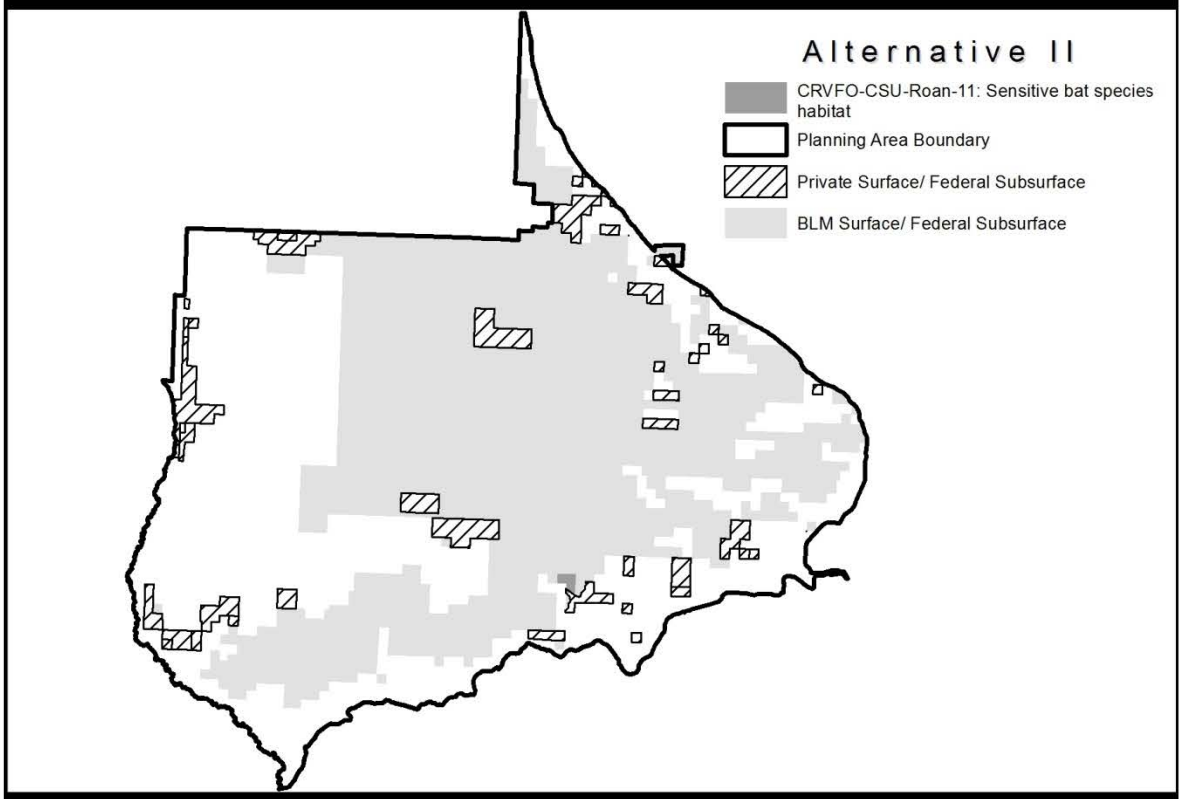
CRVFO-CSU-Roan-09: Wildlife security areas above the rim



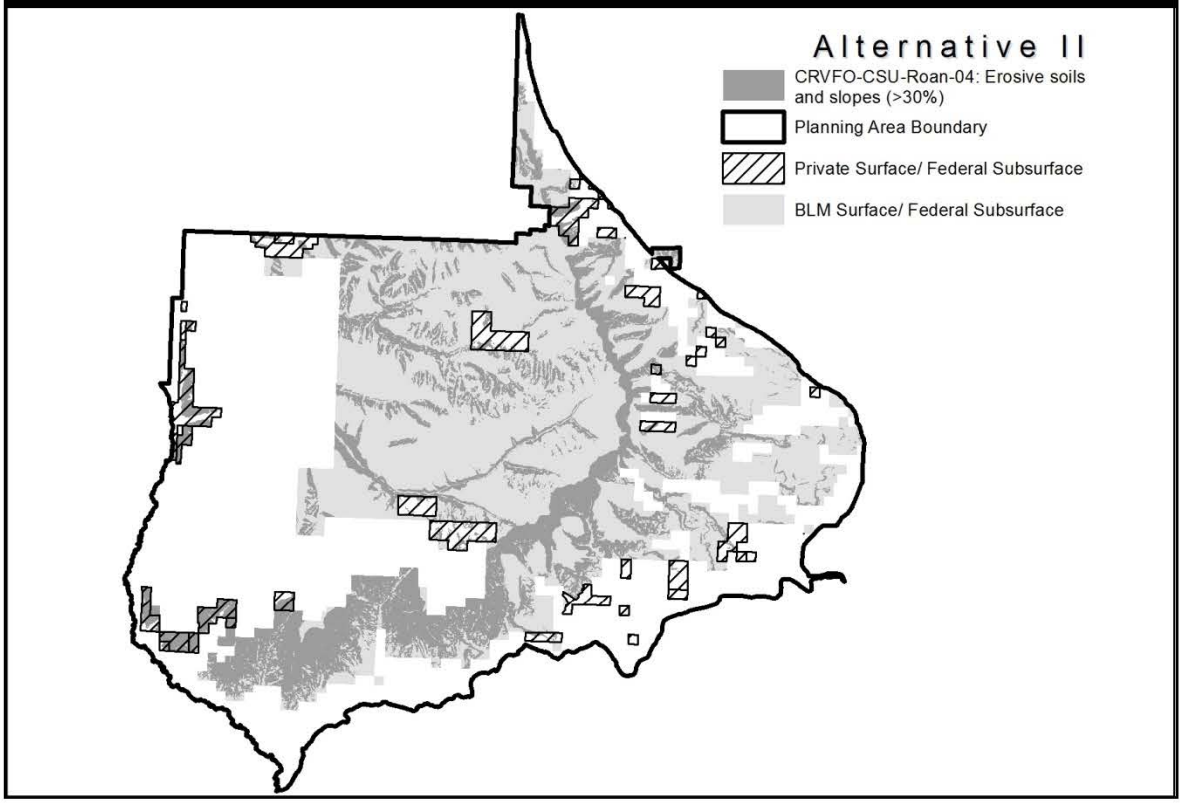
CRVFO-CSU-Roan-10: Big game migration corridors



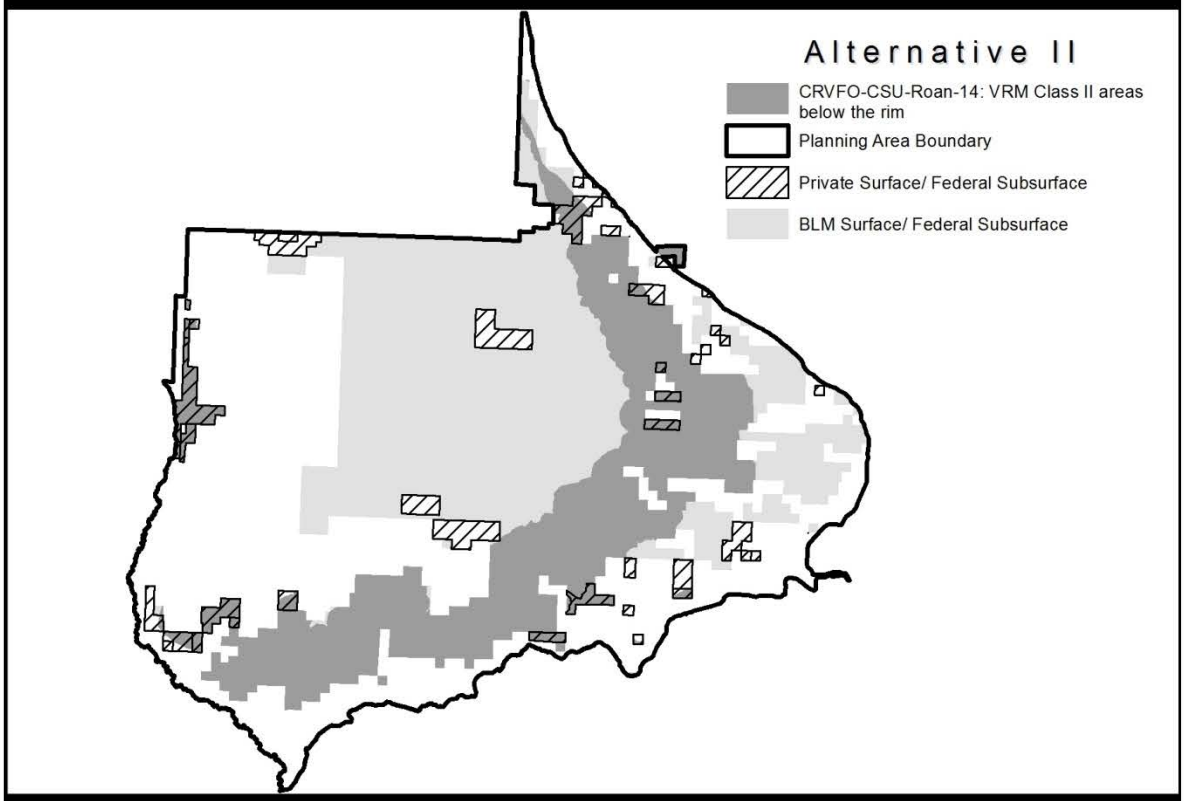
CRVFO-CSU-Roan-11: Sensitive bat species habitat



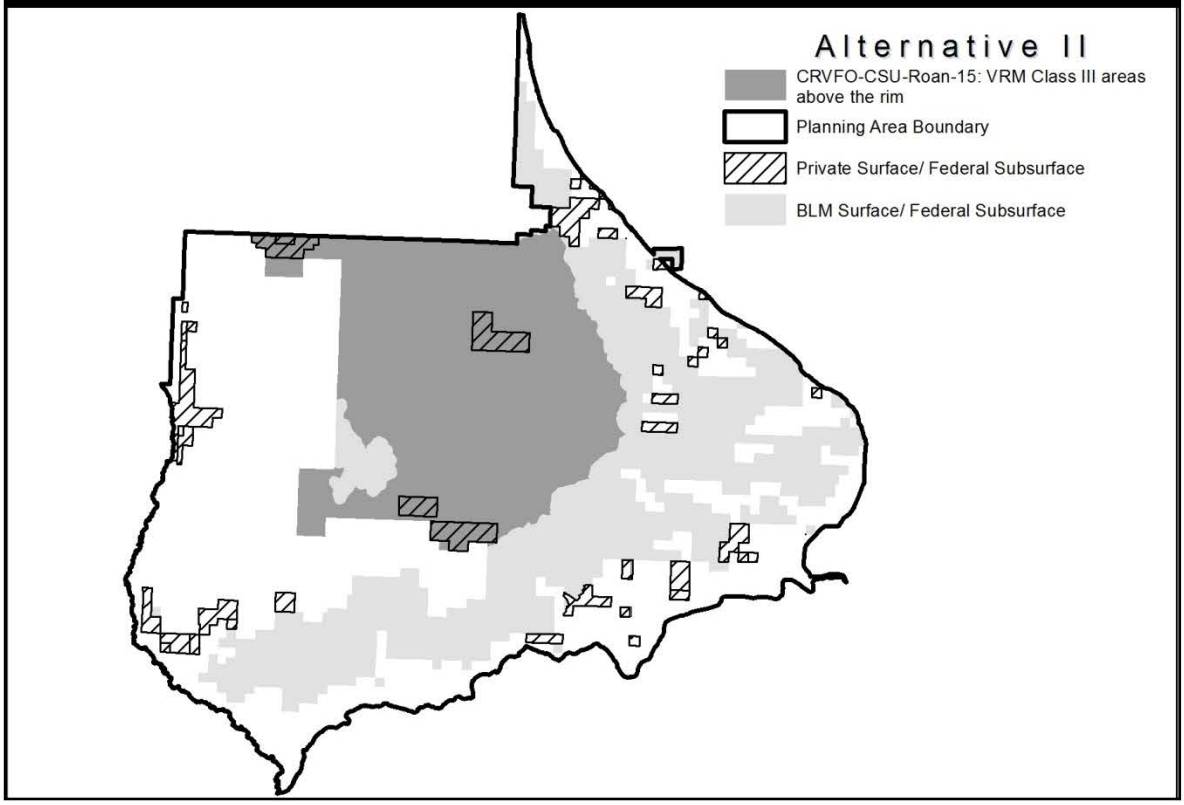
CRVFO-CSU-Roan-04: Erosive soils and slopes (>30%)



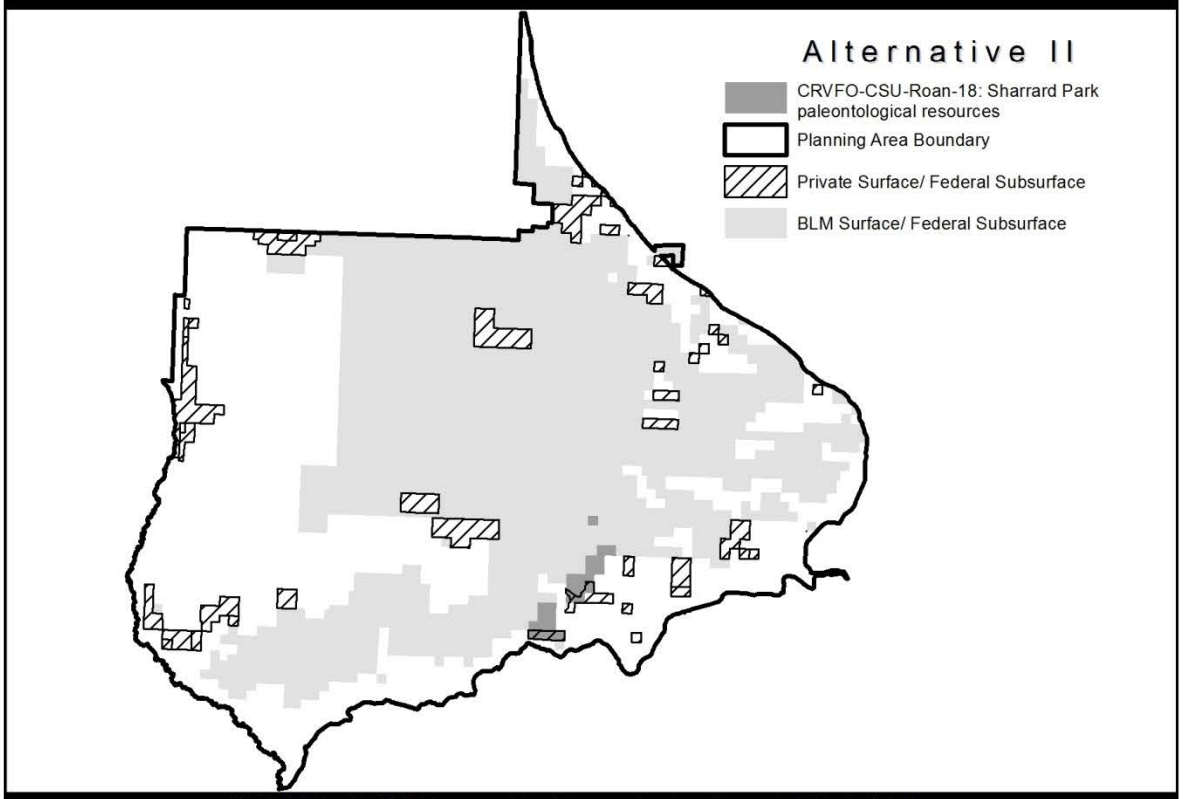
CRVFO-CSU-Roan-14: VRM Class II Areas Below the Rim



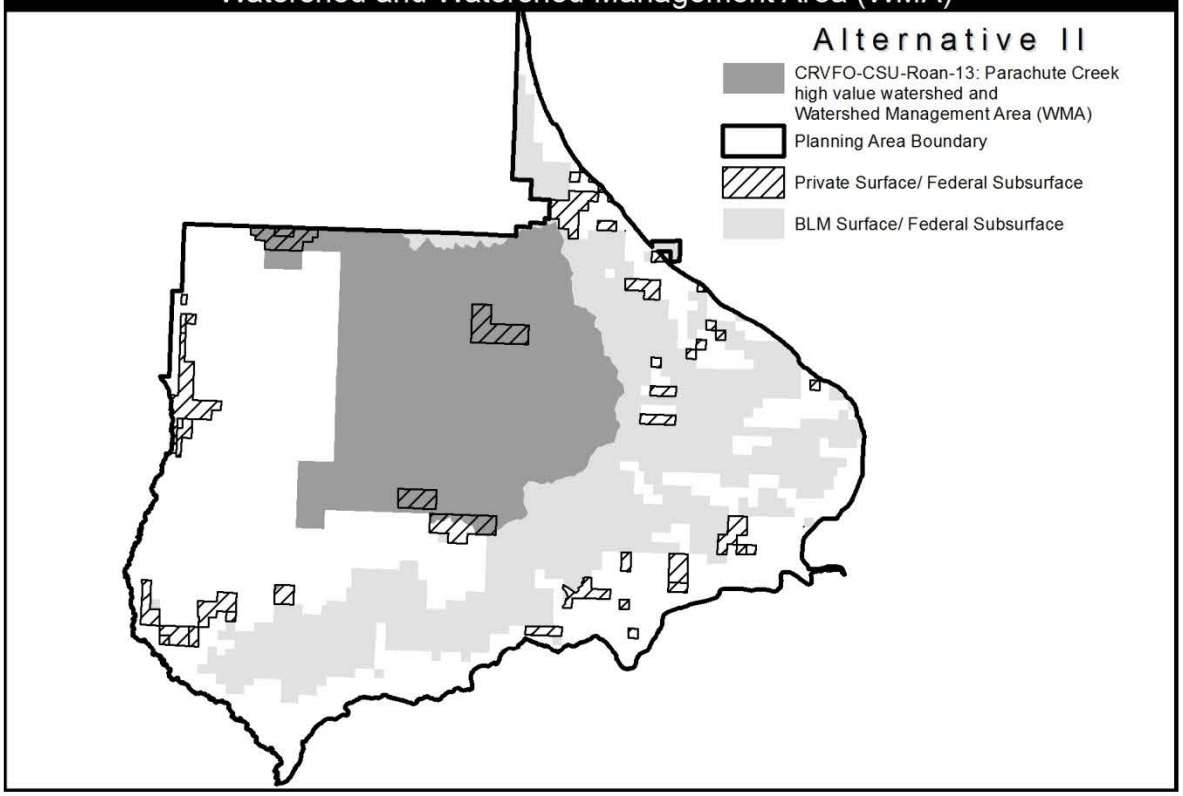
CRVFO-CSU-Roan-15: VRM Class III Areas Above the Rim



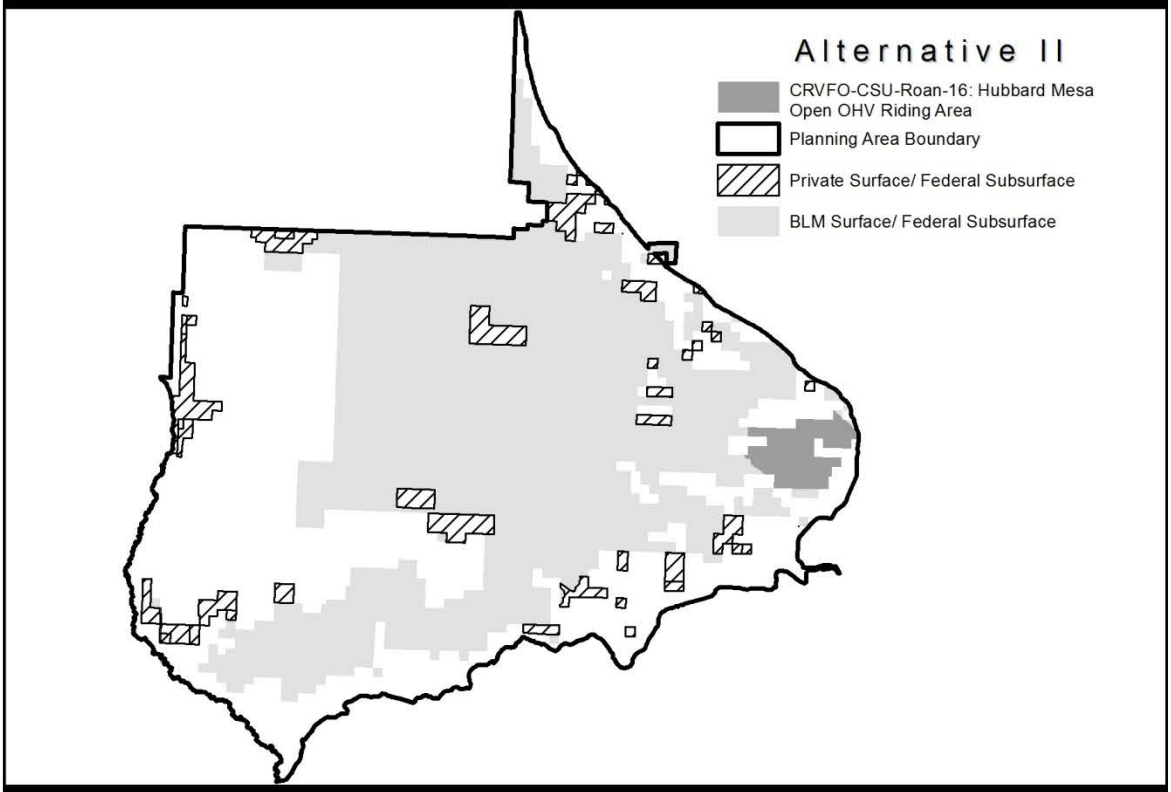
CRVFO-CSU-Roan-18: Sharrard Park Paleontological Resources



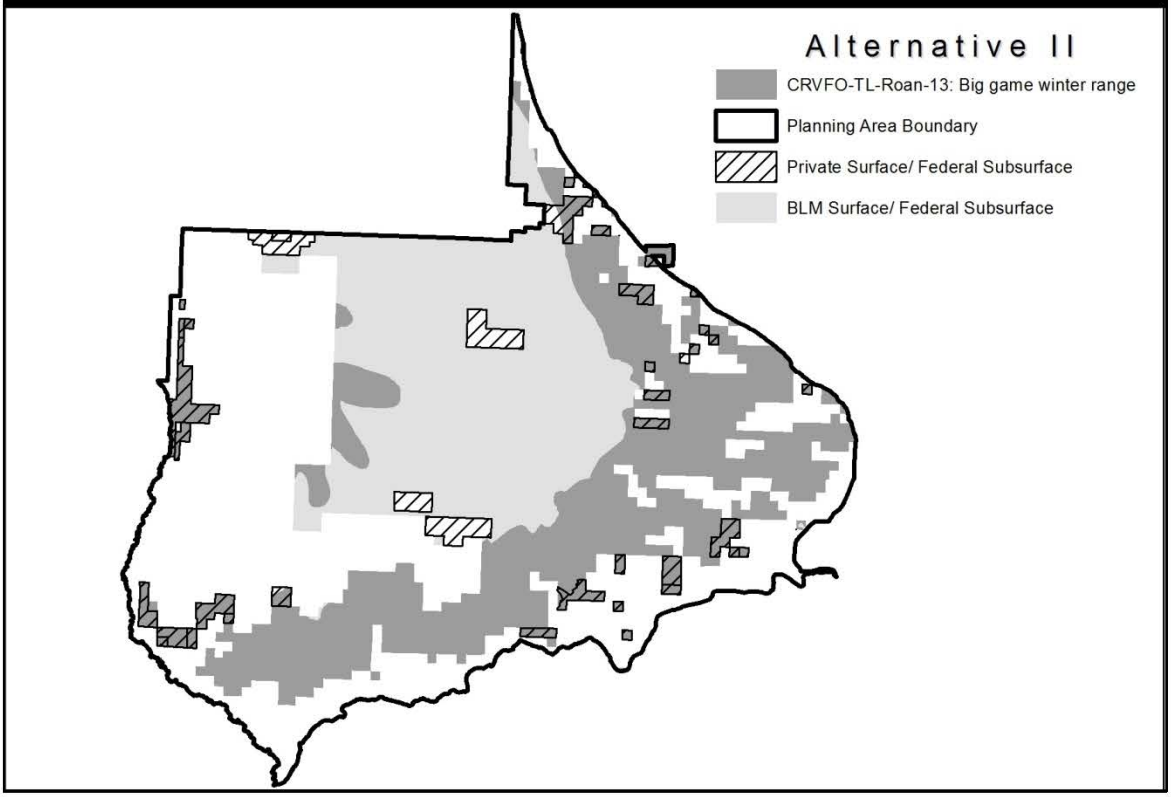
CRVFO-CSU-Roan-13: Parachute Creek High Value Watershed and Watershed Management Area (WMA)



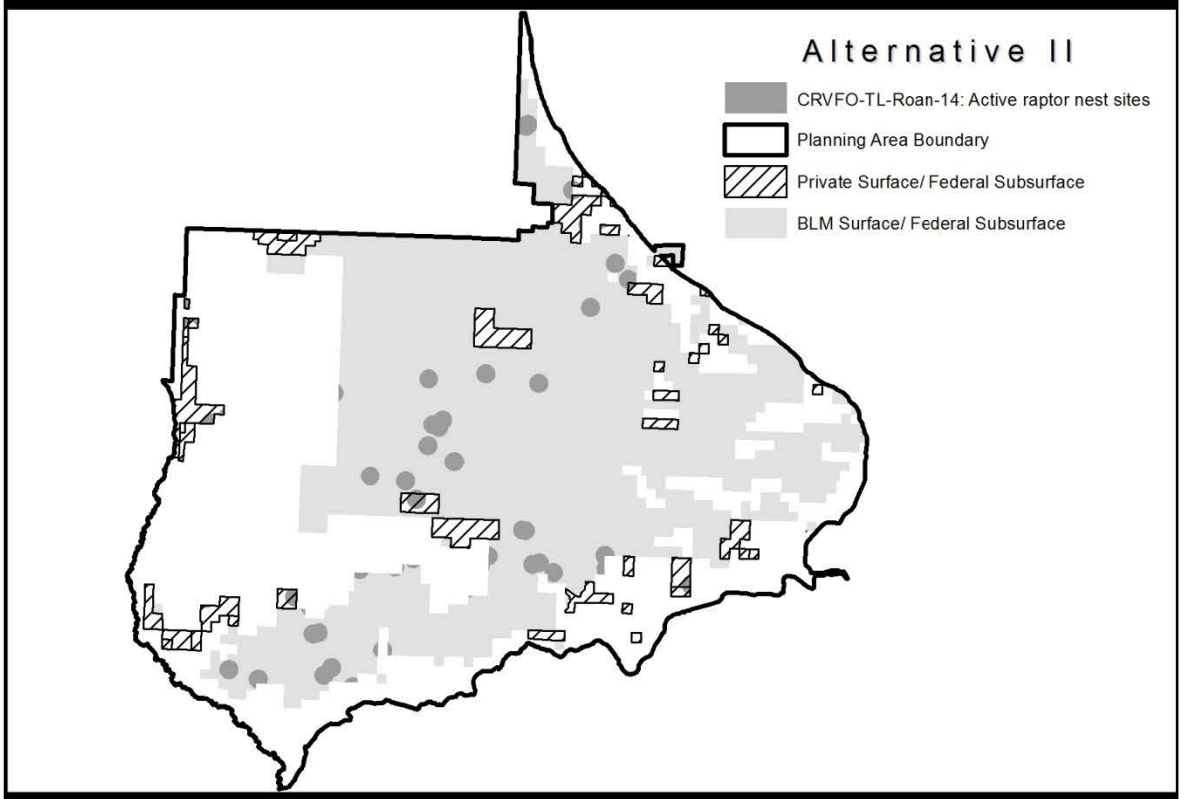
CRVFO-CSU-Roan-16: Hubbard Mesa Open OHV Riding Area



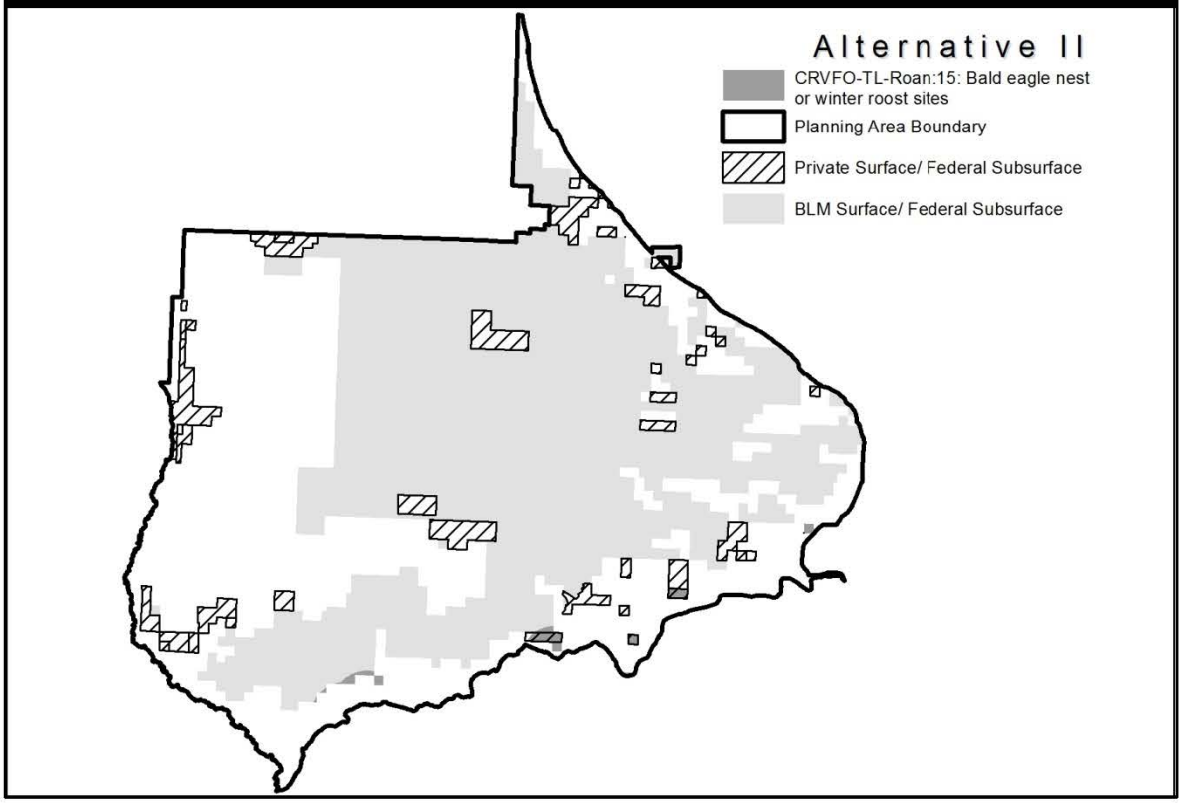
CRVFO-TL-Roan-13: Big game winter range



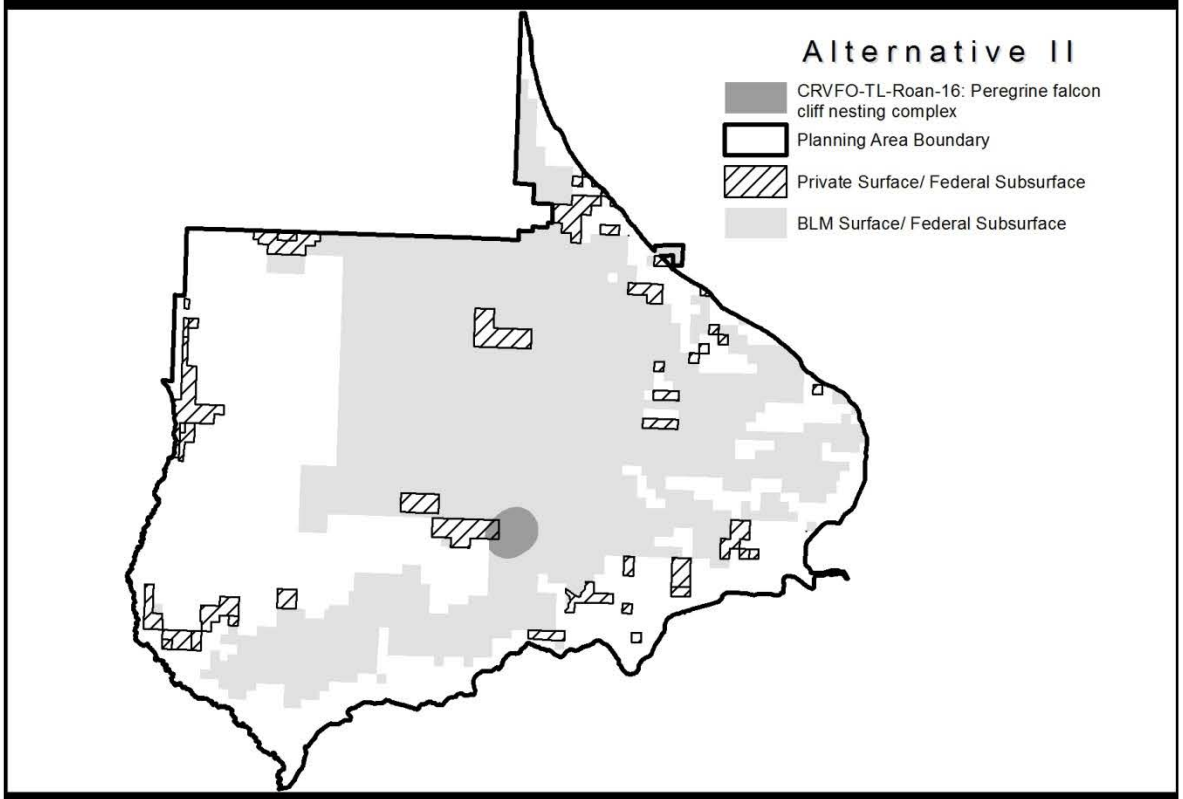
CRVFO-TL-Roan-14: Active Raptor Nest Sites



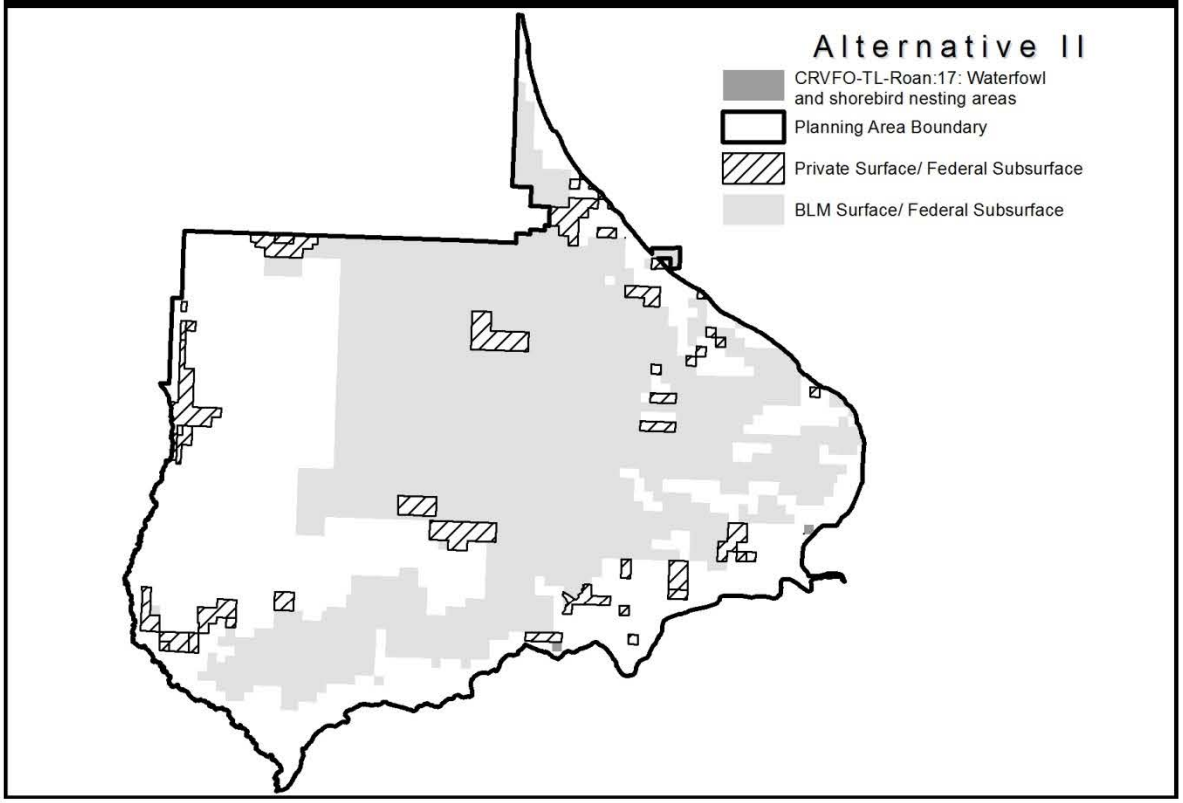
CRVFO-TL-Roan:15: Bald Eagle Nest or Winter Roost Sites

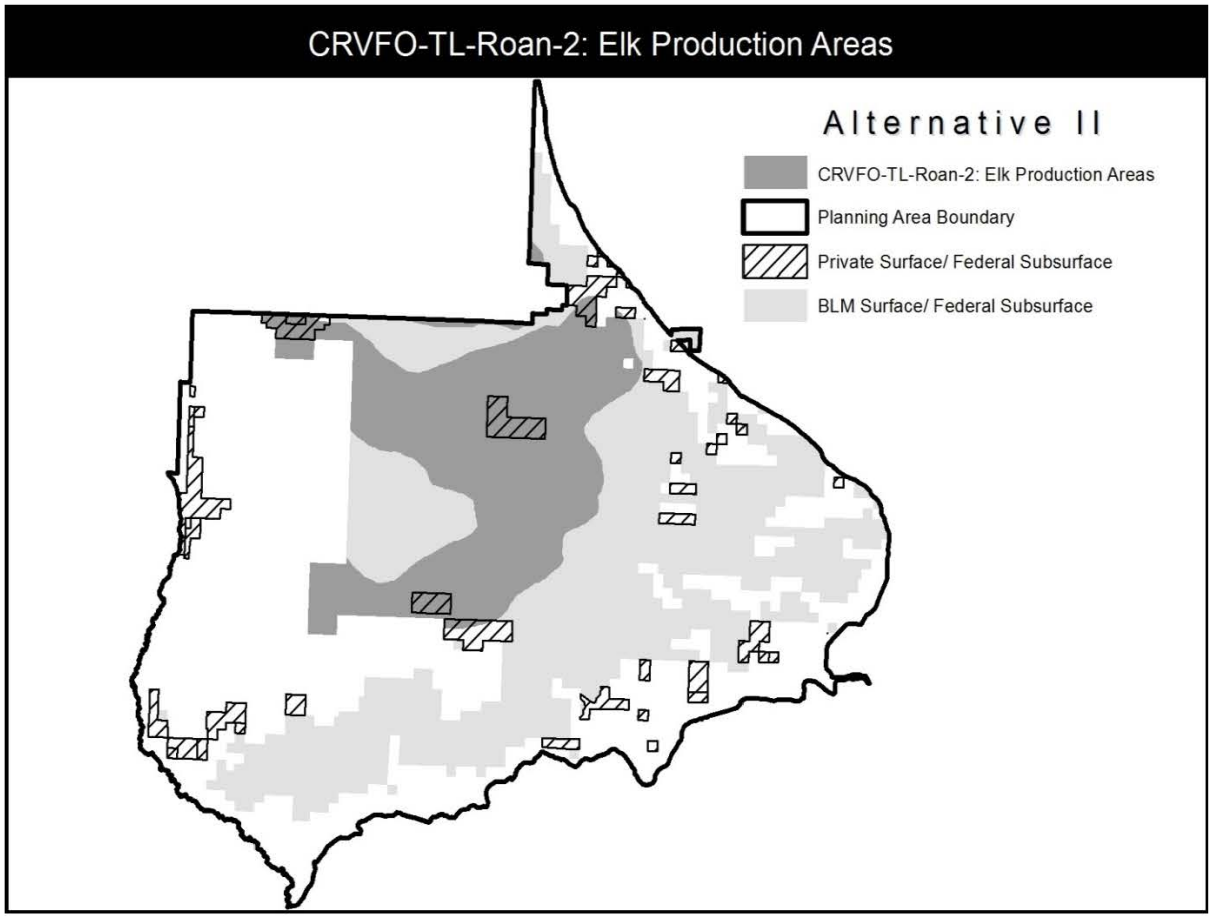


CRVFO-TL-Roan-16: Peregrine Falcon Cliff Nesting Complex



CRVFO-TL-Roan:17: Waterfowl and Shorebird Nesting Areas




CRVFO-TL-Roan-2: Elk Production Areas
Alternative II
CRVFO-TL-Roan-2: Elk Production Areas
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
No Surface Occupancy (NSO) Stipulations
CRVFO-NSO-2: Steep Slopes (>50%), 27,620 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities on slopes greater than 50 percent. **Purpose:** To maintain soil productivity and provide necessary protection to prevent excessive soil erosion on steep slopes and to reduce risks to human health and safety from placement of infrastructure on steep slopes. **Exception:** Standard exceptions apply. **Modification:** Standard modifications apply **Waiver:** Standard waivers apply
CRVFO-NSO-9: Threatened, Endangered, Proposed, and Candidate Plant Species, 3,670 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within 200 meters (656-foot) of habitat areas for those plant species listed under ESA as threatened or endangered, and for federal proposed or candidate plant species. Habitat areas include currently or historically occupied habitat, areas designated as critical habitat, suitable habitat in close proximity to occupied habitat, and habitat necessary for the maintenance or recovery of the species. **Purpose:** To protect threatened, endangered, proposed, and candidate plants, immediately adjacent suitable habitat and pollinator habitat, from direct and indirect impacts. **Exception:** Standard exceptions apply. In addition, all of the following conditions must be met: a) Valid current surveys for protected species have been completed. b) Mitigation has been applied to avoid adverse impacts to protected species. c) Section 7 consultation with USFWS on federally listed or proposed threatened or endangered species has been completed. d) The proposed disturbance would occur in unsuitable habitat. Other surface-disturbing activities may be allowed in suitable habitat if conditions 1 through 3 above are met, and the purpose or the result of the activity would improve habitat conditions for the protected species. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
CRVFO-NSO-18: Special Status Bat Species Hibernation, Maternity Roosts, Bachelor Roosts and Fall Swarming Sites, 120 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within a 0.25-mile radius of special status (i.e., endangered, threatened, candidate, or BLM sensitive) bat use areas to protect sites used for the purposes of maternity roosts, bachelor roosts, and hibernation or fall swarming activities. The stipulation will be applied based on biological surveys and CPW data as revised. **Purpose:** To protect sites documented as being used for the purposes of maternity roosts, hibernation or fall swarming activities. **Exception:** Standard exceptions apply. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVFO-NSO-19: Threatened, Endangered, Proposed, and Candidate Fish and Wildlife Species, 3,670 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities on habitat areas for fish and wildlife species listed by the federal or state government as endangered or threatened and for Federal proposed or candidate species. Habitat areas include occupied habitat and habitat necessary for the maintenance or recovery of the species. **Purpose:** To maintain the integrity of habitats for endangered, threatened or candidate species necessary for the maintenance or recovery of the species. **Exception:** Standard exceptions apply. In addition, after Section 7 consultation with USFWS, exceptions may be permitted. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVFO-NSO-8: Raptors (Non-Special Status Raptor Species), 910 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within a buffer zone centered on a nest site. Buffer widths are 0.25-mile for: • golden eagle • Cooper's hawk • sharp-shinned hawk • red-tailed hawk • Swainson's hawk • owls Buffer widths are 0.5-mile for: • prairie falcon

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
• northern goshawk Does not apply to turkey vulture, northern harrier, or American kestrel. Special status raptors are addressed separately. **Purpose:** Maintain the integrity of nest sites and surrounding habitat. **Exception:** Standard exceptions apply. More specifically, an exception can be granted if the nest site has not been occupied within the last 5 years. The activity must be conditioned so as not to impair the utility of the site for future nesting. **Modification:** Standard modifications apply. More specifically a modification may be granted if conditions have changed such that there is no reasonable likelihood of future site occupation. **Waiver:** Standard waivers apply.
CRVFO-NSO-12: Bald Eagle Roost or Nest Site, 380 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within a 0.25-mile radius of the roost or nest site. The stipulation will be applied based on biological surveys, CPW data or USFWS data as revised. **Purpose:** To maintain the integrity of occupied (used within the last 5 years) winter roost sites and surrounding habitat. **Exception:** Standard exceptions apply. More specifically, an exception can be granted if the nest or roost site has not been occupied within the last 5 years. The activity must be conditioned so as not to impair the utility of the site for future nesting or roosting. **Modification**: Standard modifications apply. More specifically a modification may be granted if conditions have changed such that there is no reasonable likelihood of future site occupation. **Waiver:** Standard waivers apply.
GS-NSO-ROAN-27: Wildlife Security Areas Below the Rim, 11,410 acres
Stipulation: Protect important wildlife security areas below the rim, especially those for deer and elk. No ground-disturbing activities in approximately 11,410 acres that provide high-value habitats along and below the base of the Roan Cliffs. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. **Purpose:** To protect important wildlife security areas below the rim. **Exceptions:** Ground-disturbing activity may be permitted if the BLM determines, following Section 7 consultation with USFWS or with CPW for State-listed species, that the requested activity would not impair values associated with maintenance or recovery of the species. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-NSO-ROAN-28: High-Value Special Status Fish Species Habitat, 15,820 acres
Stipulation: Protect Colorado River cutthroat trout from direct and indirect impacts in high-value habitat. No ground-disturbing activities in approximately 15,820 acres that would result in loss or degradation of areas designated as high-value habitat for Colorado River cutthroat trout. Prior to implementing any ground-disturbing activity or other project component in areas designated as high-value habitat for Colorado River cutthroat trout, the proponent must provide an assessment of potential impacts if any, to this resource value. The assessment will be based on current baseline data, collected by the proponent as approved by the BLM; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. **Purpose:** To protect Colorado River cutthroat trout from direct and indirect impacts in high-value habitat. **Exceptions:** Ground-disturbing activity may be permitted if the BLM determines, following consultation with CPW, that the requested activity would not impair values associated with maintenance of the species of interest. In making this determination, the BLM will consider the following resource factors: habitat conditions needed for feeding, spawning, survival of eggs and larvae, and refugia during high or low flow. Impairment could include siltation of substrate; changes in flow regime (e.g., localized damming); loss of overhanging vegetation canopy; reduction in bank stability; reduction in water quality; and direct mortality of trout or trout eggs; behavioral and ecological relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species of interest or cause habitat to become unusable. Approval of ground disturbing activities granted in any given year will not constitute approval for subsequent years; in such cases, approval for such activities must be granted (or extended) annually by the BLM. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply.

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
Waiver: Standard waivers apply.
CRVFO-NSO-5: Riparian and Wetland Habitat, 490 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within a buffer distance of 328 horizontal feet from the outer edge of riparian/wetland zones. **Purpose:** The purpose is to: 1. Maintain the proper functioning condition, including the vegetative, hydrologic and geomorphic functionality of the perennial water body. 2. Protect water quality, riparian/wetland vegetation, and aquatic habitats. 3. Provide a clean, reliable source of water for downstream users. 4. Benefit fisheries, amphibians, waterfowl, migratory birds, and other species dependent on aquatic and riparian habitats as well as the habitat itself. **Exception:** Standard exceptions apply. In addition, given the multiple resource values addressed by this NSO, an exception may be granted on a case-by-case basis if the Authorized Officer determines that the following criteria are met: • The activity would improve resource conditions (e.g., meet RMP resource objectives or achieve the standards for public land health). Restoration or enhancement work is designed to improve aquatic habitat conditions, riparian vegetation, or benefit aquatic dependent species over the long term. • The activity would have insignificant impacts on water quality, stream channel stability, and aquatic dependent species, where no reasonable alternative exists. • The activity would not cause unacceptable adverse impacts to the riparian or wetland resource (e.g., a decline in condition as defined by RMP objectives) • The activity would result in no net loss of riparian/wetland vegetation. • The activity would involve a stream crossing (e.g., roads, fences or pipelines) where there is no reasonable alternative. • The location of the activity within the riparian or wetland resource may be necessary to avoid unacceptable impacts to other resource values. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-NSO-ROAN-30: I-70 Viewshed (VRM Class II), 13,770 acres
Stipulation: Protect 13,770 acres of the Visual Resource Management (VRM) Class II, Interstate (I)-70 viewshed. No ground-disturbing activities on slopes steeper than 30 percent with high visual sensitivity in the I-70 viewshed. These are lands within 5 miles of the highway, of moderate to high visual exposure, where details of vegetation and landform are readily discernible, and changes in contrast can be easily noticed by the casual observer on I-70. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
to future proposed activities. **Purpose:** To protect Visual Resource Management (VRM) Class II, Interstate (I)-70 viewshed. **Exceptions:** Standard exceptions apply. In addition, an exception could be granted if a viewshed analysis indicates no impairment of the visual resources from the driving corridor. A ground-disturbing activity may be permitted if the BLM determines that the requested activity would not impair values associated with VRM Class II objectives or degrade the visual characteristics of the viewshed below Class II standards. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-NSO-ROAN-31: East Fork Falls Viewshed (VRM Class I), 1,620 acres
Stipulation: Prohibit surface occupancy and surface disturbing activities within areas designated VRM Class I. **Purpose:** To preserve the existing character of the landscape. **Exception:** Standard exceptions apply. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-NSO-ROAN-21: Anvil Points Claystone Cave, 120 acres
Stipulation: Protect 120 acres encompassing the Anvil Points Claystone Cave. No ground disturbing activities in the area encompassing the cave opening, subsurface features, and watersheds overlying the caves. Prior to implementing any ground-disturbing activity or other project component in the area covered by this stipulation, the proponent must provide an assessment of potential impacts to this resource value. The assessment will be based on current baseline data; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. During and subsequent to the ground-disturbing activities covered by this provision, ongoing monitoring data will be collected using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the

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BLM must be promptly notified; and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. **Purpose:** To protect the Anvil Points Claystone Cave. **Exceptions:** A ground-disturbing activity may be permitted only if the BLM determines that a proposed activity would not impair the cave values, supported by a demonstration of such, based on monitoring data or another method with a high degree of scientific reliability, and considering the type, amount, duration, and timing of the activity; and after consultation with CPW regarding wildlife habitat values. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVFO-NSO-4: Major River Corridors, 440 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within 0.5-mile of either side of the high water mark (bank-full stage) of the Colorado River. **Purpose:** To protect these riverine and adjacent areas that provide (a) special status fish and wildlife species habitat, (b) important riparian values, (c) water quality/filtering values, (d) waterfowl and shorebird production values, (e) valuable amphibian habitat, and (f) high scenic and recreation values. Included in this area are public lands near the Eagle and Colorado Rivers designated as RMAs in which BLM provides facilities to enhance recreation opportunities and maintain recreational setting characteristics. **Exception:** Standard exceptions apply. In addition, the distance from the river may be reduced after the Authorized Officer has considered the habitat values and the species present, the topography and vegetation of the area, and the type and amount of surface disturbance proposed. For the Eagle and Colorado Rivers, additional exception criteria include measures to mitigate impacts on recreation such as: a) screening operations from scenic views, b) reducing drill rig and other equipment noise to an acceptable level, c) protecting the recreating public from operations, and d) restoring disturbed areas to a condition substantially unnoticeable to the casual observer. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GRSG-NSO-46e1: *NSO within 2 miles of active GRSG leks, in GRSG ADH, no exceptions anticipated*
Stipulation incorporates stipulation NSO-46e(1) from the NCGSG Proposed LUPA/FEIS by reference
GRSG-NSO-46e2: *Exceptions, modifications, and waivers on the remainder of PHMA. Authorized Officer could grant and exception or modification in consultations with the State of Colorado.*
Stipulation incorporates stipulation NSO-46e(2) from the NCGSG Proposed LUPA/FEIS by reference

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CRVFO-NSO-Roan 1: All Sensitive Resources and Natural Values Atop Roan Plateau, 34,890 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within 200 meters (656-foot) of habitat areas, or known locations, of all sensitive resources and natural values above the rim in the Roan Plateau Planning Area. **Purpose:** To protect all sensitive resources and natural values above the rim in the Roan Plateau Planning Area. **Exception:** No exceptions apply. **Modification:** No modifications apply. **Waiver:** No waivers apply.
CRVFO-NSO-Roan 2: Lands Managed to Protect Wilderness Characteristics, 19,330 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within 200 meters (656-foot) of outer boundary of three units determined to contain wilderness characteristics: East Fork Unit, Southeast Cliff Unit, and Northeast Cliff Unit. **Purpose:** To protect and maintain wilderness characteristics and supplemental values. **Exception:** No exceptions apply. **Modification**: No modifications apply. **Waiver:** No waivers apply.
CRVFO-NSO-Roan 4: Designated Municipal Watershed, 70 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within: 1) the primary zone of a source water protection area for a permitted public water system; or 2) 1,000 horizontal feet of either side of a classified surface water supply stream segment (measured from the average high water mark) for a distance of 5 miles upstream of a public water supply intake with the classification "Water Supply" by the State of Colorado used as a public (municipal) water supply. A permitted public water system will have a number assigned by the State of Colorado. A watershed that serves a public water system as defined by the State of Colorado is a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. **Purpose:** To protect the watershed that serves a drinking water supply for a permitted public water system from potential contamination. **Exception:** BLM may consider use of new technology or engineered plans designed to protect water supply streams and intakes from operations located closer than specified in the stipulation. Consideration of special technology or designs will be coordinated with appropriate water authorities and owners (e.g. municipalities, home owners associations, source water protection stakeholder groups, etc.). In addition, activity may be permitted if the Authorized Officer determines, in consultation with the appropriate water authorities and owners, that the applicant's proposal would not cause a decrease in water quality. **Modification:** The water supply or water intake is altered. **Waiver:** The water intake is not used as a public water supply.

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CRVFO-NSO-39: Historic Properties (200 meters [656 feet])
Stipulation: Prohibit surface occupancy and surface-disturbing activities within 200 meters (656) feet of historic properties. **Purpose:** To protect historic properties. **Exception:** Standard exceptions apply. No additional specific exception criteria apply. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVFO-NSO-Roan-32: Anvil Points Spent Shale Repositories 10 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities for spent shale repositories. **Purpose:** To protect spent shale repositories. **Exception:** Standard exceptions apply. No additional specific exception criteria apply. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
Controlled Surface Use (CSU) Stipulations
GS-CSU-Roan-12: Habitat for Special Status Plant Species Populations and Significant Plant Communities, 17,840 acres
Stipulation: Protect approximately 17,840 acres of special status plant species habitat or significant plant communities. The BLM may require special design, construction, operation, mitigation, or reclamation measures, and/or relocation by more than 200 meters for any ground-disturbing activities, electric transmission lines, and other sources of disturbance within a watershed that would disturb, alter, or interrupt the hydrologic or ecological processes that support special status plant species or significant plant communities. Special status plants include the following: DeBeque milkvetch *(Astragalus debequaeus),* hanging garden sullivantia *(Sullivantia hapemanii),* Piceance bladderpod *(Lesquerella parviflora),* Roan Cliffs blazingstar *(Mentzelia rhizomata),* and sun-loving meadowrue *(Thalictrun heliophilum).* Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. **Purpose:** To protect special status plant species habitat or significant plant communities. **Exceptions:** A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. If the BLM determines that a proposed surface-disturbing activity will unacceptably impair resource values associated with species health and ecological function of associated habitat, the BLM will modify or relocate the proposed activity. In making this determination, the BLM will consider the status of the population; ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of the population or community; the effects on both individuals of the species and populations; the relationship to topography and other vegetation;

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or community. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVFO-CSU-4: Riparian/Wetland Vegetation Zones, 11,440 acres
Stipulation: Apply CSU constraint from 328 to 500 horizontal feet from the outer edge of the riparian/wetland zones. Surface-disturbing activities may require special design, construction, and implementation measures, including relocation of operations beyond 200 meters (656 feet). The actual required measures will be based on the purpose, nature, and extent of the disturbance, the affected wetland/riparian area and values, and the feasibility of relocating the project. **Purpose:** To maintain proper functioning condition (including the vegetative, hydrologic, and geomorphic functionality) of the riparian and wetland zones. • Protect water quality. • Protect fish habitat. • Protect other aquatic habitat values. • Provide a clean, reliable source of water for downstream users. • Indirectly benefit migratory birds, wildlife habitat, amphibians, and other species. **Exception:** Standard exceptions apply. In addition, an exception may be granted by the Authorized Officer on a case-by-case basis considering the following criteria: The activity would improve resource conditions (e.g., meet RMP resource objectives or achieve the standards for public land health). Restoration or enhancement work is designed to improve aquatic habitat conditions, riparian vegetation, or benefit aquatic dependent species over the long term. • The activity will have insignificant impacts on water quality, stream channel stability, and aquatic dependent species, where no reasonable alternative exists. • The activity will not cause unacceptable adverse impacts to the riparian or wetland resource (e.g., a decline in condition as defined by RMP objectives) • The activity results in no net loss of riparian/wetland vegetation. • Involves stream crossings (e.g., roads, fences or pipelines) where there is no reasonable alternative. • Location of the activity within the riparian or wetland resource may be necessary to avoid unacceptable impacts to other resource values.

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
In situations where a surface-disturbing activity is excepted, the activity could be subject to additional conditions or approvals, reclamation measures, or best management practices. Measures applied will be based on the nature, extent, and values potentially affected by the surface-disturbing activity. Exceptions to allow surface-disturbing activities are granted on a one-time, case-by-case basis and do not create a precedent for subsequent approvals. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-CSU-Roan-08: Peregrine Falcon Cliff Nesting Complex, 370 acres
Stipulation: Protect approximately 370 acres of peregrine falcon cliff nesting complex. Ground-disturbing activities may be relocated outside of the cliff-nesting complex along the Roan Cliffs. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. **Purpose:** To protect peregrine falcon cliff nesting complex. **Exception:** A site-specific ground-disturbing activity may be allowed within the CSU only if, following consultation with CPW, the BLM determines that the specific activity or requested change would not impair behaviors, habitat use and quality, and reproductive success of the peregrine falcon present within the area. In making this determination, the BLM will consider the status of the nest (active or inactive); behavioral and ecological requirements of the species; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; in such cases approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-CSU-Roan-09: Wildlife Security Areas Above the Rim, 11,410 acres
Stipulation: Protect important wildlife security areas above the rim, especially deer and elk. Ground disturbing activities may be relocated more than 200 meters to avoid approximately 11,410 acres of wildlife security areas above the rim. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
to future proposed activities. **Purpose:** To protect important wildlife security areas above the rim, especially deer and elk. **Exceptions:** A site-specific ground-disturbing activity may be permitted if the BLM determines, following consultation with CPW, that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-CSU-Roan-10: Big Game Migration Corridors, 1,560 acres
Stipulation: Protect contiguity and extent of big game migration corridors. Ground-disturbing activities may be relocated more than 200 meters to avoid approximately 1,560 acres of big game migration corridors. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. **Purpose:** To protect contiguity and extent of big game migration corridors. **Exceptions:** A site-specific ground-disturbing activity may be permitted if BLM determines, following consultation with CPW, that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of big game species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively **Modification:** Standard modifications apply.

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Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
Waiver: Standard waivers apply.
GS-CSU-ROAN-17: Wild and Scenic River Suitability, 7,750 acres
Stipulation: Protect 24 stream miles and associated buffers on 7,750 acres in portions of the East Fork Parachute Creek and Trapper/Northwater Creek drainages. No ground disturbing activities would be allowed within the boundary of the suitable stream segment, general 0.25 miles on either side. **Purpose:** To protect the East Fork Parachute Creek and Trapper/Northwater Creek drainages. **Exceptions:** A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with WSR designation, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: type and location of outstandingly remarkable values (ORVs). free flowing condition, water quality, and tentative classification; the type, amount, and duration of the surface disturbance; the relative extent of ORVs; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect ORVs, or that may affect the outcome of a suitability study. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVFO-CSU-1: Slopes Greater than 30% or Fragile/Saline Soils, 50,730 acres
Stipulation: As appropriate, apply CSU constraint on areas: 1) with slopes steeper than 30 percent or 2) areas with fragile and saline soils regardless of slope based on the NRCS soil description and surveys. Fragile soils as defined by the NRCS include those having shallow depth to bedrock, minimal structure and organic matter in the surface layer, and textures making them easily detached and eroded. The soil map unit description rates soils in the resource area as to their susceptibility to water erosion. Wind erosion may also be a hazard, particularly when surface litter and vegetation are removed by fire. A potentially saline soil has Mancos shale parent geology. The following soil/slope characteristics are indicative of a potentially fragile soil: 1. Soils rated as highly or severely erodible by wind or water 2. Soils on slopes greater than 35%, particularly if they have one of the following characteristics: a) a surface texture that is sand, loamy sand, very fine sandy loam, fine sandy loam, silty clay, or clay; b) a depth to bedrock less than 20 inches; c) an erosion hazard rating of high or very high; and d) a K (soil erodibility potential) factor greater than 0.32. **Purpose:** To: • reduce erosion potential, to maintain soil stability and productivity of sensitive areas;

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• ensure successful reclamation; and • minimize contributions of salinity, selenium and sediments likely to affect downstream water quality, fisheries and other downstream aquatic habitats. **Exception:** Standard exceptions apply. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-CSU-Roan-14: VRM Class II Areas Below the Rim, 29,560 acres
Stipulation: Protect approximately 29,560 acres in VRM Class II areas. The BLM may require special design, construction, operation, mitigation, or reclamation measures, or relocation by more than 200 meters in VRM Class II areas below the rim to retain the existing landscape character and allow only limited changes. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually or as required by the BLM. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project component. **Purpose:** To protect VRM Class II areas. **Exceptions:** A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with VRM Class II objectives, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Authorized ground disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-CSU-Roan-15: VRM Class III Areas Above the Rim, 32,880 acres
Stipulation: Protect 32,880 acres of VRM Class III areas on top of the plateau. The BLM may require special design, construction, operation, mitigation, or reclamation measures, or relocation by more than 200 meters in VRM Class III areas. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted

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during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project component. **Purpose:** To protect VRM Class III Areas. **Exception:** A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with VRM Class III objectives, or if relocation or modification of such activity is found to be acceptable. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GS-CSU-Roan-16: Hubbard Mesa Open OHV Riding Area, 2,330 acres
Stipulation: Protect recreation opportunities and settings in the Hubbard Mesa Off-Highway Vehicle (OHV) Riding Area. BLM may require special design, construction, operation, mitigation, and reclamation measures, including relocation by more than 200 meters. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. **Purpose:** To protect recreation opportunities and settings in the Hubbard Mesa Off-Highway Vehicle (OHV) Riding Area. **Exceptions:** A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values with OHV opportunities within the Hubbard Mesa area, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: existing OHV use; existing OHV riding opportunities; anticipated future use; management of OHV use; type, amount, and duration of the surface disturbance; the relative extent of OHV use and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect OHV riding opportunities. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.

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GS-CSU-Roan-18: Sharrard Park Paleontological Resources, 1,020 acres
Stipulation: Protect 1,020 acres of the Sharrard Park paleontological resource. The BLM may require special survey, design, construction, operation, and reclamation measures, or relocation by more than 200 meters in identified portions of Wasatch Formation outcrops in Sharrard Park. Prior to any ground disturbing activity, the operator must have the paleontological resources surveyed within 200 feet of the proposed disturbance by a BLM approved paleontologist. Other special measures include requirements that (a) on-site personnel are informed of the potential for fossils; (b) the proponent will notify the BLM if any fossils are found; and (c) activities do not disturb fossils in any way. Prior to implementing any ground-disturbing activity or other project component in the area covered by this stipulation, the proponent must provide an assessment of potential impacts to this resource value. The assessment will be based on current baseline data; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. The BLM will determine the level of protection available under this stipulation required to protect, preserve, and/or recover the fossil resources at specific sites or for specific activities within this area. The BLM determination will be based on site specific conditions and the type, amount, and duration of the associated impacts. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through adaptive management to refine the project components and associated mitigation measures that will be applied to future proposed activities. **Purpose:** To protect the Sharrard Park paleontological resources. **Exceptions:** Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendices A and C, respectively. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply
Timing Limitations (TL) Stipulations
CRVFO-TL-2: Big Game Winter Habitat, 38,430 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities from December 1 to April 15 to protect: mule deer critical winter range; elk winter concentration areas; moose winter range; Rocky Mountain bighorn sheep winter, severe winter and winter concentration areas; and pronghorn winter concentration area. **Purpose:** To reduce behavioral disruption of big game during the winter season. Exception: Standard exceptions apply. In addition, site-specific ground-disturbing activities between December 1 and April 15 may be allowed if BLM determines, following consultation with CPW, that the requested activity would not impair values associated with the quantity and quality of the winter range for the species of interest. In making this determination, the proponent of any ground-disturbing activity asking for an exception will provide to BLM an assessment with their proposal that documents anticipated compliance or non-impairment of resource values protected by this stipulation based on the following resource factors:

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• current baseline data; the type, location, duration, and intensity of potential adverse effects • minimization of the footprint of activities • changes to winter habitat effectiveness, fragmentation, and habitat loss across the game management unit as a whole • the relative extent of available winter range; relationship to topography and vegetation screening; • effectiveness of proposed voluntary offsite mitigation and conservation measures to offset any adverse effects • other factors that may affect the winter range or cause winter range to become unusable Under mild winter conditions, the last 60 days of the seasonal limitation period may be suspended after consultation with CPW. Approval of ground-disturbing activities granted in any given year may not constitute approval for subsequent years; in such cases approval for such activities must be granted (or extended) annually by BLM. **Modification:** Standard modifications apply. A modification may also be approved if the proponent, Bureau of Land Management, and Colorado Parks and Wildlife agree to compensatory mitigation that satisfactorily offset detrimental impacts to big game winter range or its use, or an agreement can be reached where by a wildlife mitigation plan can be accommodated consistent with established RMP objectives and decisions. **Waiver:** Standard waivers apply.
CRVFO-TL-5: Raptors (Non-special Status Raptor Species), 3,550 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities to protect use of nesting and fledgling habitat during the following time periods: The timing limitation is applied within a 0.25-mile radius on species-specific dates as follows: • Red-tailed hawk and all owls: February 15 to July 15 • all Swainson's hawk: April 1 to July 15 • Osprey: April 1 to August 31 • Cooper's hawk and sharp-shinned hawk: April 15 to July 15 The timing limitation is applied within a 0.5-mile radius on species-specific dates as follows: • Golden eagle: December 15 to July 15 • Northern goshawk: March 1 to September 15 • Prairie falcon: March 15 to July 15 **Purpose:** To protect nesting and fledgling habitat during use. **Exception:** Standard exceptions apply. In addition, the stipulation may be suspended during any year in which the nest is unoccupied two weeks after the last date incubation should have begun. This date will be determined by a BLM biologist in consultation with CPW or USFWS biologists as necessary. The timing

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limitations may be excepted once the young have fledged and dispersed from the nest. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVFO-TL-6: Waterfowl and Shorebird Nesting and Production Areas, 90 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities from April 15 to July 15 in a 328 feet radius of: goose winter concentration areas, goose brood concentration areas, geese production areas, great blue heron historic nest areas, and great blue heron nesting areas to protect nesting waterfowl and shorebirds. **Purpose:** To protect nesting waterfowl and shorebirds. **Exception:** Exceptions may be granted after consultation with the CPW if nesting waterfowl and shorebirds are not present at the reservoirs, or if operations can be located in such a manner as to minimize disturbance to nesting waterfowl and shorebirds. **Modification**: Standard modifications apply. **Wavier:** Standard waivers apply.
CRVFO-TL-8: Bald Eagle Nest Sites and Winter Roost Sites, 510 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within a 0.5-mile buffer around nest sites and around winter roost sites during the flowing time periods: • Nest Sites: November 15 to July 31 • Winter Roost Sites: November 15 to March 15. The stipulation will be applied based on surveys, CPW data, or USFWS data as revised. Purpose: To: (a) protect nesting, including nest-centered courtship, nest attentiveness and construction or repair, egg-laying, incubation, feeding of nestlings, and post-fledging use of the nest; and (b) prevent disruption of wintering bald eagles at winter roost sites. **Exception:** Nest Sites. An exception can be granted or the distance reduced in years when a nest site is unoccupied by May 15 or once the young have fledged and dispersed from the nest. Winter Roost Sites. An exception can be granted or the distance reduced to 0.25-mile, if an environmental analysis of the proposed action indicates that the nature or conduct of the activity could be conditioned so as not to impair the utility of the site. **Modification**: Standard modifications apply. More specifically a modification may be granted if conditions have changed such that there is no reasonable likelihood of future site occupation. **Waiver:** Standard waivers apply.

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CRVFO-TL-10: Peregrine Falcon Nesting Complex, 920 acres
Stipulation: Prohibit surface occupancy and surface-disturbing activities within a 0.5-mile buffer around the cliff-nesting complex from March 15 to July 31. The stipulation will be applied based on surveys, CPW data, or USFWS data as revised. **Purpose:** To protect reproductive activity at nest sites and avoid nest abandonment. **Exception:** Standard exceptions apply. The limitation may be suspended in years when the nest site is unoccupied by May 15, or once the young have fledged and dispersed from the nest. The activity must be conditioned so as not to impair the utility of the site for future nesting. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
GRSG-TL-46e: No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood rearing (March 1- July 15).
Stipulation incorporates stipulation GRSG-TL-46e from the NCGSG Proposed LUPA/FEIS by reference.
GRSG-TL-PHMAPHMA-ROW-TL: Prohibit surface occupancy and surface disturbing activities associated with BLM ROW permits within 4 miles from active leks during lekking, nesting, and early brood rearing (March 1- July 15).
Stipulation incorporates stipulation GRSG-TL-PHMA-ROW-TL from the NCGSG Proposed LUPA/FEIS by reference.
CRVFO-TL- Roan 1: Migratory Bird Nesting Season
Stipulation: Prohibit surface occupancy and surface-disturbing activities from May 15 to July 15. The stipulation would be applied based on biological surveys and species habitat preferences. **Purpose:** To protect use of nesting and fledgling habitat for birds of conservation concern (BCC). **Exception:** Standard exceptions apply. The application of the timing limitation would consider: the type of equipment to be used, the scale, and the duration of the project; species potentially present; habitat types present; breeding phenology; weather conditions; elevation; distance to known nests; and terrain.. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVFO-TL- Roan 2: Elk Production Area, 24,400 acres
Stipulation: Prohibit surface occupancy and surface disturbing activities from April 15 to June 30 in mapped elk production areas to reduce behavioral disruption during parturition and early young rearing period. This stipulation does not apply to operation and maintenance of production facilities. **Exception:** The Field Manager may grant an exception if an environmental analysis indicates that the proposed action can be conditioned so as not to interfere with habitat function or compromise animal condition within the project vicinity. An exception may also be granted if the proponent, Bureau of Land Management, and Colorado Division of Wildlife negotiate compensation that would satisfactorily offset anticipated impacts to big game production or habitat condition, or an agreement can be reached where by a COGCC wildlife mitigation plan can be accommodated consistent with established RMP objectives and decisions. An exception may also be granted for actions intended to enhance the long term utility for availability of suitable habitat.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
Modification: The Field Manager may modify the size and time frames of this stipulation if Colorado Division of Wildlife monitoring information indicates that current animal use patterns are inconsistent with dates established for animal occupation. **Waiver:** This stipulation may be waived if Colorado Division of Wildlife determines that the area is no longer utilized by big game for production purposes.
CRVFO-TL-1: Salmonid and Native Non-Salmonid Fishes
Stipulation: Prohibit surface occupancy and surface-disturbing activities during species-specific spawning periods to reduce impacts to breeding adults, eggs, emerging larval fish, and avoid stream channel disturbances: Non-Special Status Species: • Rainbow trout: March 1 to June 15 • Brown trout: October 1 to May 1 • Brook trout: August 15 to May 1. Special Status Species: • Cutthroat trout: May 1 to September 1 • Bluehead sucker: May 1 to July 15 • Flannelmouth sucker: April 1 to July 1 • Roundtail chub: May 15 to July 15 • Mountain sucker: May 1 to July 15. **Purpose:** To promote recruitment by protecting adult fish, redds (egg masses) in the gravel, and emerging fry during spawning periods. **Exception:** Standard exceptions apply. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
Lease Notices (LN) Stipulations
GS-LN-Roan-14: Master Development Plan
Stipulation: A MDP will be required of oil and gas operators prior to exploration or development activities. For all activities in areas atop the plateau, and in areas being actively explored or developed below the rim, the operator must submit a MDP. The MDP must include all anticipated activities for a minimum of 2 years following the date of submission, for all operator-controlled federal leases or units. A longer term is encouraged and would be allowed under this standard to expedite the permitting process, provide for efficiencies as provided for in Standard 6 of this stipulation, and reduce costs to the operator for MDP preparation. The boundaries of the geographic areas to be addressed atop the plateau, as identified by the BLM, may be modified with approval from the BLM. The boundaries of all other geographic areas must be proposed by the operator and must be approved by

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

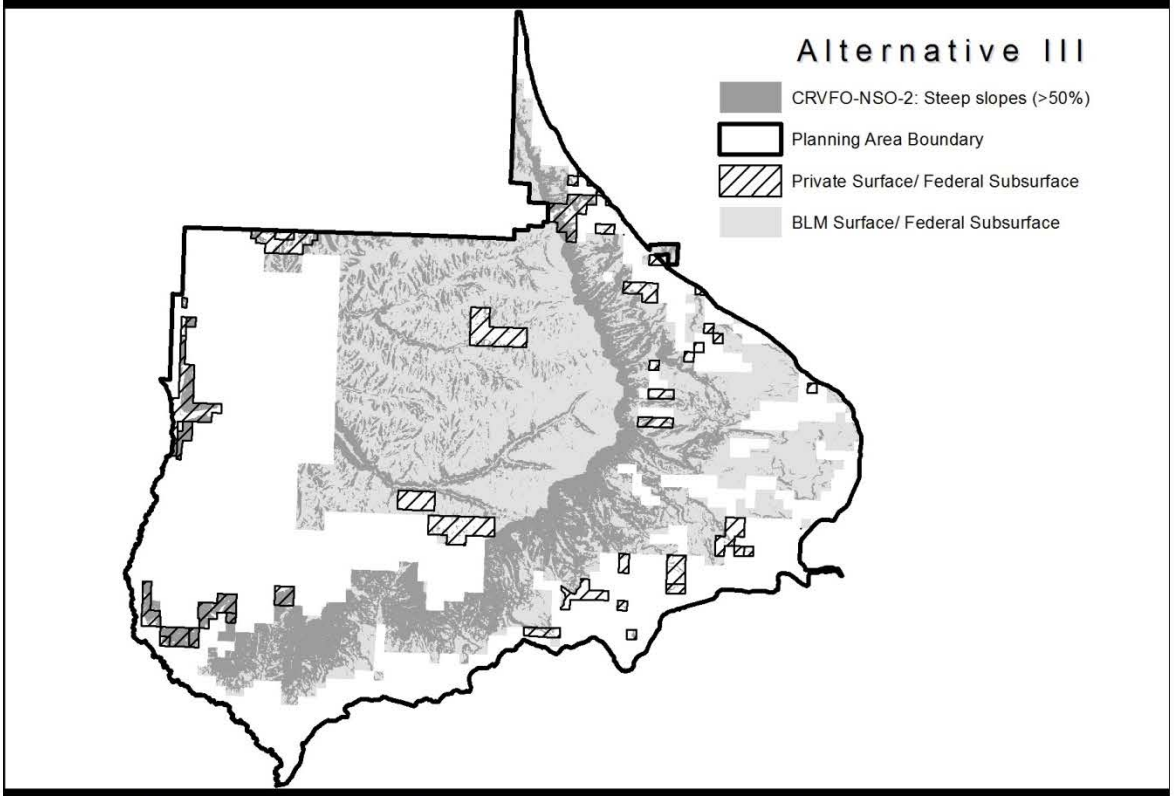
Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
the BLM. The MDP must identify all anticipated exploration, development, and production activities on federal leases within the area, identifying well locations, roads, pipelines, and any other exploration or production disturbance or facilities. The MDP must include all specific measures needed to comply with standards associated with all stipulations and any other decisions of this RMPA. The MDP must include an analysis of site-specific and cumulative environmental effects and mitigation. The MDP must also address reasonable alternatives, and other information sufficient to satisfy the requirements of the National Environmental Policy Act (NEPA). The extent of the analysis will be dependent on the extent of surface ownership, extent of lease holdings, topography, access, resource concerns, and the ability to tier to the Roan Plateau Environmental Impact Statement (EIS), consistent with 40 CFR § 1500. The extent of the analysis needed to comply with 40 CFR § 1500 may appropriately vary when considering individual wells or small groups of exploratory wells or for directional wells drilled on previously developed wellpads. To the extent practicable, the activities identified in the MDP must be presented in such a manner as to support the orderly and efficient exploration and development of mineral resources in an environmentally responsible manner. MDPs may be modified by operators as needed, and shall be reviewed by the operators not less than annually. As appropriate, either a statement documenting that the MDP is current or a modified MDP shall be provided to the BLM.
GS-LN-Roan-34: ESA Consultation
The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended, 16 USC § 1531 et seq., including completion of any required procedure for conference or consultation.
GRSG PHMAPHMA LN-46e: Any lands leased in PHMA are subject to the restrictions of 1 disturbance per 640 acres calculated by CO management zone to allow clustered development.
Stipulation currently under development as part of the NCGSG RMP/EIS process
GRSG PHMAPHMA LN -54e: Within PHMA, operators would be encouraged to complete Master Development Plans in consultation with the State of Colorado, instead of single well Applications for Permit to Drill for all exploratory wells.
Stipulation currently under development as part of the NCGSG RMP/EIS process
CRVFO-LN-Roan-35: Emergency Response Plan
The operator is required to prepare and maintain a current emergency response plan. The plan shall be provided to the BLM, Colorado State Patrol, the affected county and communities, and the general public. The plan shall contain information sufficient to describe the potential for emergency incidents related to fluid minerals development that pose an immediate danger to human health and safety and would normally require immediate actions by the operator to remove the threat, such as for hazardous materials spills; actions to be taken by the operator in the event of such an incident; and a communications plan to inform appropriate authorities and potentially affected citizens.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

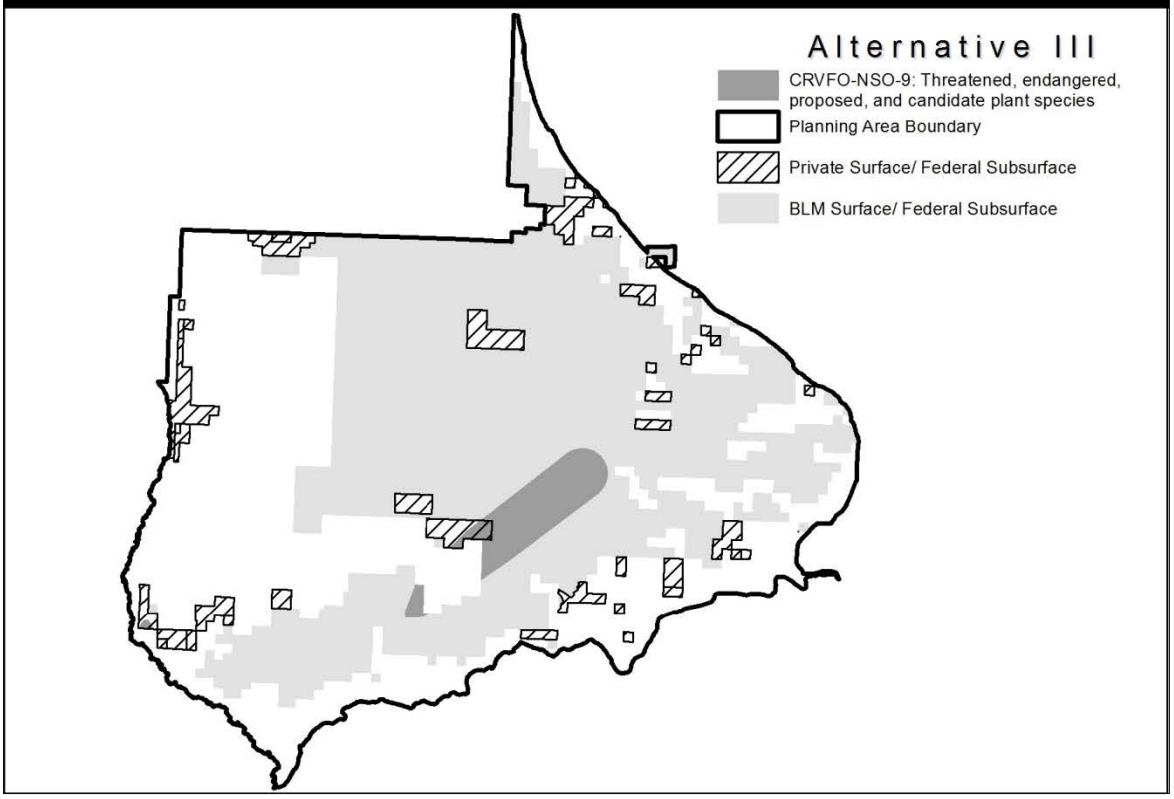
Appendix Table C-3. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative III, Community Alternative[1]
Conditions of Approval (COAs) Stipulations
GRSG PHMAPHMA COA-47-51b/c
The operator/lessee is required to conduct site- specific review of proposed projects prior to approval of Applications for Permit to drill. For leases within PHMA, the following COAs would apply: • Preclude new surface occupancy on existing leases within PHMA. • If the lease is entirely within PHMA, do not allow surface occupancy of any portion within 4 miles around the lek and limit permitted disturbances to one per section with no more than 3 percent surface disturbance in that section. • If the entire lease is within the 4-mile lek perimeter, limit permitted disturbances to one per section with no more than 3 percent surface disturbance in that section. Require any development to be placed at the most distal part of the lease from the lek, or depending on topography and other habitat aspects, in an area that is demonstrably less harmful to GRSG, such as based on topography or vegetation. The surface occupancy restriction criteria identified in this notice may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on federal, state, or private lands within PHMA.
GRSG PHMAPHMA COA-52b/d
Apply a seasonal restriction on exploratory drilling in PHMA to prohibit surface-disturbing activities during the lekking, nesting, and early brood rearing season. This COA is to be attached to leases within PHMA and could preclude the lessee the right to occupy the surface of the lease within PHMA during nesting and early brood rearing.
GRSG ADH COA-52c
Apply seasonal restriction on exploratory drilling to prohibit surface-disturbing activities during the lekking, nesting, and early brood rearing season in ADH. This restriction shall also apply to related activities that are disruptive to GRSG, including vehicle traffic and other human presence. This COA to be attached to leases within ADH could preclude the lessee the right to occupy the surface of the lease within ADH during nesting and early brood rearing.
GRSG PHMAPHMA COA-55b
For leases that are not yet developed within PHMA, the proposed surface disturbance cannot exceed 3 percent within that Colorado MZ. This restriction on surface occupancy may preclude surface occupancy and maybe beyond the ability of the lessee to meet due to existing surface disturbance on federal, state, or private lands within PHMA.

[1] NSO, CSU, and TL stipulations may overlap within and among categories. Acres of stipulations cannot be summed to calculate total area affected.

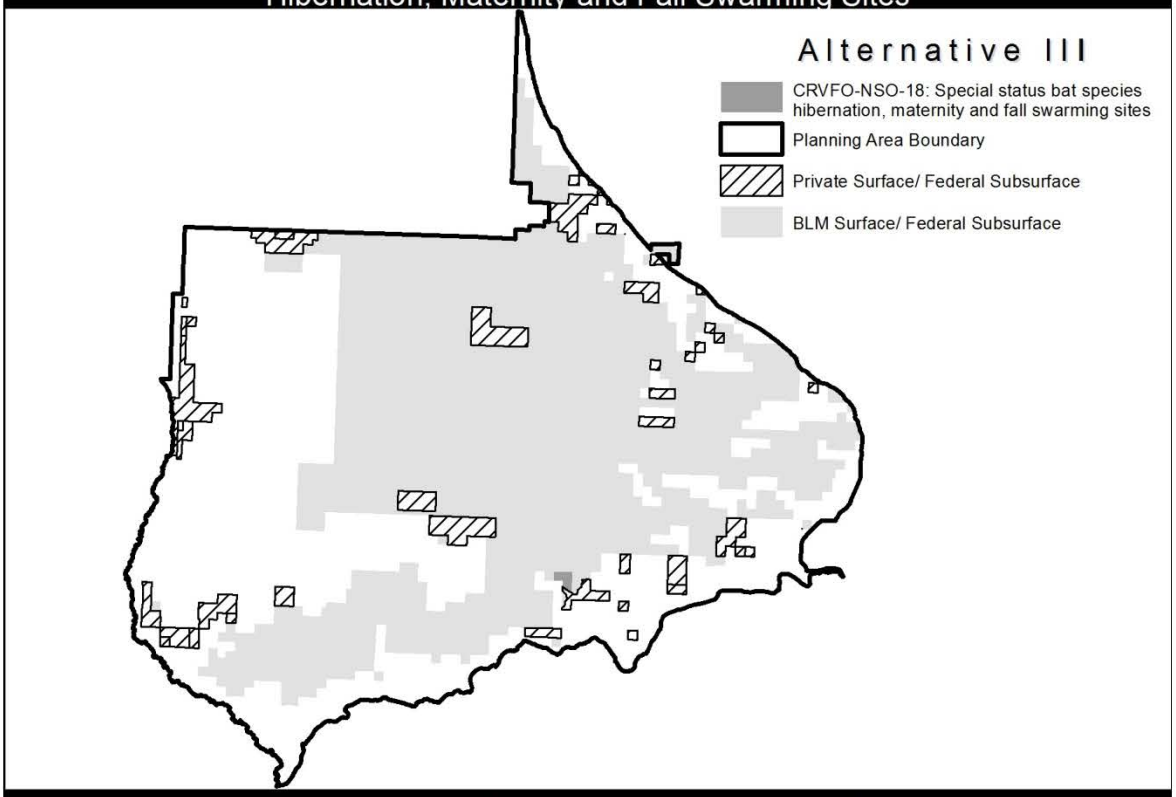
CRVFO-NSO-2: Steep Slopes (>50%)



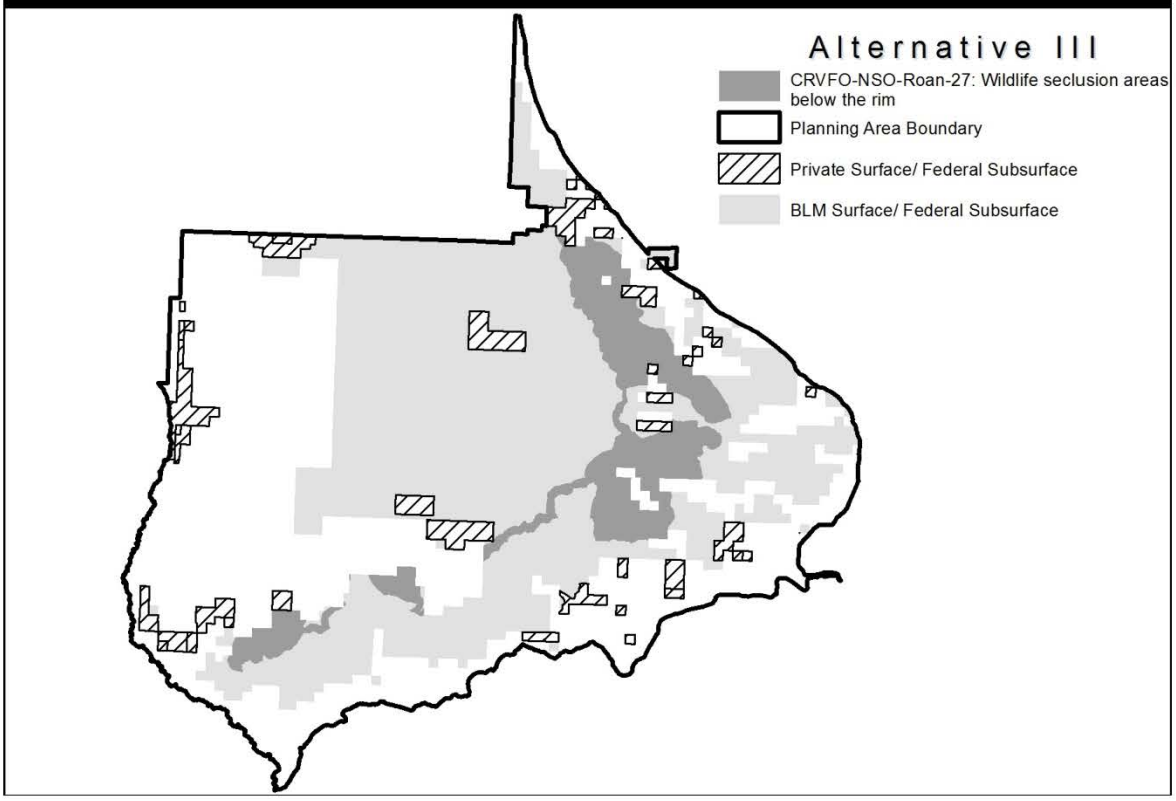
CRVFO-NSO-9: Threatened, Endangered, Proposed, and Candidate Plant Species



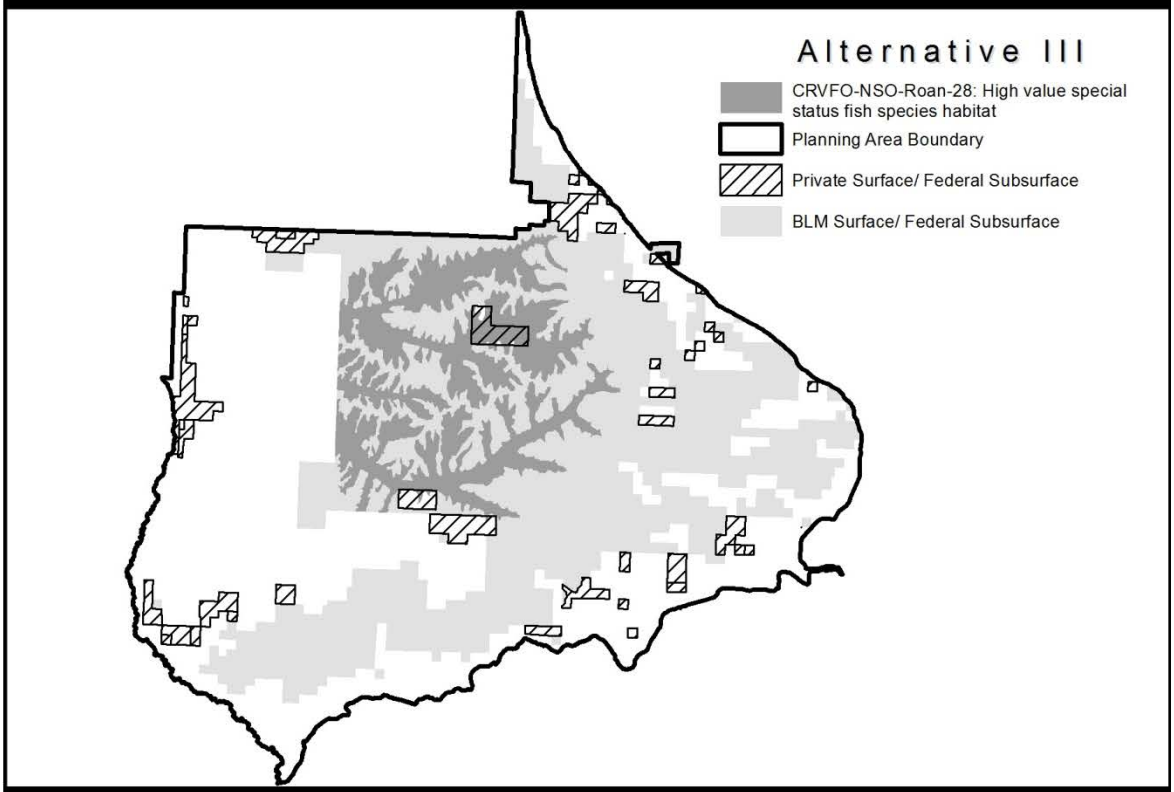
CRVFO-NSO-18: Special Status Bat Species Hibernation, Maternity and Fall Swarming Sites



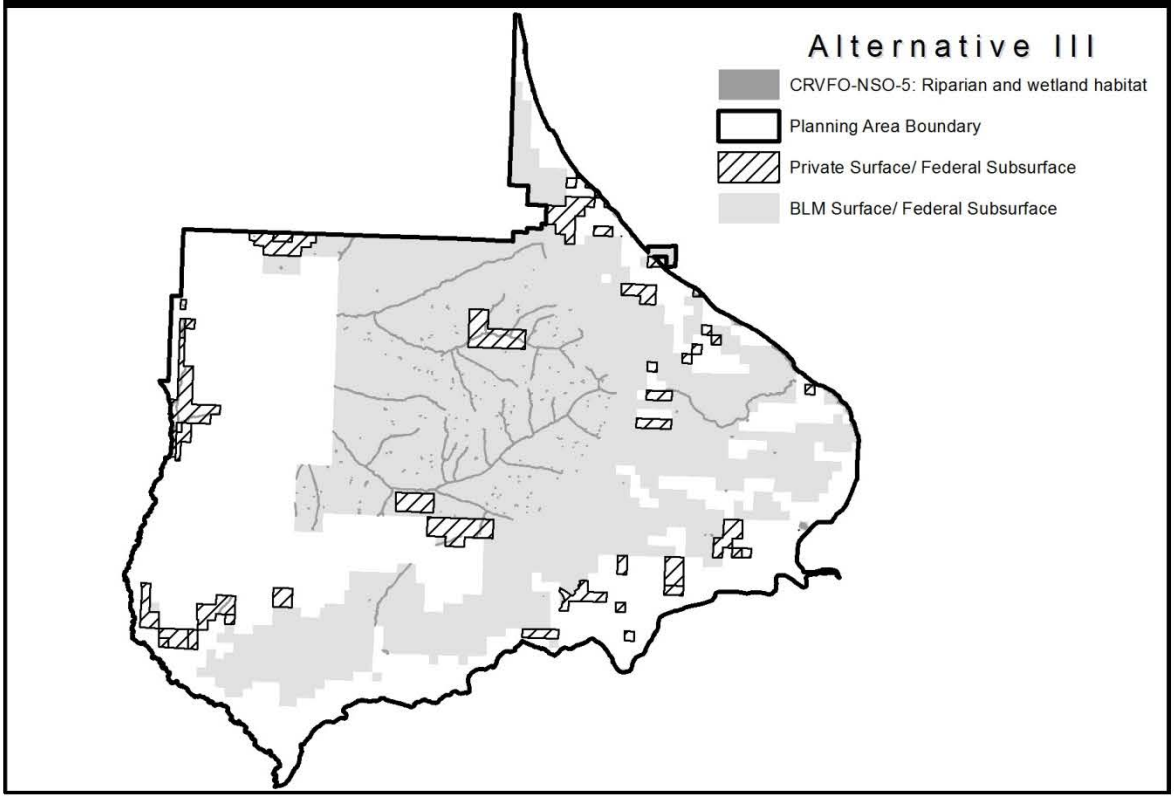
CRVFO-NSO-Roan-27: Wildlife Seclusion Areas Below the Rim



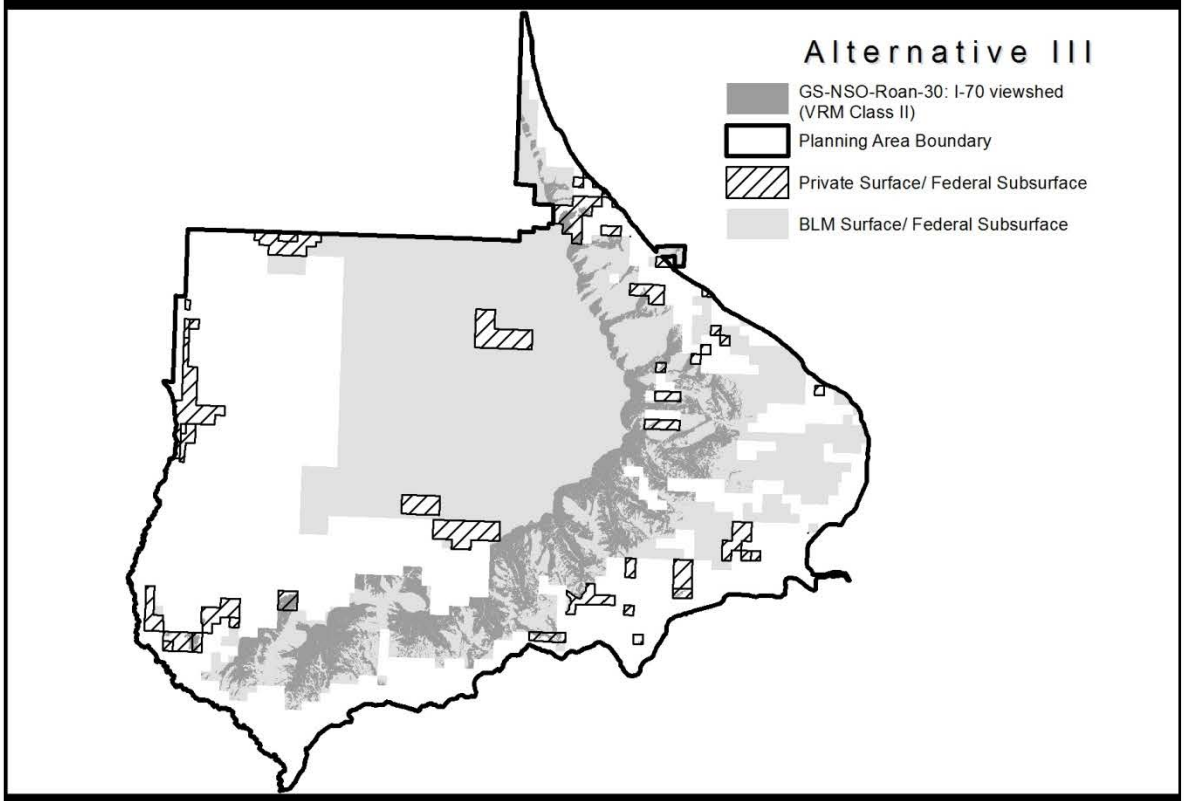
CRVFO-NSO-Roan-28: High Value Special Status Fish Species Habitat



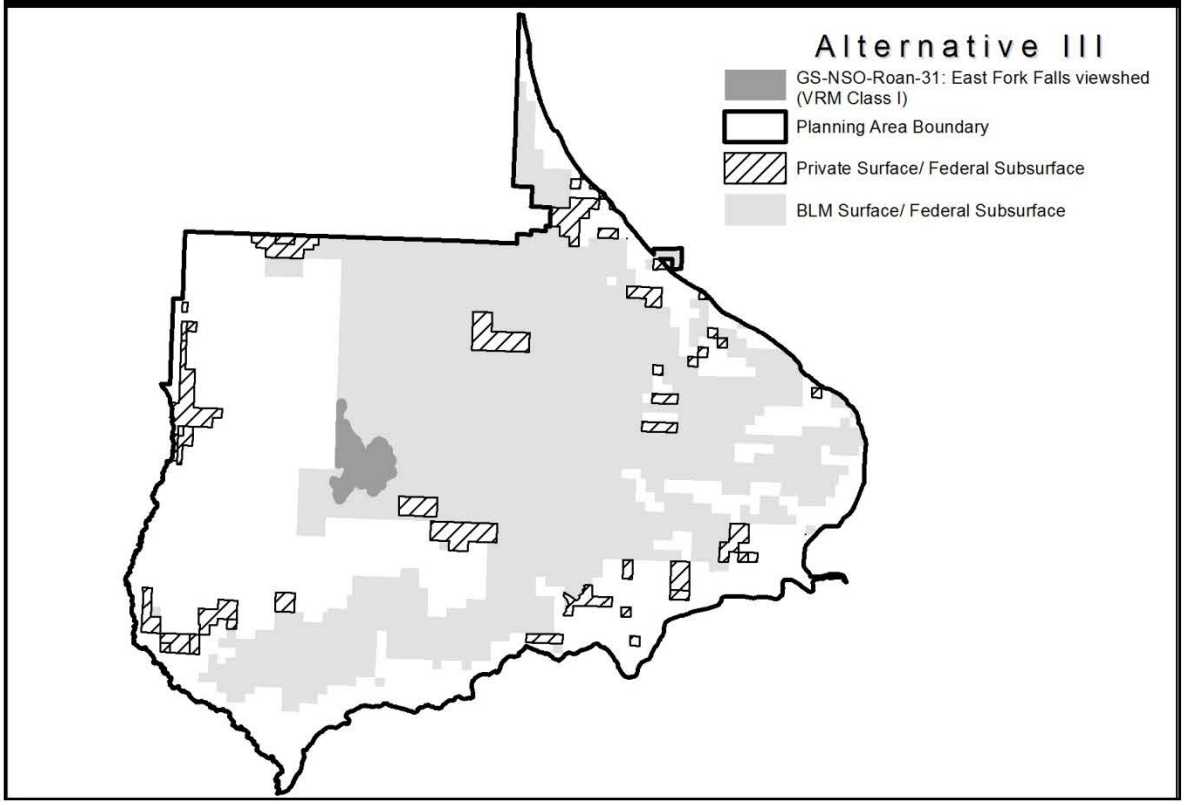
CRVFO-NSO-5: Riparian and Wetland Habitat

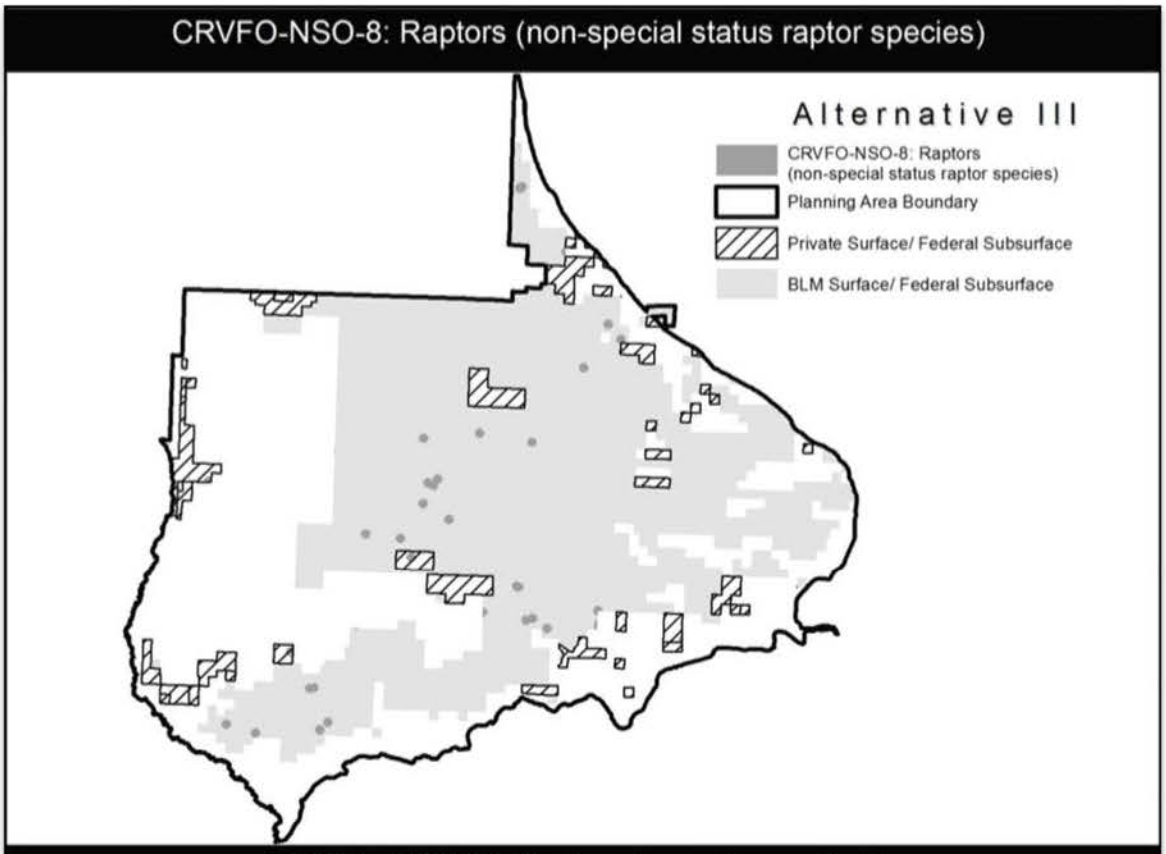


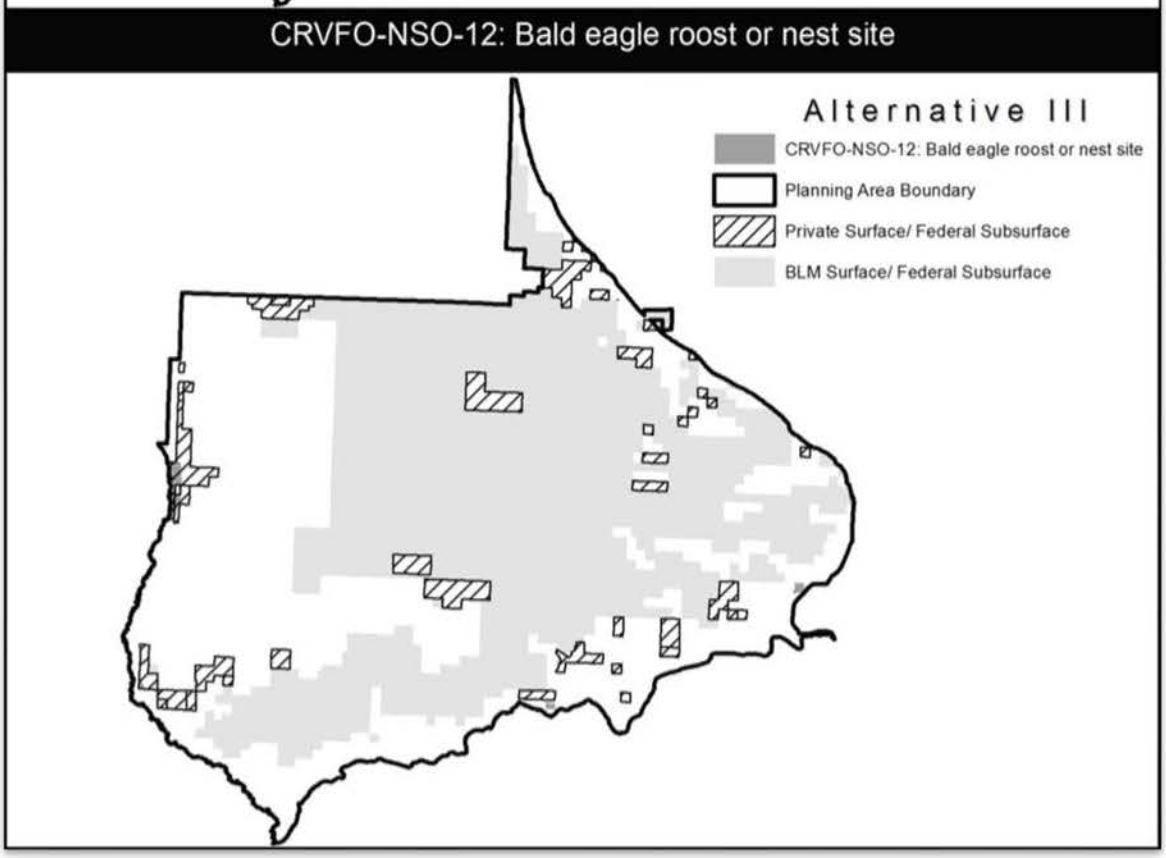
GS-NSO-Roan-30: I-70 Viewshed (VRM Class II)



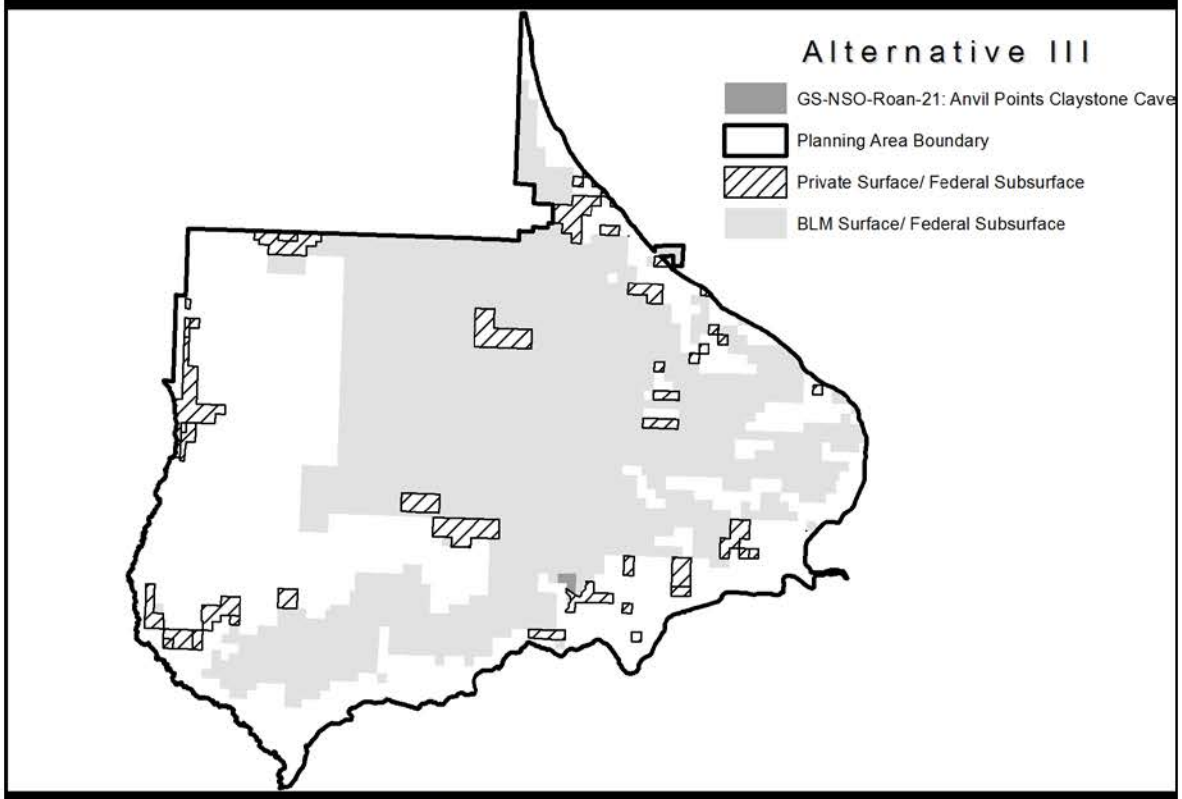
GS-NSO-Roan-31: East Fork Falls Viewshed (VRM Class I)



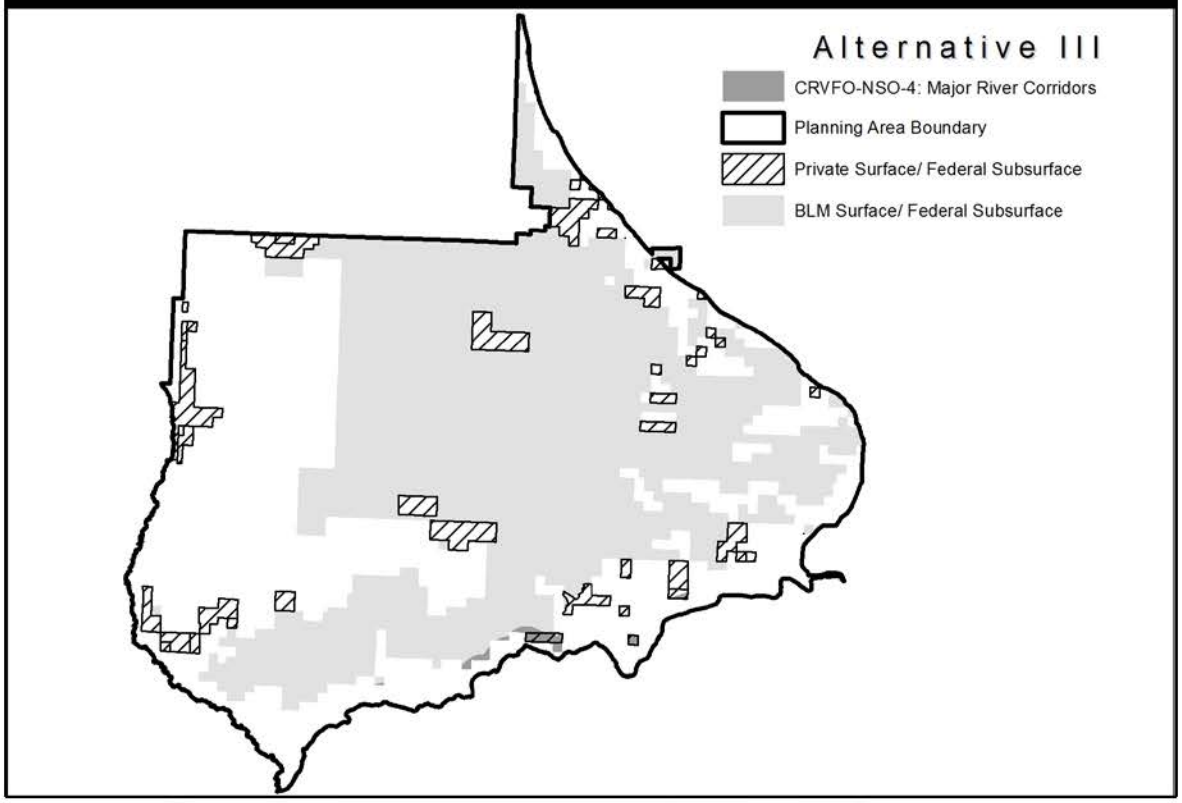

CRVFO-NSO-8: Raptors (non-special status raptor species)
Alternative III
CRVFO-NSO-8: Raptors
(non-special status raptor species)
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


CRVFO-NSO-12: Bald eagle roost or nest site
Alternative III
CRVFO-NSO-12: Bald eagle roost or nest site
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

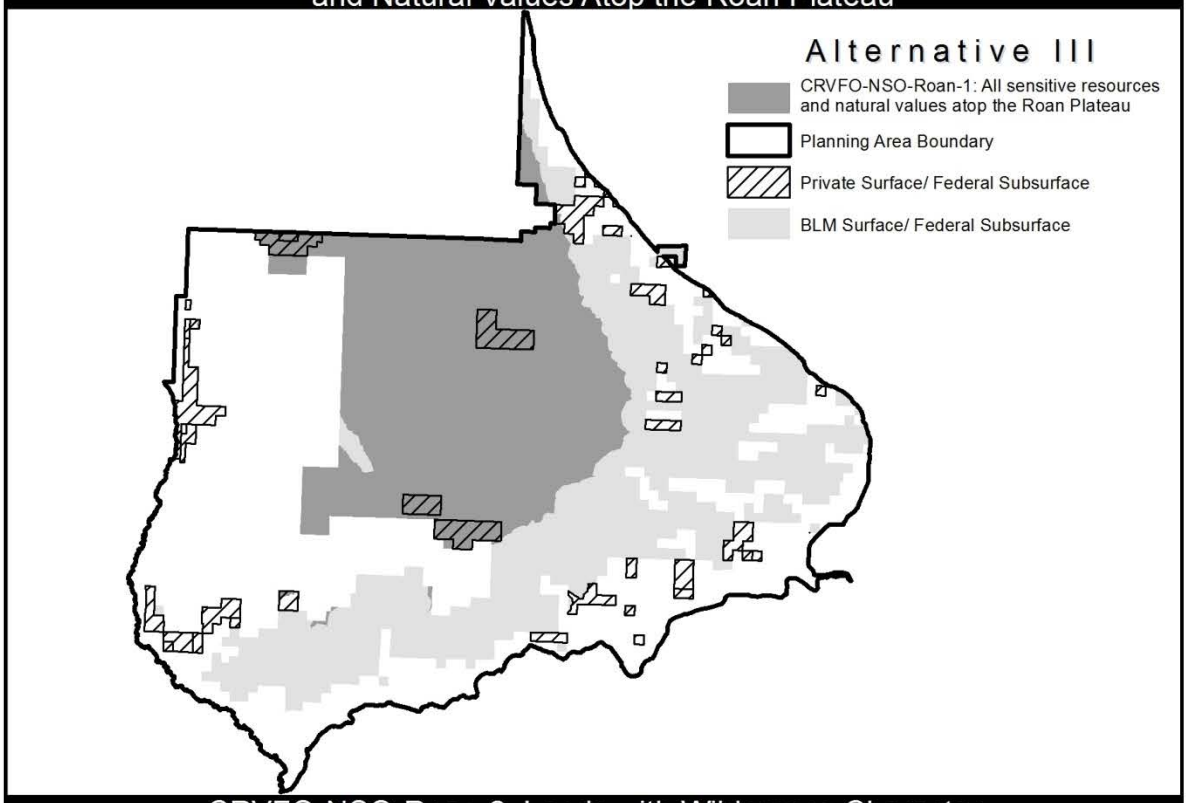
GS-NSO-Roan-21: Anvil Points Claystone Cave



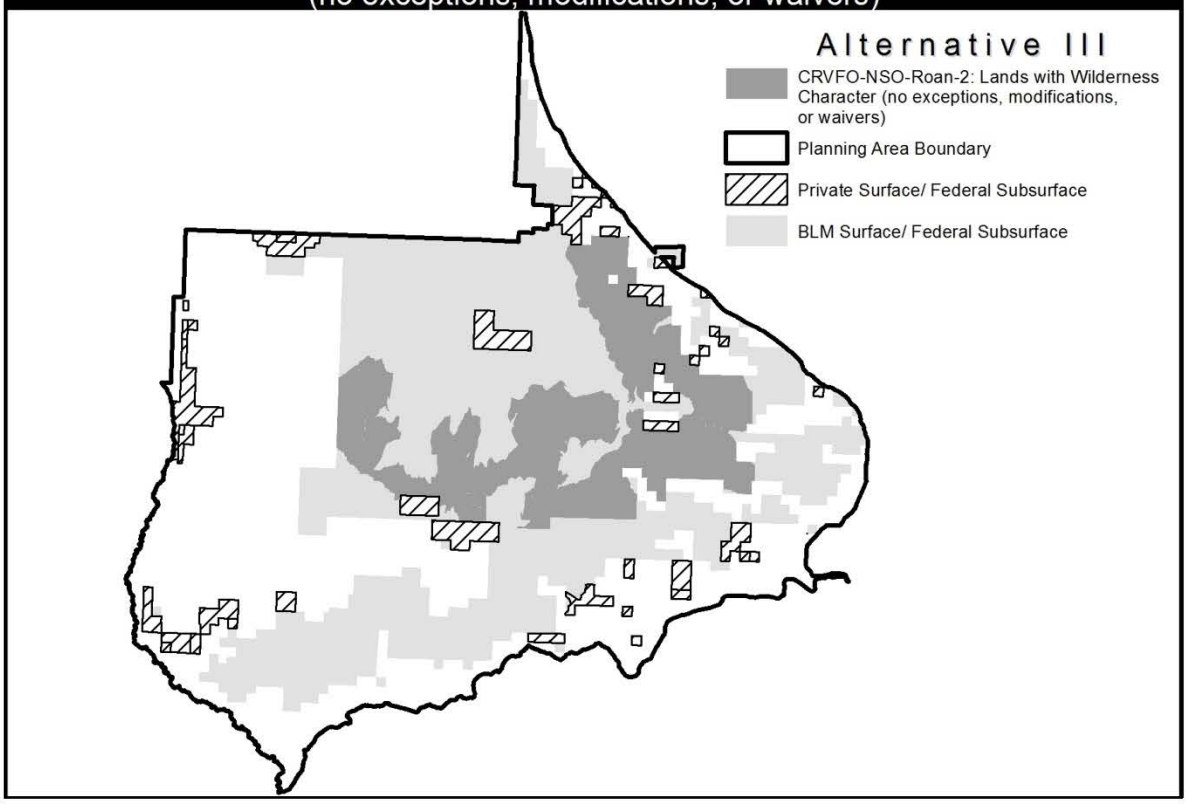
CRVFO-NSO-4: Major River Corridors

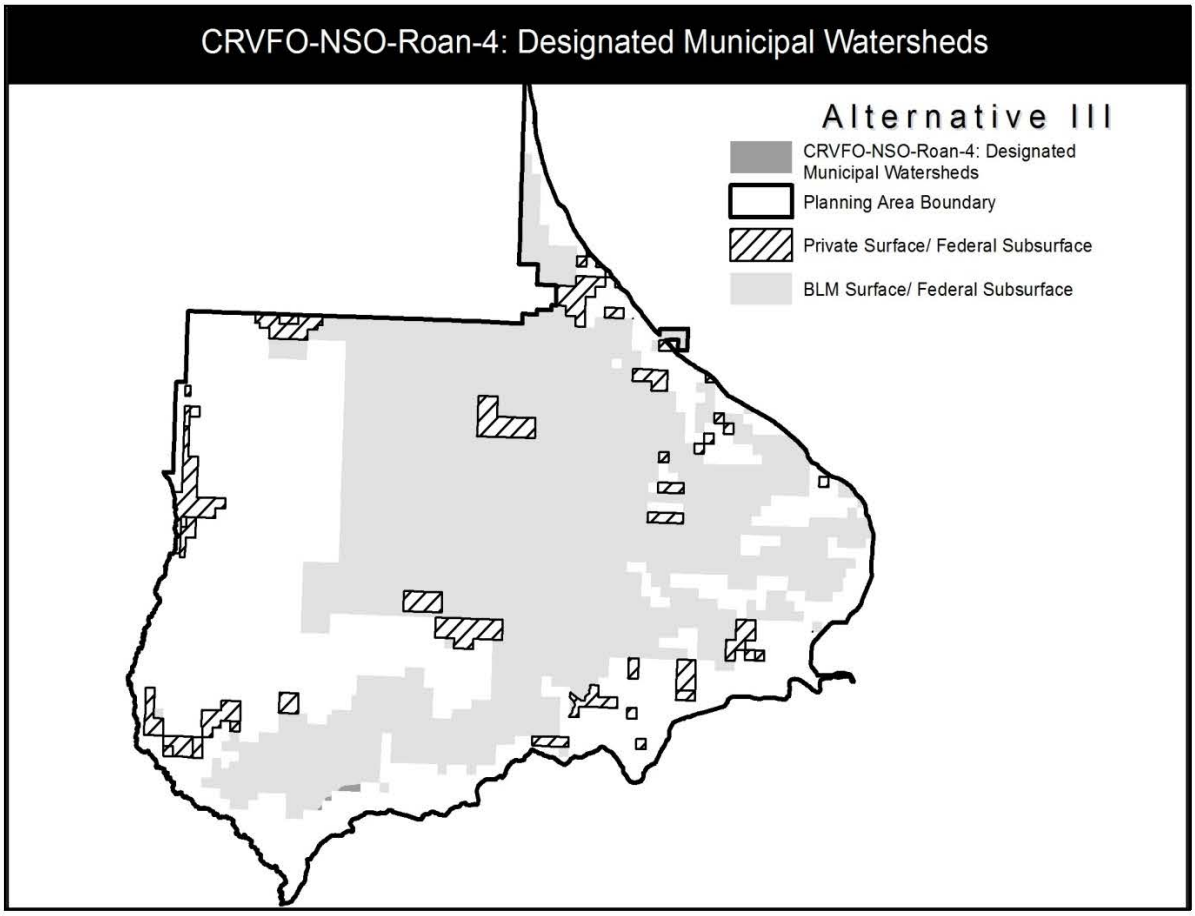


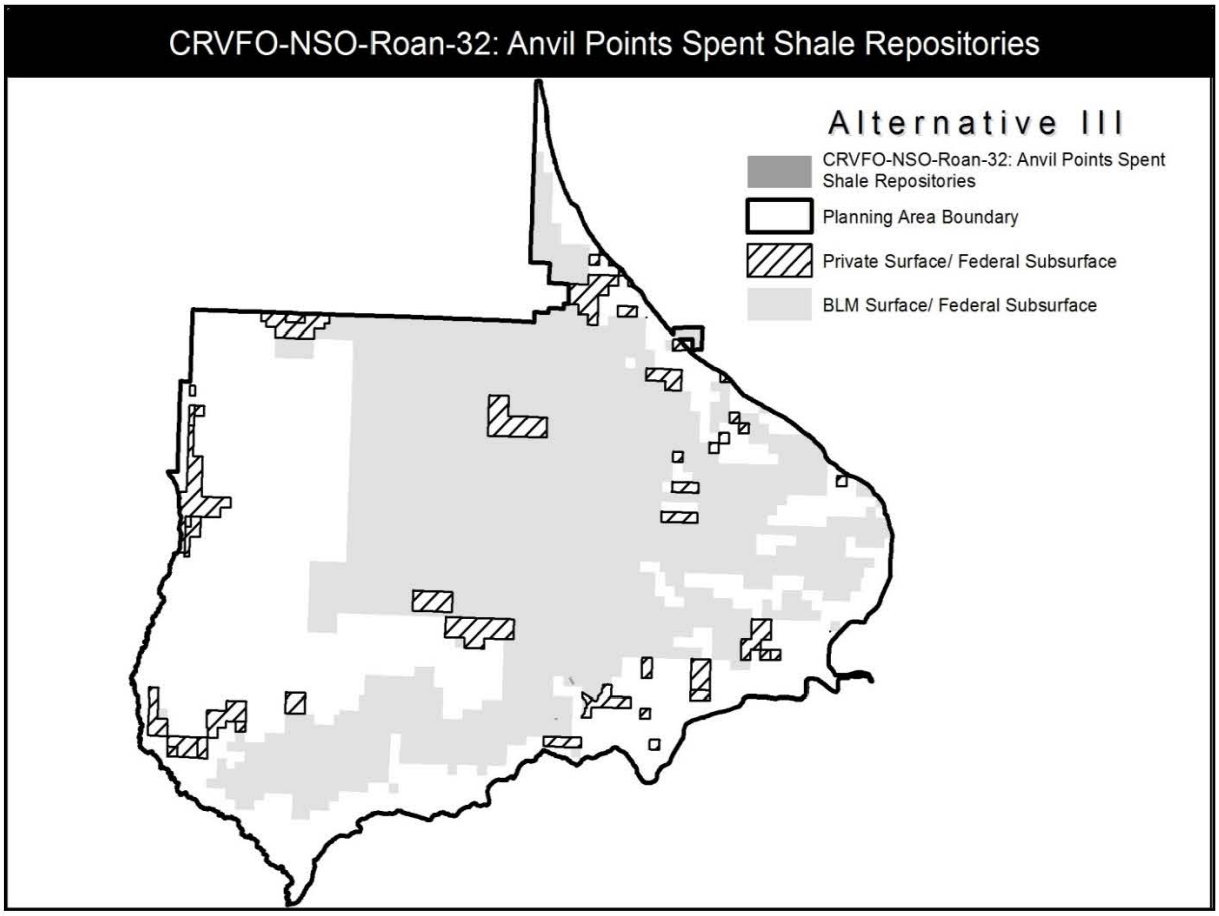
CRVFO-NSO-Roan-1: All Sensitive Resources and Natural Values Atop the Roan Plateau



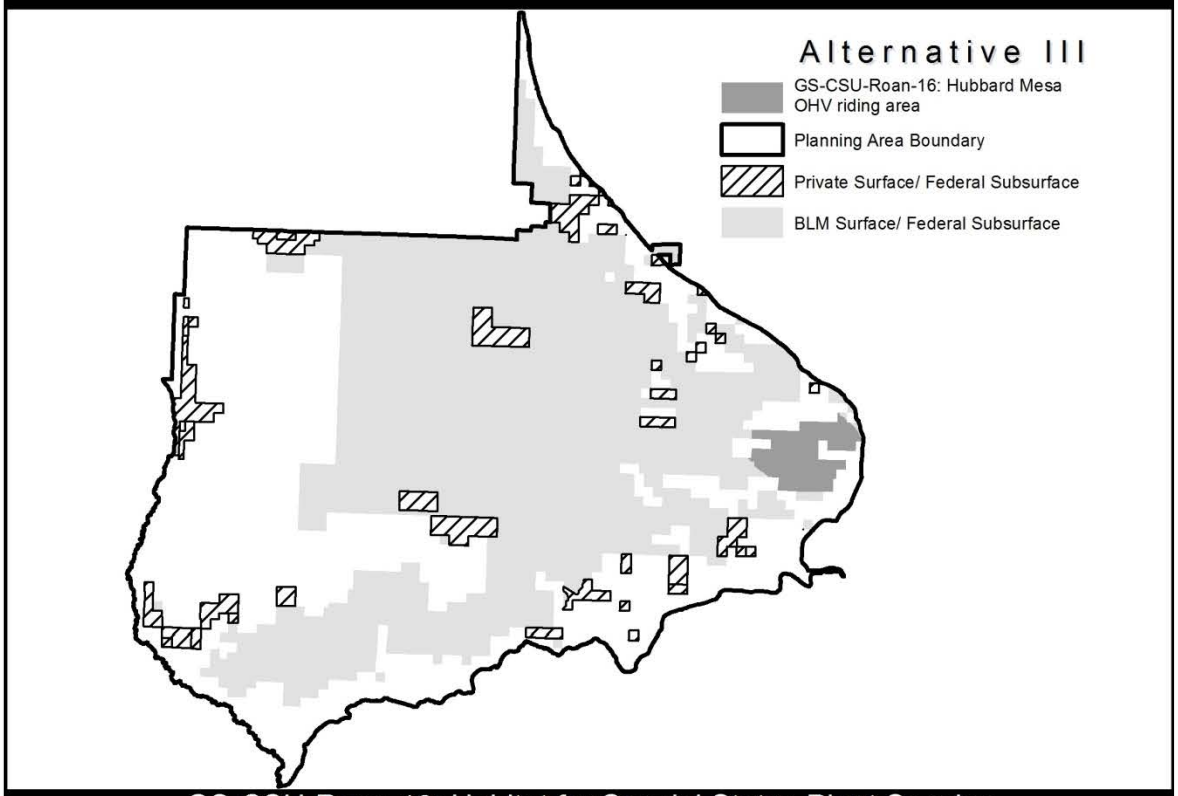
CRVFO-NSO-Roan-2: Lands with Wilderness Character (no exceptions, modifications, or waivers)



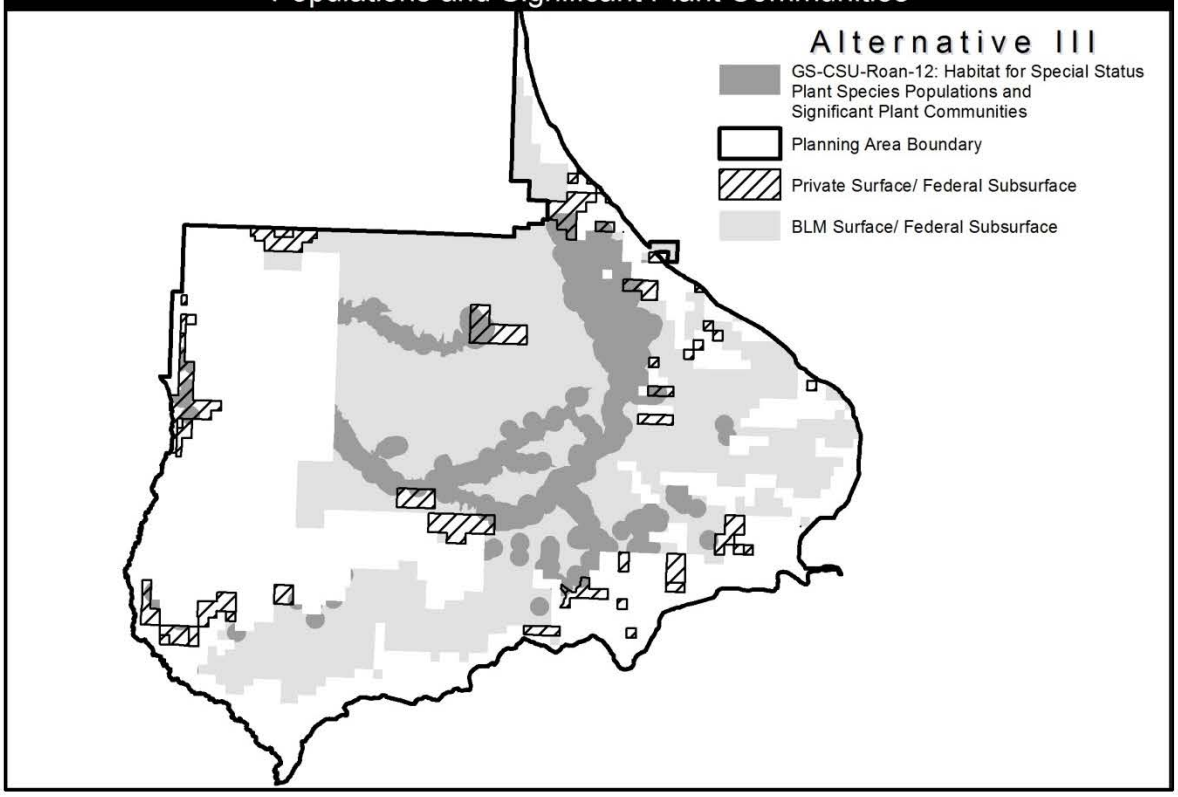

CRVFO-NSO-Roan-4: Designated Municipal Watersheds
Alternative III
CRVFO-NSO-Roan-4: Designated Municipal Watersheds
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


CRVFO-NSO-Roan-32: Anvil Points Spent Shale Repositories
Alternative III
CRVFO-NSO-Roan-32: Anvil Points Spent Shale Repositories
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

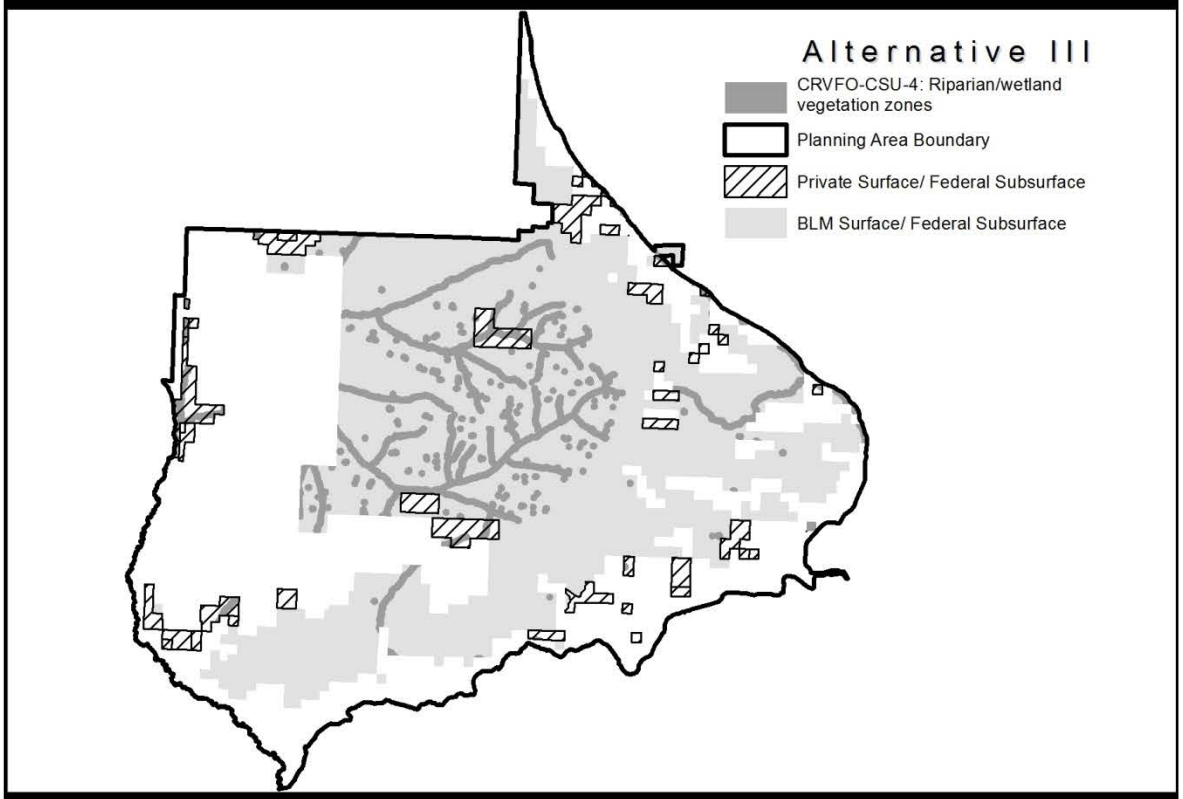
GS-CSU-Roan-16: Hubbard Mesa OHV Riding Area



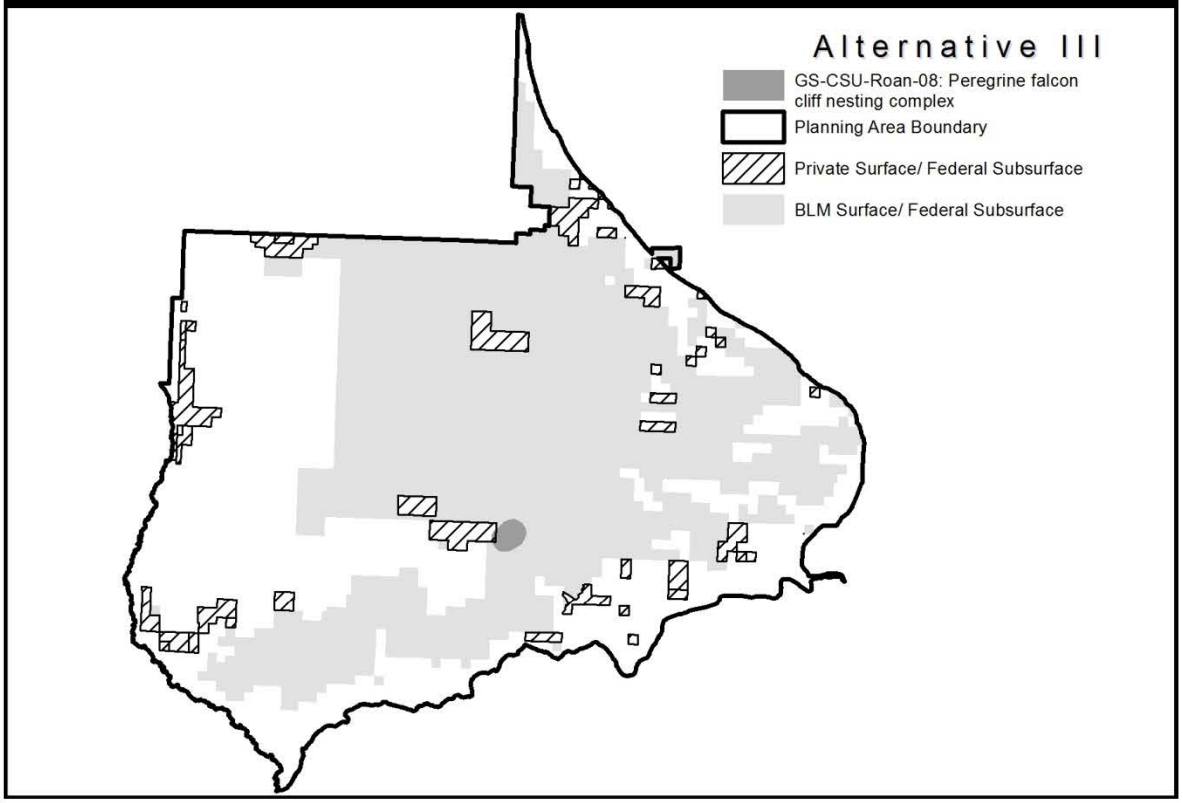
GS-CSU-Roan-12: Habitat for Special Status Plant Species Populations and Significant Plant Communities



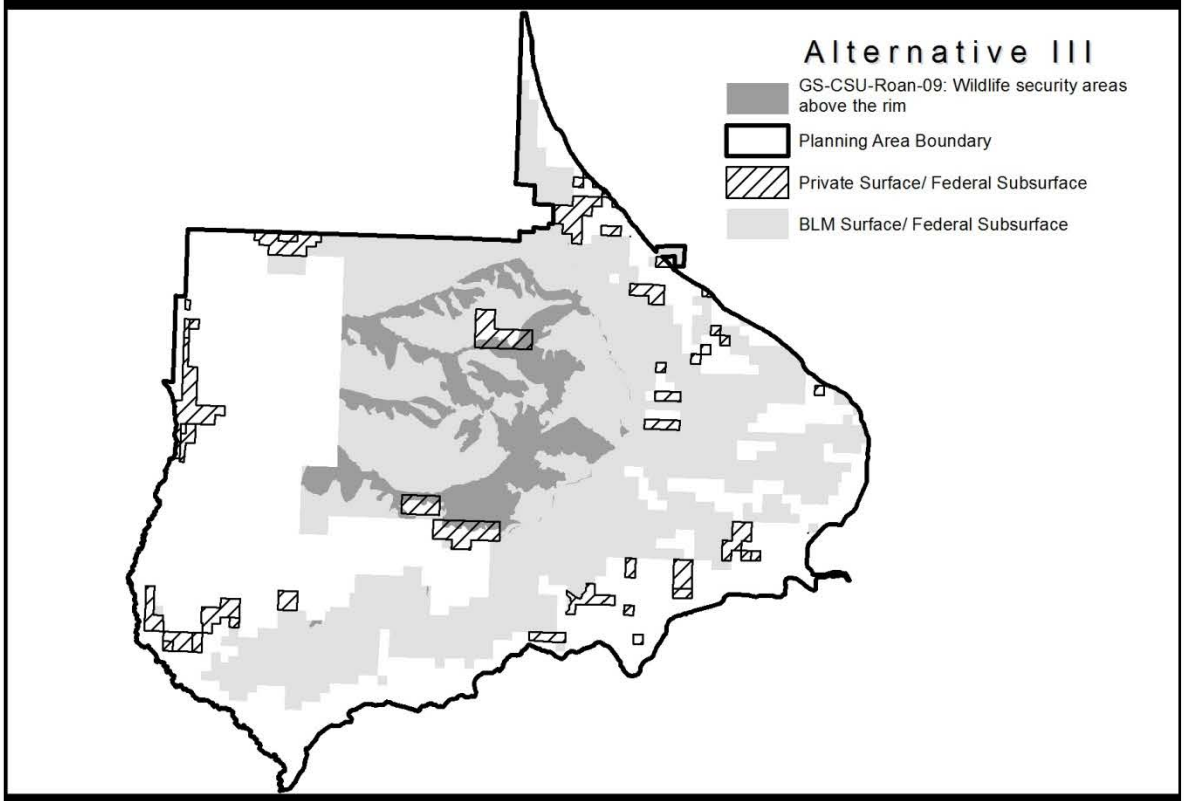
CRVFO-CSU-4: Riparian/Wetland Vegetation Zones



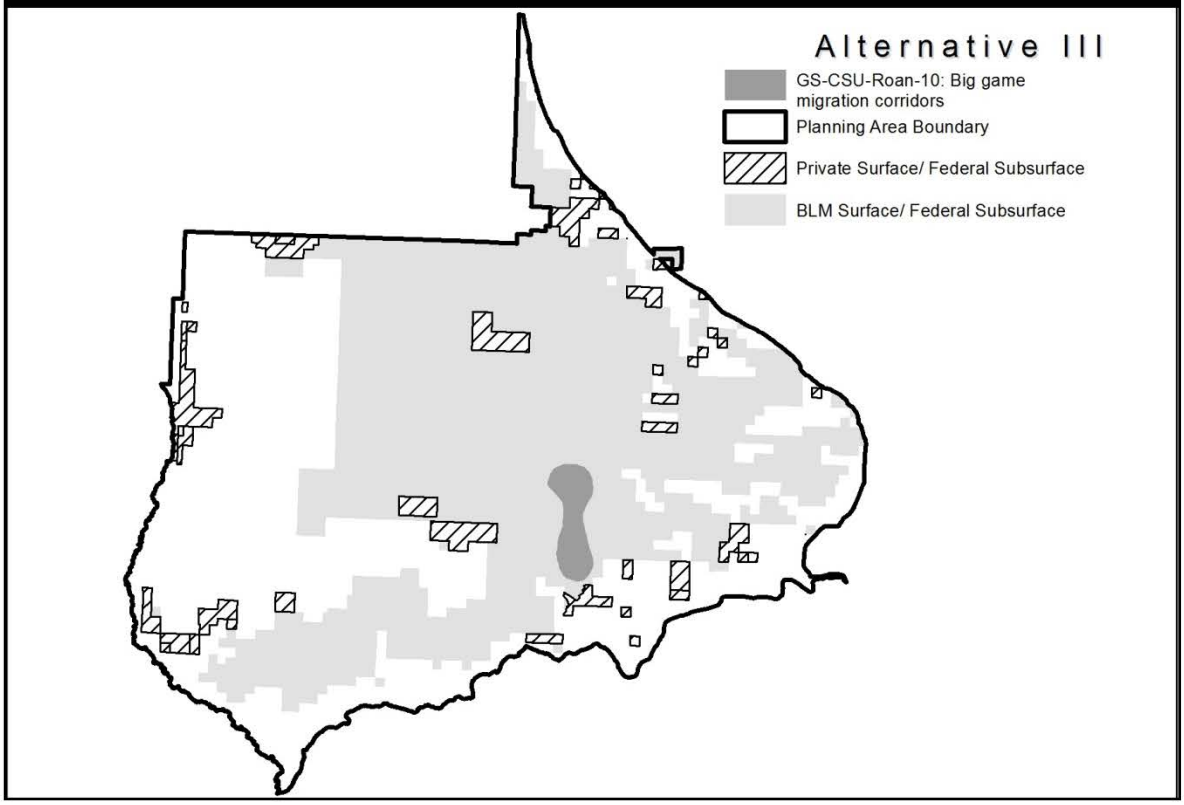
GS-CSU-Roan-8: Peregrine Falcon Cliff Nesting Complex



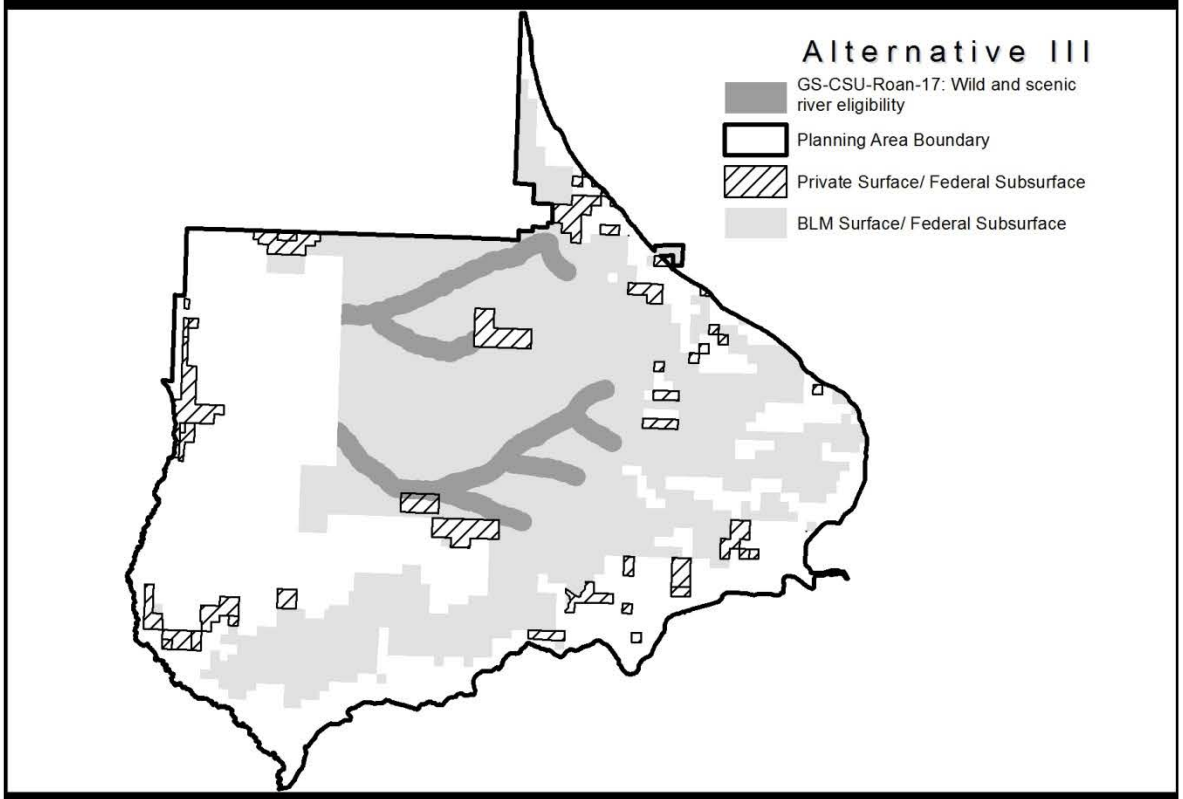
GS-CSU-Roan-09: Wildlife Security Areas Above the Rim



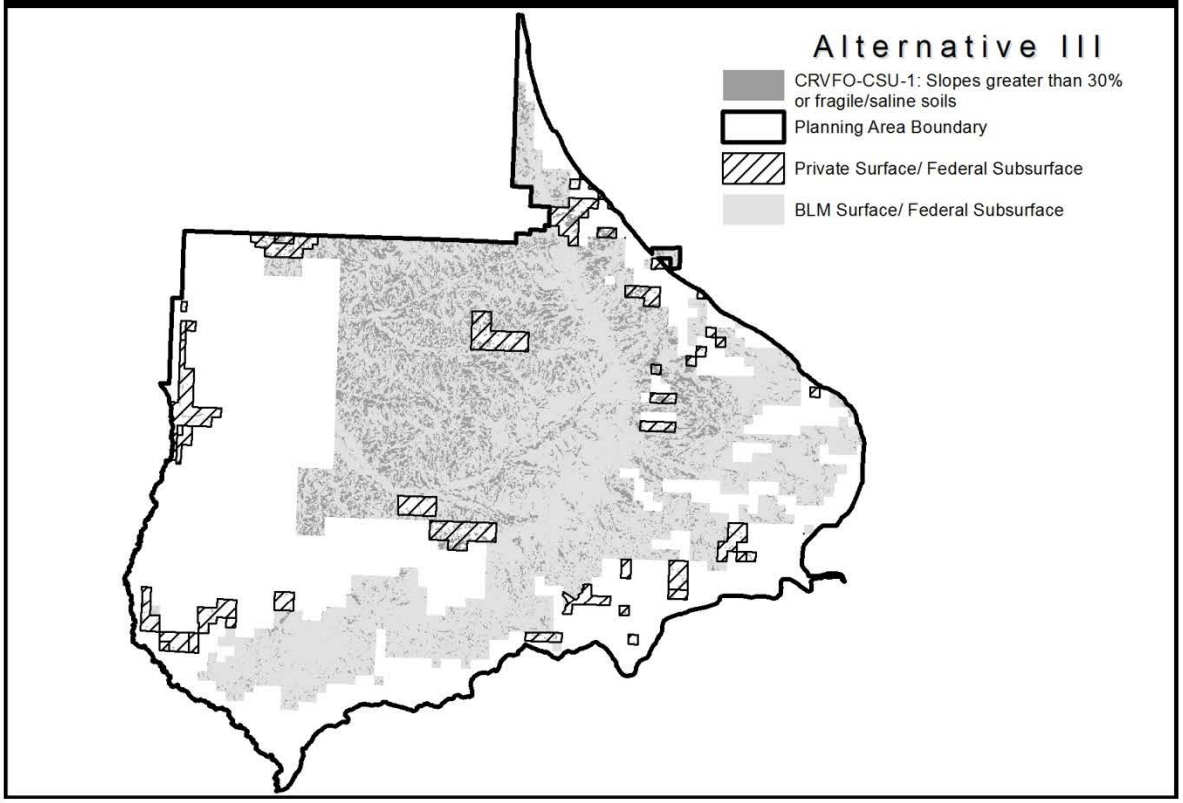
GS-CSU-Roan-10: Big Game Migration Corridors



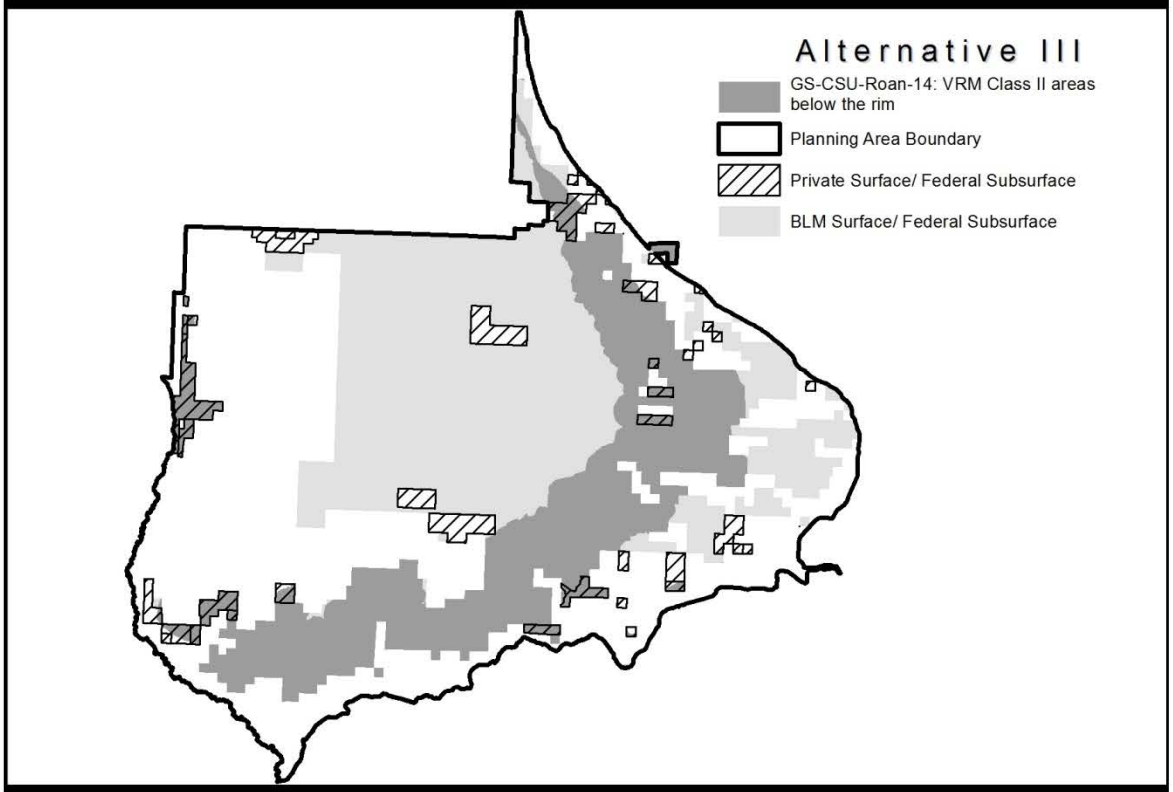
GS-CSU-Roan-17: Wild and Scenic River Eligibility



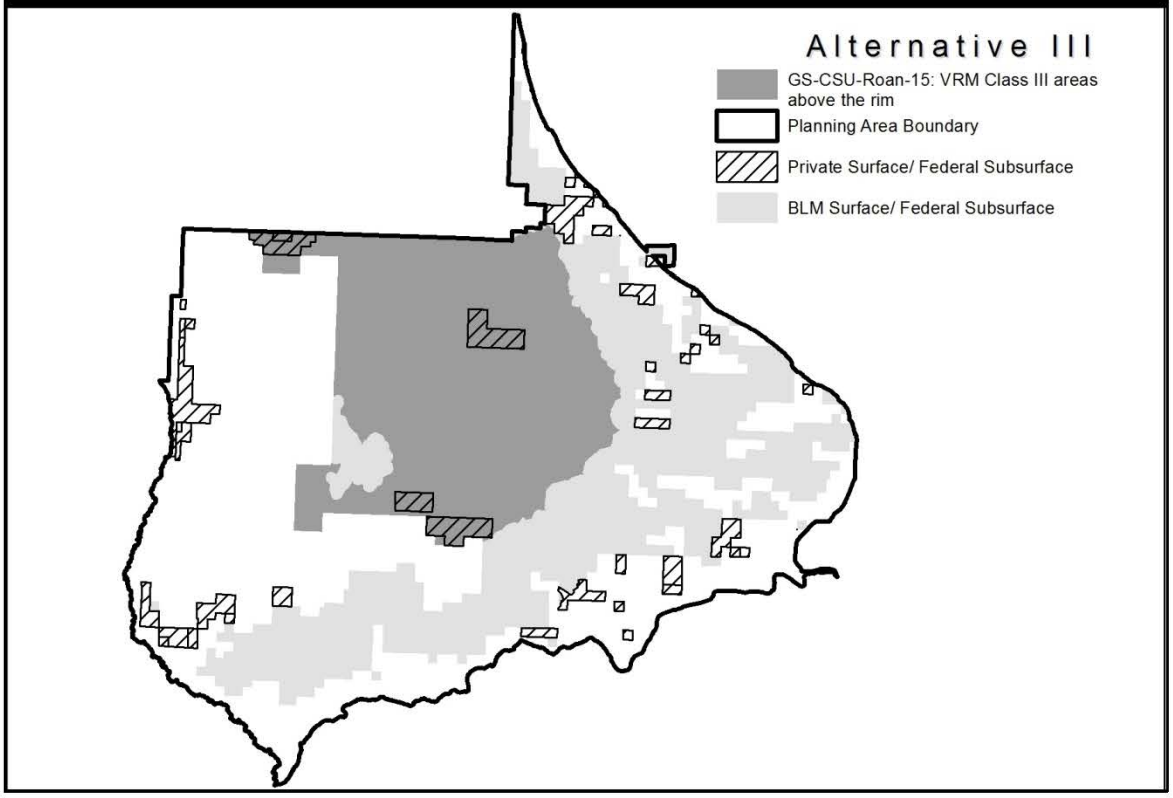
CRVFO-CSU-1: Slopes Greater than 30% or Fragile/Saline Soils

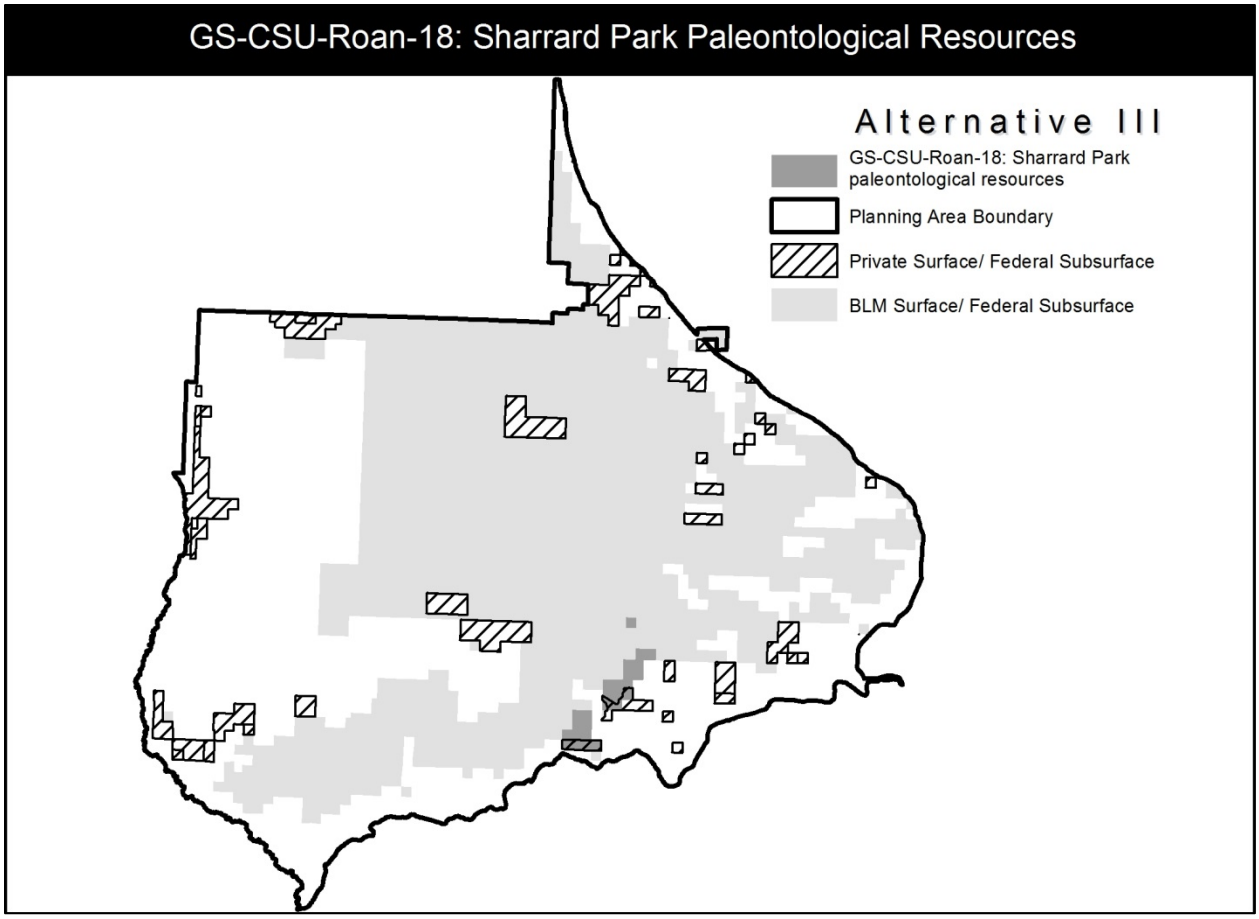


GS-CSU-Roan-14: VRM Class II Areas Below the Rim

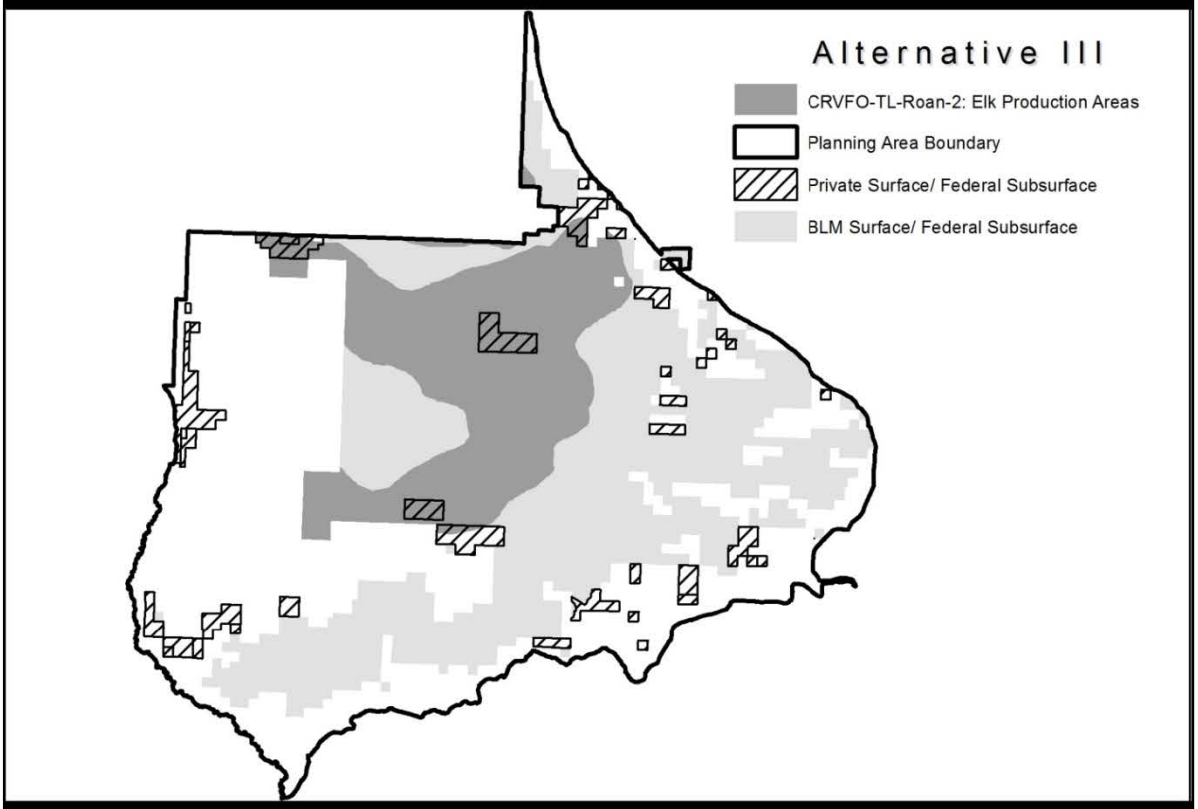


GS-CSU-Roan-15: VRM Class III Areas Above the Rim

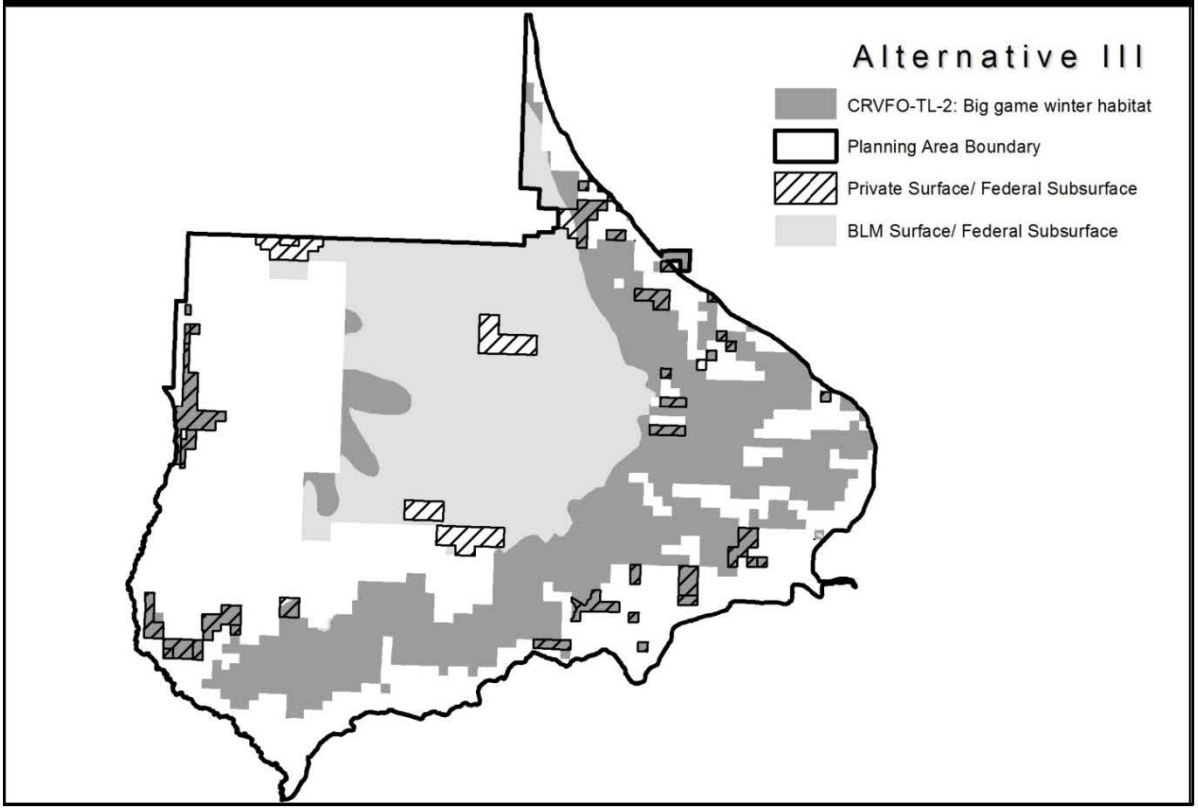



GS-CSU-Roan-18: Sharrard Park Paleontological Resources
Alternative III
GS-CSU-Roan-18: Sharrard Park paleontological resources
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

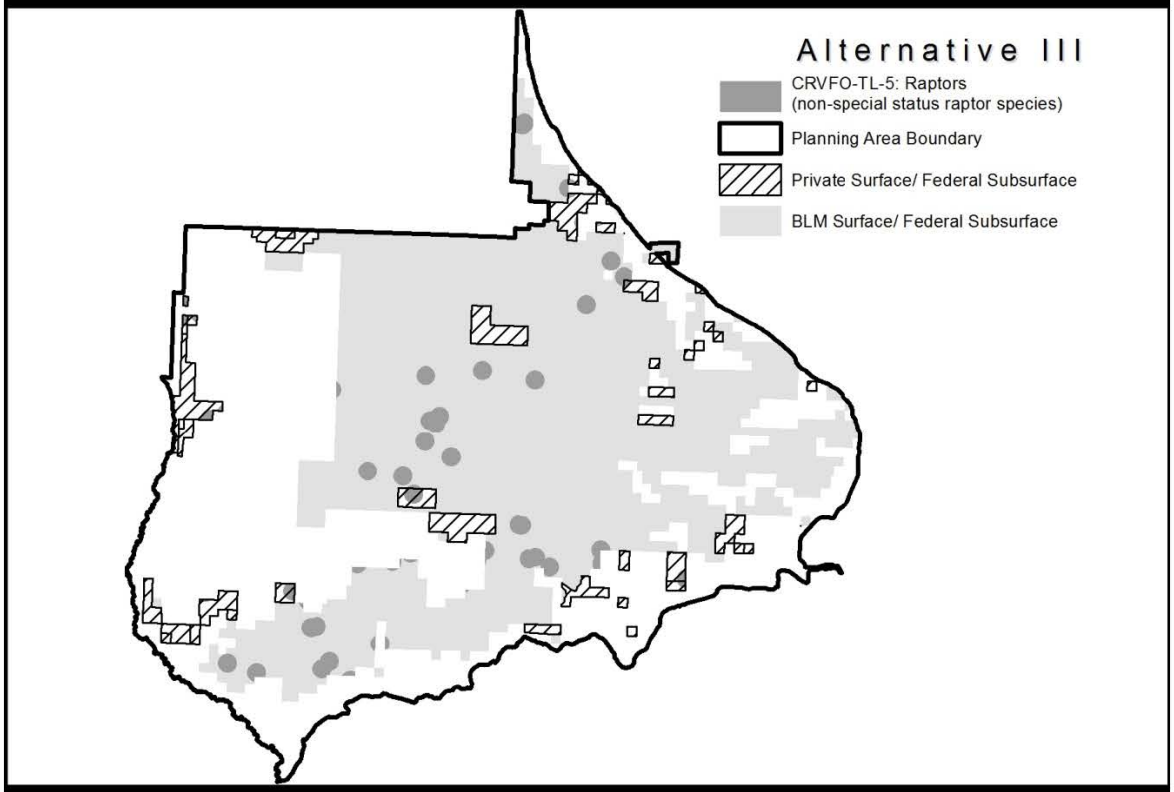
CRVFO-TL-Roan-2: Elk Production Areas



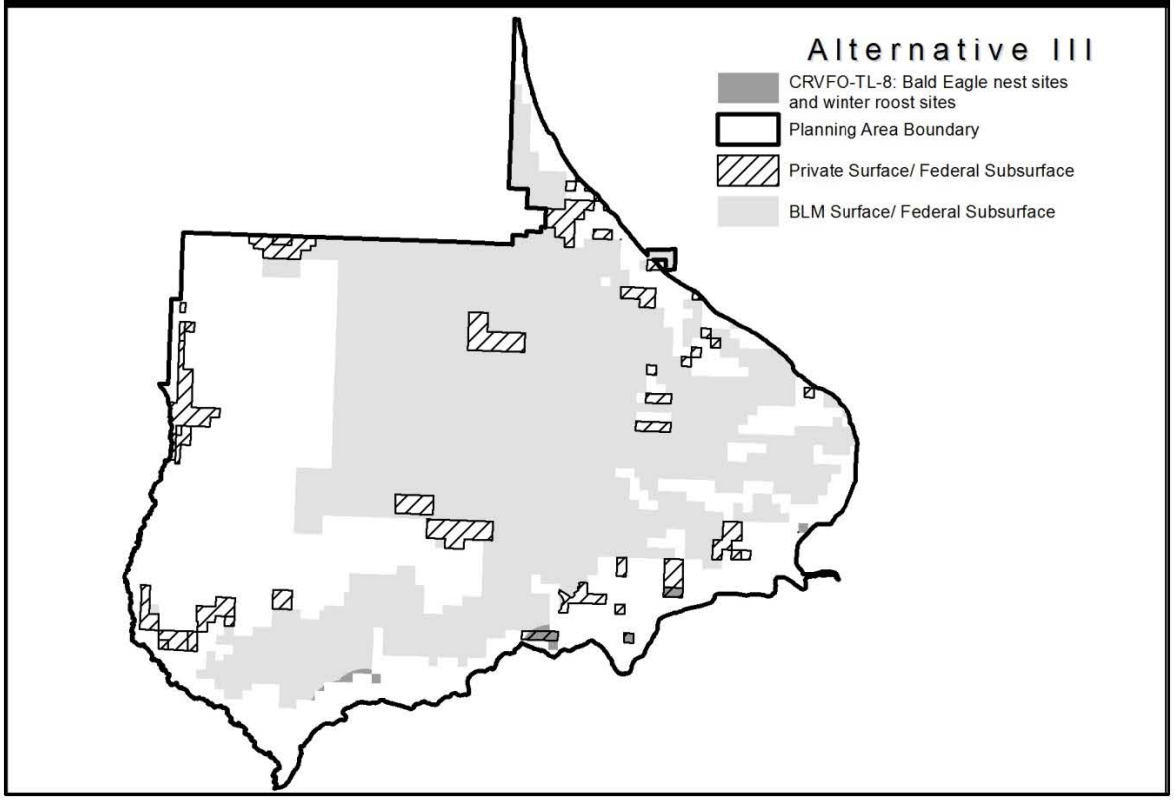
CRVFO-TL-2: Big Game Winter Habitat



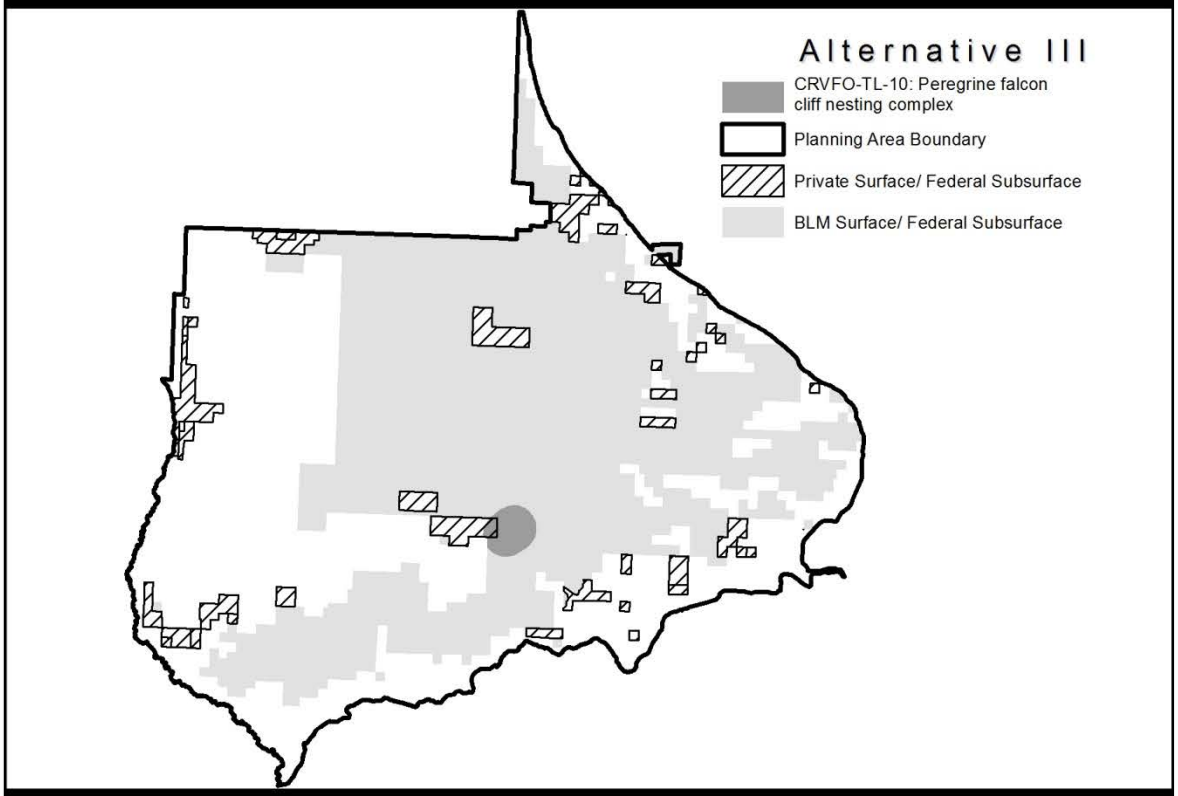
CRVFO-TL-5: Raptors (Non-special status raptor species)



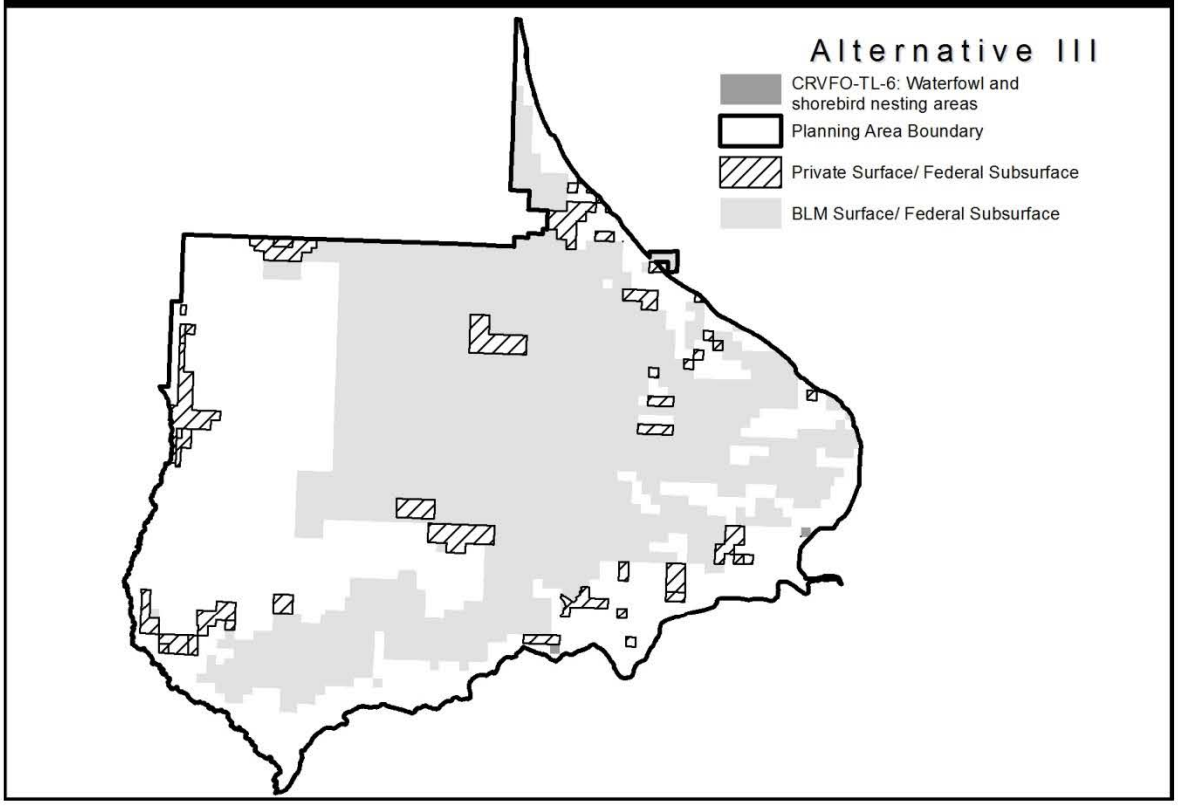
CRVFO-TL-8: Bald Eagle Nest Sites and Winter Roost Sites



CRVFO-TL-10: Peregrine Falcon Cliff Nesting Complex



CRVFO-TL-6: Waterfowl and Shorebird Nesting Areas



Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
No Surface Occupancy (NSO) Stipulations	
GS-NSO-Roan-22: Steep Slopes (>50%), 13,840 acres	
Stipulation	**Standards**
NSO on slopes greater than 50 percent. No ground-disturbing activities on the 13,840 acres of slopes steeper than 50 percent.	1. No ground-disturbing activities will be granted in areas of steep slopes that also are designated as wildlife movement corridors. 2. Ground-disturbing activities in areas with slopes steeper than 50 percent will not be granted for access to areas with slopes less than 50 percent. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards detailed in Appendix I.
GS-NSO-Roan-24: Threatened, Endangered, or Candidate Species Habitat, 290 acres	
Stipulation	**Standards**
NSO to protect occupied habitat, designated critical habitat, and immediately adjacent potential habitat crucial for the maintenance or recovery of species listed under the Endangered Species Act (ESA) or by the State of Colorado as threatened or endangered (including proposed or candidate species under the ESA). No ground-disturbing activities within approximately 290 acres of habitat currently mapped as occupied, critical habitat, or immediately adjacent to potential habitat.	1. Ground-disturbing activity may be permitted if the BLM determines, following Section 7 consultation with USFWS or with CPW for State-listed species, that the requested activity would not impair values associated with maintenance or recovery of the species. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Ground-disturbing activities must avoid a 0.25-mile buffer around Mexican spotted owl nest sites year-round, with seasonal avoidance of active nests and a 0.5-mile buffer from February 1 - August 15.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
	3. If species affected by this stipulation is removed from the federal list, this stipulation would not apply to that specie. Other requirements, however, will apply if the species remains classified as sensitive, or is otherwise protected. 4. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be promptly notified, and corrective measures, as approved by the BLM, must be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 5. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
GS-NSO-Roan-25: Raptor Nest Sites, 590 acres	
Stipulation	**Standards**
NSO to protect approximately 590 acres around raptor nest areas not protected by the ESA or other species-specific stipulation. No ground-disturbing activities within 0.125 mile of an active nest (i.e., containing eggs or young or being attended by adults in preparation for nesting).	1. Site-specific ground-disturbing activity near active raptor nest sites will not be allowed between February 1 and August 15 unless the BLM determines, following consultation with CPW, that the requested activity would not impair values, behaviors, or habitat associated with nesting and fledging. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; potential to cause the nest not to be used or lead to nest failure; abandonment of the nest; mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species, or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-

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	disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
GS-NSO-Roan-26: Bald Eagle Nest or Winter Roost Sites, 380 acres	
Stipulation	**Standards**
NSO to protect approximately 380 acres of bald eagle nest, winter roost sites, and winter range. No ground disturbing activities within 0.25 mile of designated bald eagle nesting or roosting habitat, within bald eagle winter range, or within 0.25 mile of Fravert Reservoir (subject to valid existing rights and authorizations).	1. Ground-disturbing activity may be permitted if the BLM determines, following Section 7 consultation with USFWS or with CPW for State-listed species, that the requested activity would not impair values associated with maintenance or recovery of the species. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values

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	protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CSU-NSO-Roan-27: Wildlife Seclusion Areas Below the Rim, 6,830 acres	
Stipulation	**Standards**
NSO to protect important wildlife security areas below the rim, especially those for deer and elk. No ground-disturbing activities in approximately 6,830 acres that provide high-value habitats along and below the base of the Roan Cliffs.	1. Ground-disturbing activity may be permitted if BLM determines, following consultation with CPW, that the requested activity would not impair values associated with maintenance or recovery of the species. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and

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	(b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
GS-NSO-Roan-28: High-value Special Status Fish Species Habitat, 1,820 acres	
Stipulation	**Standards**
NSO to protect Colorado River cutthroat trout from direct and indirect impacts in high-value habitat. No ground-disturbing activities in approximately 1,820 acres that would result in loss or degradation of areas designated as high-value habitat for Colorado River cutthroat trout.	1. Prior to implementing any ground-disturbing activity or other project component in areas designated as high-value habitat for Colorado River cutthroat trout, the proponent must provide an assessment of potential impacts if any, to this resource value. The assessment will be based on current baseline data, collected by the proponent as approved by the BLM; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. 2. Ground-disturbing activity may be permitted if the BLM determines, following consultation with CPW, that the requested activity would not impair values associated with maintenance of the species of interest. In making this determination, the BLM will consider the following resource factors: habitat conditions needed for feeding, spawning, survival of eggs and larvae, and refugia during high or low flow. Impairment could include siltation of substrate; changes in flow regime (e.g., localized damming); loss of overhanging vegetation canopy; reduction in bank stability; reduction in water quality; and direct mortality of trout or trout eggs; behavioral and ecological relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species of interest or cause

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	habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; in such cases, approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 3. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 4. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
GS-NSO-Roan-23: Riparian and Wetland Habitat, 130 acres	
Stipulation	**Standards**
NSO to protect approximately 130 acres of riparian or wetland vegetation. Ground-disturbing activities including oil and gas facilities, roads, pipelines, electric transmission lines, communication facilities, and other sources of surface disturbance are limited to areas beyond the outer edge of riparian or wetland vegetation.	1. A ground-disturbing activity may be permitted only if BLM determines that (a) the activity will not cause loss of riparian vegetation or, if riparian vegetation is lost, that the loss is limited to no more than 0.1 acre, and 100 linear feet, per mile of stream; (b) any temporarily disturbed areas must be revegetated with existing or similar species, including use of containerized nursery stock rather than seeds to replace woody plants on a one-to-one basis (trees) or area-for-area basis (shrubs); (c) revegetation success will be achieved within 2 years; (d) the activity will not impair water quality, flow regime, aquatic habitat quality,

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	and channel and bank stability; and (e) no practicable alternative is available. Resource factors include topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or enhancement of the resource values. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; in such instances approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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GS-NSO-Roan-30: I-70 Viewshed (VRM Class II), 9,780 acres	
Stipulation	**Standards**
NSO to protect 9,780 acres of the Visual Resource Management (VRM) Class II, Interstate (I)-70 viewshed. No ground-disturbing activities on slopes steeper than 30 percent with high visual sensitivity in the I-70 viewshed. These are lands within 5 miles of the highway, of moderate to high visual exposure, where details of vegetation and landform are readily discernible, and changes in contrast can be easily noticed by the casual observer on I-70.	1. A ground-disturbing activity may be permitted if the BLM determines that the requested activity would not impair values associated with VRM Class II objectives or degrade the visual characteristics of the viewshed below Class II standards. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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GS-NSO-Roan-31: East Fork Falls Viewshed (VRM Class I), 600 acres	
Stipulation	**Standards**
NSO to protect East Fork Falls Viewshed (VRM Class II).	1. A ground-disturbing activity may be permitted if the BLM determines that the requested activity would not impair values associated with VRM Class II objectives or degrade the visual characteristics of the viewshed below Class II standards. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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GS-NSO-Roan-21: Anvil Points Claystone Cave, 120 acres	
Stipulation	**Standards**
NSO to protect 120 acres encompassing the Anvil Points Claystone Cave. No ground disturbing activities in the area encompassing the cave opening, subsurface features, and watersheds overlying the caves.	1. Prior to implementing any ground-disturbing activity or other project component in the area covered by this stipulation, the proponent must provide an assessment of potential impacts to this resource value. The assessment will be based on current baseline data; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. 2. A ground-disturbing activity may be permitted only if the BLM determines that a proposed activity would not impair the cave values, supported by a demonstration of such, based on monitoring data or another method with a high degree of scientific reliability, and considering the type, amount, duration, and timing of the activity; and after consultation with CPW regarding wildlife habitat values. 3. During and subsequent to the ground-disturbing activities covered by this provision, ongoing monitoring data will be collected using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified; and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 4. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
GS-NSO-Roan-29: Colorado River Corridor, 320 acres	
Stipulation	**Standards**
NSO to protect approximately320 acres of high-quality habitat and wildlife areas, water quality benefits, and scenic qualities along the Colorado River. No ground-disturbing activities within 0.5 mile of high-water mark on either side of river.	1. A specific activity may be allowed if the BLM determines that (a) the specific activity or requested change would not impair water quality, high-quality habitat, and scenic qualities after considering the vegetation, topography, existing habitat impacts, and other site-specific or activity-specific factors and the amount, type, and duration of surface disturbance proposed, and (b) any lost

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	vegetation would be replaced with the same or similar species within 3 to 5 years. 2. Short-term (reclaimed within two years of initiation) activities may be permitted if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
GRSG-NSO-46e1: *NSO within 2 miles of active GRSG leks, in GRSG ADH, no exceptions anticipated*	
Stipulation incorporates stipulation NSO-46e(1) from the NCGSG Proposed LUPA/FEIS by reference	
GRSG-NSO-46e2: *Exceptions, modifications, and waivers on the remainder of PHMA. Authorized Officer could grant and exception or modification in consultations with the State of Colorado.*	
Stipulation incorporates stipulation NSO-46e(2) from the NCGSG Proposed LUPA/FEIS by reference	
CRVFO-NSO-Roan 4: Designated Municipal Watershed, 70 acres	
Stipulation: Prohibit surface occupancy and surface-disturbing activities within: 1) the primary zone of a source water protection area for a permitted public water system; or 2) 1,000 horizontal feet of either side of a classified surface water supply stream segment (measured from the average high water mark) for a distance of 5 miles upstream of a public water supply intake with the classification "Water Supply" by the State of Colorado used as a public (municipal) water supply. A permitted public water system will have a number assigned by the State of Colorado. A watershed that serves a public water system as defined by the State of Colorado is a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. **Purpose:** To protect the watershed that serves a drinking water supply for a permitted public water system from potential contamination. **Exception:** BLM may consider use of new technology or engineered plans designed to protect water supply streams and intakes from operations located closer than specified in the stipulation. Consideration of special technology or designs will be coordinated with appropriate water authorities and owners (e.g. municipalities, home owners associations, source water protection stakeholder groups, etc.). In addition, activity may be permitted if the Authorized Officer determines, in consultation with the appropriate water authorities and owners, that the applicant's proposal would not cause a decrease in water quality. **Modification:** The water supply or water intake is altered. **Waiver:** The water intake is not used as a public water supply.	
CRVFO-NSO-Roan-32: Anvil Points Spent Shale Repositories, 10 acres	
Stipulation	**Standards**
Prohibit surface occupancy and surface-disturbing activities for spent shale repositories.	1. Recommend modification of the current oil shale withdrawal affecting the transferred lands to allow for land tenure actions while keeping land closed to mineral location and entry, but retain oil shale withdrawal (without modification) for Anvil Points Facility Repositories 1 and 2 for consistency with perpetual

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	ROW on repositories. 2. Recommend withdrawal of Anvil Points Oil Shale Facility Repository 3” 3. Retain BLM ROW on Anvil Points Facility Repositories 1, 2, and 3.
Controlled Surface Use (CSU) Stipulations	
GS-CSU-Roan-12: Habitat for BLM Sensitive Plant Species Populations and Significant Plant Communities, 8,030 acres	
Stipulation	**Standards**
CSU to protect approximately 8,030 acres of special status plant species or significant plant communities. The BLM may require special design, construction, operation, mitigation, or reclamation measures, and/or relocation by more than 200 meters for any ground-disturbing activities, electric transmission lines, and other sources for disturbance within a watershed that would disturb, alter, or interrupt the hydrologic or ecological processes that support special status plant species or significant plant communities. Special status plants include the following: DeBeque milkvetch (*Astragalus debequaeus*), DeBeque phacelia (*Phacelia submutica*), hanging garden sullivantia (*Sullivantia hapemanii*), Parachute penstemon (*Penstemon debilis*), Piceance bladderpod (*Lesquerella parviflora*), Roan Cliffs blazingstar (*Mentzelia rhizomata*), sun-loving meadowrue *(Thalictrun heliophilum*), and Utah fescue (*Argillochloa dasyclada*).	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. If the BLM determines that a proposed surface-disturbing activity will unacceptably impair resource values associated with species health and ecological function of associated habitat, the BLM will modify or relocate the proposed activity. In making this determination, the BLM will consider the status of the population; ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of the population or community; the effects on both individuals of the species and populations; the relationship to topography and other vegetation; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or community. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or nonimpairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically

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	protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
GS-CSU-Roan-07: Riparian and Wetland Habitat, 3,770 acres	
Stipulation	**Standards**
CSU to protect 3,770 acres of riparian and wetland habitat. The BLM may require special design, construction, operation, mitigation, or reclamation measures, and/or relocation by more than 200 meters for any ground-disturbing activities, electric transmission lines, and other sources of disturbance within 500 feet of riparian or wetland vegetation to protect the values and functions of these areas. Measures required will be based on the nature, extent, and value of the area potentially affected.	1. The BLM will consider the following resource factors: proper hydrological and ecological functioning; protection of habitat supporting fish and wildlife resources; ecological requirements to maintain the riparian area; the type, amount, and duration of the surface disturbance; the relative extent and condition of the riparian area; the relationship to topography and surrounding vegetation; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or condition of the riparian area. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan-08: Peregrine Falcon Cliff Nesting Complex, 10 acres	
Stipulation	**Standards**
CSU to protect approximately 10 acres of peregrine falcon cliff nesting complex. Ground-disturbing activities may be relocated outside of the cliff-nesting complex along the Roan Cliffs.	1. A site-specific ground-disturbing activity may be allowed within the CSU only if, following consultation with CPW, the BLM determines that the specific activity or requested change would not impair behaviors, habitat use and quality, and reproductive success of the peregrine falcon present within the area. In making this determination, the BLM will consider the status of the nest (active or inactive); behavioral and ecological requirements of the species; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; in such cases approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan-09: Wildlife Security Areas Above the Rim, 2,020 acres	
Stipulation	**Standards**
CSU to protect important wildlife security areas above the rim, especially deer and elk. Ground disturbing activities may be relocated more than 200 meters to avoid approximately 2,020 acres of wildlife security areas above the rim.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines, following consultation with CPW, that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of the species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Authorized ground-disturbing activities will be reviewed annually; if needed BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan-10: Big Game Migration Corridors, 580 acres	
Stipulation	**Standards**
CSU to protect contiguity and extent of big game migration corridors. Ground-disturbing activities may be relocated more than 200 meters to avoid approximately 580 acres of big game migration corridors.	1. A site-specific ground-disturbing activity may be permitted if BLM determines, following consultation with CPW, that the requested activity will not impair values, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of big game species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan-11:Sensitive Bat Species Habitat, 120 acres	
Stipulation	**Standards**
CSU to protect and preserve bat habitat values of the Anvil Points Claystone Cave. Special design, construction, implementation, and/or mitigation measures including relocation of operations by more than 200 meters to protect approximately 120 acres of habitat may be required for those species listed as sensitive by the BLM.	1. If the BLM, in consultation with CPW, determines that a proposed surface disturbing activity will unacceptably impair resource values associated with sensitive bat species habitat, the BLM will modify or relocate the proposed activity. In making this determination, the BLM will consider the following resource factors: behavioral and ecological requirements of sensitive bat species; the type, amount, and duration of the surface disturbance; the relative extent of available habitat; the relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect maintenance or recovery of the species or cause habitat to become unusable. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan-04: Erosive Soils and Slopes Greater Than 30 %, 23,550 acres	
Stipulation	**Standards**
CSU for erosive soils with slopes greater than 30 percent. The BLM may require special analysis, design, construction, operation, mitigation, reclamation measures, monitoring, and/or relocation by more than 200 meters to protect the soil resource, minimize impacts to other resources, and ensure reclamation success in the 23,550 acres with highly erosive soils on slopes steeper than 30 percent.	1. Prior to implementing any ground-disturbing activity or other project component in the area covered by this stipulation, the proponent must provide an assessment of potential impacts to this resource value. The assessment will be based on current baseline data; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. The BLM will determine the level of protection available under this stipulation required to preserve soil stability and productivity and minimize adverse impacts from soil erosion. The BLM's determination will be based on site-specific conditions and the type, amount, and duration of the associated impacts. 2. Prior to, during, and subsequent to ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through adaptive management to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. BMPs (Appendix H) and reclamation standards (Appendix I) will be used to mitigate soil impacts. 4. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
GS-CSU-Roan-13: Parachute Creek High Value Watershed and Watershed Management Area, 4,450 acres	
Stipulation	**Standards**
CSU to protect 4,450 acres within the Parachute Creek high-value watershed and Watershed Management Area (WMA). Provide resource protections through actions that minimize disturbance and habitat fragmentation, and protect key habitats from disturbance.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with the WMA, or relocation or modification of such activity is found to be acceptable If the BLM determines that a proposed surface-disturbing activity will unacceptably impair resource values, the BLM will modify or relocate the

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
	proposed activity. The BLM will consider the following resource factors: protection of ecological, hydrological, and habitat functions and resources; the type, amount, and duration of the surface disturbance; relationship to naturally occurring conditions; topography; type, location, duration, and intensity of potential adverse effects; mitigation measures to avoid, minimize, or offset any adverse effects; and other factors that may affect the paleontological resource. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity will provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. The BLM will determine what level of protection available under this stipulation is required to protect Colorado River cutthroat trout and habitat, rare and/or significant natural plant communities, and municipal water supply and quality. The BLM's determination would be based on site-specific conditions and the type, amount, and duration of the associated impacts. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. This monitoring may specifically include but not be limited to monitoring of surface and groundwater. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM will be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through adaptive management to refine the project components and associated mitigation measures to be applied to future proposed activities. 3. Short-term (reclaimed within two years of initiation) activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan-14: VRM Class II Areas Below the Rim, 23,740 acres	
Stipulation	**Standards**
CSU to protect approximately 23,740 acres in VRM Class II areas. The BLM may require special design, construction, operation, mitigation, or reclamation measures, or relocation by more than 200 meters in VRM Class II areas below the rim to retain the existing landscape character and allow only limited changes.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with VRM Class II objectives, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Authorized ground disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually or as required by the BLM. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project component. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan-15: VRM Class III Areas Above the Rim, 4,190 acres	
Stipulation	**Standards**
CSU to protect 4,190 acres of VRM Class III areas on top of the plateau. The BLM may require special design, construction, operation, mitigation, or reclamation measures, or relocation by more than 200 meters in VRM Class III areas.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values associated with VRM Class III objectives, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: retention of the overall landscape character on both a site-specific and cumulative basis including line, form, color, and texture; the extent to which the activity blends with characteristics of the natural landscape; the type, amount, and duration of the surface disturbance; the relative extent of viewshed characteristics and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects including line, form, color, and texture; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the visual and aesthetic quality. Authorized ground disturbing activities will be reviewed annually; if needed BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project component. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan -16: Hubbard Mesa Open OHV Riding Area, 2,320 acres	
Stipulation	**Standards**
CSU to protect recreation opportunities and settings in the Hubbard Mesa Off-Highway Vehicle (OHV) Riding Area 2,320- acre Special Recreation Management Area (SRMA). The BLM may require special design, construction, operation, mitigation, and reclamation measures, including relocation by more than 200 meters.	1. A site-specific ground-disturbing activity may be permitted if the BLM determines that the requested activity will not impair values with OHV opportunities within the Hubbard Mesa area, or if relocation or modification of such activity is found to be acceptable. In making this determination, the BLM will consider the following resource factors: existing OHV use; existing OHV riding opportunities; anticipated future use; management of OHV use; type, amount, and duration of the surface disturbance; the relative extent of OHV use and current conditions; the relationship to topography and vegetation screening; the type, location, duration, and intensity of potential adverse effects; mitigation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect OHV riding opportunities. Authorized ground-disturbing activities will be reviewed annually; if needed the BLM will adjust authorizations in order to meet resource objectives. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
GS-CSU-Roan-18: Sharrard Park Paleontological Resources, 1,020 acres	
Stipulation	**Standards**
CSU to protect 1,020 acres of the Sharrard Park paleontological resource. The BLM may require special survey, design, construction, operation, and reclamation measures, or relocation by more than 200 meters in identified portions of Wasatch Formation outcrops in Sharrard Park. Prior to any ground disturbing activity, the operator must have the paleontological resources surveyed within 200 feet of the proposed disturbance by a BLM approved paleontologist. Other special measures include requirements that (a) on-site personnel are informed of the potential for fossils, (b) the proponent will notify the BLM if any fossils are found, and (c) activities do not disturb fossils in any way.	1. Prior to implementing any ground-disturbing activity or other project component in the area covered by this stipulation, the proponent must provide an assessment of potential impacts to this resource value. The assessment will be based on current baseline data; the type, location, duration, and intensity of potential adverse effects; and mitigation measures proposed to avoid, minimize, or offset the adverse effects. The BLM will determine the level of protection available under this stipulation required to protect, preserve, and/or recover the fossil resources at specific sites or for specific activities within this area. The BLM determination will be based on site specific conditions and the type, amount, and duration of the associated impacts. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be notified promptly, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through adaptive management to refine the project components and associated mitigation measures that will be applied to future proposed activities. 3. Ground-disturbing activities may be permitted without relocation by more than 200 meters if they will result in a limited surface disturbance area from which it can be demonstrated that no adverse impacts to the specifically protected resource would result. In situations where such a ground-disturbing activity is permitted, the activity would be subject to additional COAs and reclamation standards, criteria, plans, and practices detailed in Appendix I.
CRVFO-CSU-Roan 17: Lease Area Above the Rim, 4,640 acres	
A. No more than 7 well pads may be located on the Retained Leases; including pads drilled for either exploration or production activities. Subject to onsite inspection and approval by the BLM and other regulatory agencies, well pads shall be located approximately as depicted in the attached map. Exhibit 2.A. Each well pad may disturb no more than 10 acres of the surface when drilling operations are occurring, and may be limited to a smaller size if BLM determines 10 acres are not needed for projected drilling operations. Each well pad shall be limited to approximately 3 acres of unreclaimed surface during production. There shall be no more than four pads on the Retained Leases at any time that take up more than three acres each of un-reclaimed surface. Those four pads may take up to a total of approximately 40 acres of un-reclaimed surface, with drilling operations occurring on no more than two of the pads at any one time. For purposes of this requirement, surface is considered reclaimed if BLM determines that its interim reclamation requirements have been met. The Retained Leases are not required to be joined in a federal unit.	

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative
B. Primary access shall be limited to designated roads approximately as depicted on the attached map, Exhibit 2.A., subject to BLM's onsite inspection and approval. Operators may not use Cow Creek Road or the Rim Road east of the retained leases for access except in emergencies. For purposes of this requirement, an "emergency" means unforeseeable physical inaccessibility for other routes or an unforeseeable condition creating a significant risk of environmental harm or injury to persons. Limitations on contractual access from the south or west, or foreseeable delays in obtaining access for drilling, site preparation, completion activities, or regularly-scheduled maintenance and other activities, do not represent an emergency. Where an emergency situation exists, access for maintenance of on-going active drilling and completion operations, and service for existing production, is allowed.
C. Pipeline and gathering line infrastructure, water lines, and utility lines, shall be collocated with designated access roads as depicted on the attached map, Exhibit 2.A., subject to BLM's onsite inspection and approval, and may depart from designated access roads if BLM determines that doing so reduces net disturbance or visual impacts. No less than 90 percent of the total pipeline length shall be collocated.
D. Prior to exploration and/or lease development on the Retained Leases, the operator must submit a proposed Master Development Plan ("MDP") identifying projected activity (including well locations, roads, pipelines, facilities and associated infrastructure) and appropriate monitoring and methodologies in conformance with the requirements of the resource management plan as adopted to incorporate the Settlement Alternative.
E. Prior to submitting the MDP, the operator shall consult with the Colorado Division of Parks and Wildlife and BLM to develop terms that minimize impacts to wildlife and other resources. Agreed-upon terms shall be included in the operator's proposed MDP.
F. The following will be required in any approved MDP, and incorporated as conditions of approval for all drilling permits:
a. Road engineering standards to minimize disturbance associated with road improvements;
b. Requirements for removing unnecessary infrastructure as soon as feasible;
c. The required reclamation plan will include reclamation processes that can be reasonably expected to meet the 5 year reclamation standard within 3 growing seasons;
d. Closed-loop drilling systems and/or tanks shall be used instead of pits, except for pits used solely to store fresh water;
e. Telemetry for remote monitoring of producing wells;
f. Wellheads to be subject to appropriate measures for visual impact mitigation;
g. Conveyance by pipeline of drilling water, water used for hydraulic fracturing and completions, and flowback water, to minimize truck traffic;
h. Centralized water management during drilling, completion and production (e.g., not every location will have pits);
i. Recycling of water used during well completions, and recycling of produced water while well completion activities are in progress;
j. Conveyance by pipeline of produced water and condensate to centralized facilities to minimize truck traffic;
k. Utilize centralized compression, storage, separation and dehydration facilities;
l. No more than 3 centralized facilities will be constructed for all centralized management purposes in Paragraphs F.h., F.j. and F.k., and those facilities will be located on three of the potential locations indicated on the attached map, Exhibit 2.A.;

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
m. Disclosure of all chemicals used during drilling and production activities. Chemicals used during completion activities shall be disclosed pursuant to Colorado Oil and Gas Conservation Commission rules; n. Tier III equivalent or lower emissions for drill rigs for all wells; o. Vapor combustors or vapor recovery on all condensate tanks, water tanks and dehydrators, and no/low-bleed control valves on all facilities; p. Reduced-emission ("green") completions, as defined by 40 C.F.R. § 60.5430; and q. Utilize liquids lifting practices to limit venting, including plunger lifts or alternative technologies that are at least as effective in limiting venting. G. Potential conditions of approval identified in the applicable record of decision replace those identified in the 2006 Proposed Resource Management Plan Amendment/Final Environmental Impact Statement and associated records of decision.	
CRVFO-CSU-Roan 18: Lease Area Below the Rim, 14,260 acres	
Prior to exploration and/or lease development on it Base Leases, an operator shall submit a proposed master development plan ("MDP") identifying its projected activities. Prior to submitting the MDP, an operator shall consult with the Colorado Division of Parks and Wildlife and Bureau of Land Management to develop terms that minimize impacts to wildlife and other resources. Agreed-upon terms shall be included in the operator's MDP.	
Timing Limitation (TL) Stipulations	
GS-TL-Roan-13: Big Game Winter Range, 31,410 acres	
Stipulation	**Standards**
TL to protect and maintain physical and biological components important to deer and elk winter range (approximately 31,410 acres) and the obligate species, both on federal lands and across the landscape as a whole, as opportunities present. This includes reducing or eliminating stress induced impacts to deer and elk associated with human activity during critical winter months when animals are already stressed by environmental factors and concentrated on limited winter range. Surface disturbance and human activities that lessen the quality of the deer and elk winter range will not be allowed from December 1 to April 30. Ongoing drilling and other activities and operations will be designed and implemented such that the well bore is adequately secured and that all drilling and surface-disturbing operations cease by December 1 in important and critical deer and elk winter habitats. In the event of unforeseeable and unplanned events, extensions not exceeding two weeks in duration may be authorized to ensure safe shutdown of drilling operations, and conservation of mineral resources. Human activities including visitations for production activities and well monitoring from December 1 to April 30 will be designed and carried out to minimize impacts.	1. Site-specific ground-disturbing activity in big game winter range may be allowed between December 1 and April 30 if the BLM determines, following consultation with CPW, that the requested activity would not impair values associated with the quantity and quality of the winter range for the species of interest. In making this determination, the BLM will consider the following resource factors: minimization of the footprint of activities; fragmentation; impacts to winter range across the Planning Area as a whole; effectiveness of voluntary off-site mitigation of habitat with respect to quantity, quality, and duration of both the surface-disturbing activity and mitigation; the relative extent of available winter range; relationship to topography and vegetation screening; current baseline data; the type, location, duration, and intensity of potential adverse effects; mitigation and conservation measures to avoid, minimize, or offset the adverse effects; and other factors that may affect the winter range or cause winter range to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; in such cases approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation,

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
This includes well monitoring through telemetry, scheduling of all nonemergency well maintenance activities outside the December 1 to April 30 timeframe, conducting unavoidable and necessary on-the ground visits between the hours of 10:00 a.m. and 3:00 p.m., and minimizing on-the-ground visitations.	and (b) considers the above-mentioned resource factors. 2. The big game winter range TL may not apply, and the restriction may be considered to be met, if the BLM determines, following consultation with CPW, that animals are not using the habitat, are not likely to use the habitat in a particular season, and that activities will not lessen overall habitat quality in future years. 3. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.
GS-TL-Roan-14: Raptor Nest Sites, 2,300 acres	
Stipulation	**Standards**
TL to protect approximately 2,300 acres of nesting and fledging habitat for raptors not protected by species-specific measures. This includes owls, northern harriers, accipiters, buteos, golden eagle, osprey, and falcons except the American kestrel. Within a 0.25-mile radius of a nest, no activities or other sources of disturbance with the potential to cause the nest not to be used or lead to nest failure, abandonment, or mortality of fledglings will be allowed. Stipulations will be applied annually from February 1 through August 15.	1. Site-specific ground-disturbing activity near active raptor nest sites may be allowed between February 1 and August 15 if the BLM determines, following consultation with CPW that the requested activity would not impair values, behaviors, or habitat associated with nesting and fledging. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; potential to cause the nest not to be used or lead to nest failure, abandonment of the nest, or mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
	by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.
GS-TL-Roan-15: Bald Eagle Nest or Winter Roost Sites, 510 acres	
Stipulation	**Standards**
TL to protect approximately 510 acres of nesting, fledging, and winter roost habitat of the bald eagle. Within a 0.5-mile radius of a nest, no activities or other sources of disturbance that could cause the nest not to be used or lead to nest abandonment, failure, or mortality of fledglings will be allowed. Stipulations will be applied annually from November 15 through June 15.	1. Site-specific ground-disturbing activity at bald eagle nests or winter roost sites may be allowed between November15 and June 15 if the BLM determines, following Section 7 consultation with the USFWS that the requested activity would not impair values associated with maintenance or recovery of the species; behaviors associated with winter roosting, nesting, and fledging; or fledging habitat. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; the status of the nest (active or inactive); the type, intensity, and duration of disturbance; measures required by the USFWS; potential for the activity to cause the roost or nest not to be used; potential for nest failure, abandonment of the roost or nest, or mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect roosting or nesting success. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. This TL will be applied to wells that are drilled directionally from private surface into Federal minerals for the Federal lease being developed. Where the Federal lease does not include a relevant TL stipulation (and a nest or roost site falls within the identified buffer), BLM would not approve any permits for Federal wells or grant a right-of-way across BLM land unless the proponent has agreed

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
	to a voluntary TL (allowing a determination of "No Effect") or until Section 7 consultation on proposed action has been completed and any associated terms and conditions agreed to by the proponent. 3. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.
GS-TL-Roan-16: Peregrine Falcon Cliff Nesting Complex, 130 acres	
Stipulation	**Standards**
TL to protect approximately 130 acres of nesting and fledging habitat of the State-listed threatened peregrine falcon. Within a 0.5-mile radius of the cliff-nesting complex on the Roan Cliffs, no activities or other sources of disturbance that could cause abandonment of a nest or established territory will be allowed. Stipulations will be applied annually, from March 15 through July 31.	1. Site-specific ground-disturbing activity at the peregrine falcon cliff-nesting complex may be allowed between March 15 and July 31 if the BLM determines, following consultation with CPW that the requested activity would not impair values, behaviors, or habitat associated with nesting and fledging. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; the status of the nest (active or inactive); potential to cause the nest not to be used or lead to nest failure, abandonment of the nest, or mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
	noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.
GS-TL-Roan-17: Waterfowl and Shorebird Nesting Areas, 90 acres	
Stipulation	**Standards**
TL to protect approximately 90 acres of nesting and brood-rearing habitats at the Fravert Reservoir Watchable Wildlife Area. No ground-disturbing activities or other sources of disturbance, from April 15 through July 15, or until all young have hatched and dispersed from the production area, or that could cause waterfowl and shorebirds not to nest or lead to nest failure or abandonment within 0.25- mile of the nesting and production area of Fravert Reservoir will be allowed.	1. Site-specific ground-disturbing activity at the Fravert Reservoir Watchable Wildlife Area may be allowed between April 15 and July 15 if the BLM determines, following consultation with CPW that the requested activity would not impair values, behaviors, or habitat associated with nesting and fledging. In making this determination, the BLM will consider the following resource factors: meteorological or ecological conditions during the period requested; the status of the nest (active or inactive); hatching and dispersal of young from the production or nesting area; potential to cause the nest not to be used or lead to nest failure, abandonment of the nest, or mortality of fledglings; behavioral and ecological requirements of the species; the type, amount, intensity, and duration of the surface disturbance; the relative extent of available nesting and fledgling habitat; relationship to topography and vegetation screening; current baseline data; the type, location, intensity, and duration of potential adverse effects; mitigation measures proposed to avoid, minimize, or offset the adverse effects; and other factors that may affect the species or cause habitat to become unusable. Approval of ground-disturbing activities granted in any given year will not constitute approval for subsequent years; approval for such activities must be granted (or extended) annually by the BLM. The proponent of any ground-disturbing activity must provide an assessment with their proposal that (a) documents anticipated compliance or non-impairment of resource values protected by this stipulation, and (b) considers the above-mentioned resource factors. 2. Prior to, during, and subsequent to the ground-disturbing activities covered by this provision, monitoring data will be collected by the proponent using widely accepted scientific methods as approved by and reported to the BLM not less often than annually. If unanticipated types or levels of adverse effects are noted during monitoring, the BLM must be promptly notified, and corrective measures, as approved by the BLM, will be identified and implemented by the proponent. This information will be used through an adaptive management process to refine the project components and associated mitigation measures that will be applied to future proposed activities.
GRSG-TL-46e: *No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood rearing*	

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative
(March 1- July 15).
Stipulation incorporates stipulation GRSG-TL-46e from the NCGSG Proposed LUPA/FEIS by reference.
GRSG-TL-PHMA-ROW-TL: Prohibit surface occupancy and surface disturbing activities associated with BLM ROW permits within 4 miles from active leks during lekking, nesting, and early brood rearing (March 1- July 15).
Stipulation incorporates stipulation GRSG-TL-PHMA-ROW-TL from the NCGSG Proposed LUPA/FEIS by reference.
CRVO-TL- Roan 1: Migratory Bird Nesting Season
Stipulation: Prohibit surface occupancy and surface-disturbing activities from May 15 to July 15. The stipulation would be applied based on biological surveys and species habitat preferences. **Purpose:** To protect use of nesting and fledgling habitat for birds of conservation concern (BCC). **Exception:** Standard exceptions apply. The application of the timing limitation would consider: the type of equipment to be used, the scale, and the duration of the project; species potentially present; habitat types present; breeding phenology; weather conditions; elevation; distance to known nests; and terrain.. **Modification:** Standard modifications apply. **Waiver:** Standard waivers apply.
CRVO-TL- Roan 3: Elk Production Area, 500 acres
Stipulation: Prohibit surface occupancy and surface disturbing activities from April 15 to June 30 in mapped elk production areas to reduce behavioral disruption during parturition and early young rearing period. This stipulation does not apply to operation and maintenance of production facilities. **Exception:** The Field Manager may grant an exception if an environmental analysis indicates that the proposed action can be conditioned so as not to interfere with habitat function or compromise animal condition within the project vicinity. An exception may also be granted if the proponent, Bureau of Land Management, and Colorado Division of Wildlife negotiate compensation that would satisfactorily offset anticipated impacts to big game production or habitat condition, or an agreement can be reached where by a COGCC wildlife mitigation plan can be accommodated consistent with established RMP objectives and decisions. An exception may also be granted for actions intended to enhance the long term utility for availability of suitable habitat. **Modification**: The Field Manager may modify the size and time frames of this stipulation if Colorado Division of Wildlife monitoring information indicates that current animal use patterns are inconsistent with dates established for animal occupation. **Waiver**: This stipulation may be waived if Colorado Division of Wildlife determines that the area is no longer utilized by big game for production purposes.
CRVFO-TL-1: Salmonid and Native Non-Salmonid Fishes
Stipulation: Prohibit surface occupancy and surface-disturbing activities during species-specific spawning periods to reduce impacts to breeding adults, eggs, emerging larval fish, and avoid stream channel disturbances: Non-Special Status Species: • Rainbow trout: March 1 to June 15 • Brown trout: October 1 to May 1

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• Brook trout: August 15 to May 1. Special Status Species: • Cutthroat trout: May 1 to September 1 • Bluehead sucker: May 1 to July 15 • Flannelmouth sucker: April 1 to July 1 • Roundtail chub: May 15 to July 15 • Mountain sucker: May 1 to July 15. **Purpose:** To promote recruitment by protecting adult fish, redds (egg masses) in the gravel, and emerging fry during spawning periods. **Exception:** Standard exceptions apply (Section B.3). **Modification:** Standard modifications apply (Section B.3). **Waiver:** Standard waivers apply (Section B.3).	
Lease Notices (LN) Stipulations	
GS-LN-Roan-14: Master Development Plan (MDP)	
Stipulation	**Standards**
A MDP will be required of oil and gas operators prior to exploration or development activities.	1. For all activities in each of the geographic areas atop the plateau and in areas being actively explored or developed below the rim, the operator must submit a MDP. The MDP must include all anticipated activities for a minimum of 2 years following the date of submission, for all operator-controlled federal leases or units. A longer term is encouraged and would be allowed under this standard to expedite the permitting process, provide for efficiencies as provided for in Standard 6 of this stipulation, and reduce costs to the operator for MDP preparation. 2. The boundaries of the geographic areas to be addressed atop the plateau, as identified by the BLM, may be modified with approval from the BLM. The boundaries of all other geographic areas must be proposed by the operator and must be approved by the BLM. 3. The MDP must identify all anticipated exploration, development, and production activities on federal leases within the area, identifying well locations, roads, pipelines, and any other exploration or production disturbance or facilities. 4. The MDP must include all specific measures needed to comply with standards associated with all stipulations and any other decisions of this RMPA.

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Appendix Table C-4. Descriptions of Surface-Use Stipulations Applicable to New Oil and Gas Leases Under Alternative IV, Settlement Alternative	
	5. The MDP must include an analysis of site-specific and cumulative environmental effects and mitigation. The MDP must also address reasonable alternatives, and other information sufficient to satisfy the requirements of the National Environmental Policy Act (NEPA). The extent of the analysis will be dependent on the extent of surface ownership, extent of lease holdings, topography, access, resource concerns, and the ability to tier to the Roan Plateau Environmental Impact Statement (EIS), consistent with 40 CFR § 1500. The extent of the analysis needed to comply with 40 CFR § 1500 may appropriately vary when considering individual wells or small groups of exploratory wells or for directional wells drilled on previously developed wellpads. 6. To the extent practicable, the activities identified in the MDP must be presented in such a manner as to support the orderly and efficient exploration and development of mineral resources in an environmentally responsible manner. 7. MDPs may be modified by operators as needed, and shall be reviewed by the operators not less than annually. As appropriate, either a statement documenting that the MDP is current or a modified MDP shall be provided to the BLM.
GS-LN-Roan-34: ESA Consultation	
Stipulation	**Standards**
Endangered Species Act, Section 7 Consultation Stipulation.	1. The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended, 16 USC § 1531 et seq., including completion of any required procedure for conference or consultation.

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GRSG PHMA LN-46e: Any lands leased in PHMA are subject to the restrictions of 1 disturbance per 640 acres calculated by CO management zone to allow clustered development.
Stipulation currently under development as part of the NCGSG RMP/EIS process
GRSG PHMA LN -54e: Within PHMA operators would be encouraged to complete Master Development Plans in consultation with the State of Colorado, instead of single well Applications for Permit to Drill for all exploratory wells.
Stipulation currently under development as part of the NCGSG RMP/EIS process
CRVFO-LN-Roan-35: Emergency Response Plan
The operator is required to prepare and maintain a current emergency response plan. The plan shall be provided to the BLM, Colorado State Patrol, the affected county and communities, and the general public. The plan shall contain information sufficient to describe the potential for emergency incidents related to fluid minerals development that pose an immediate danger to human health and safety and would normally require immediate actions by the operator to remove the threat, such as for hazardous materials spills; actions to be taken by the operator in the event of such an incident; and a communications plan to inform appropriate authorities and potentially affected citizens.

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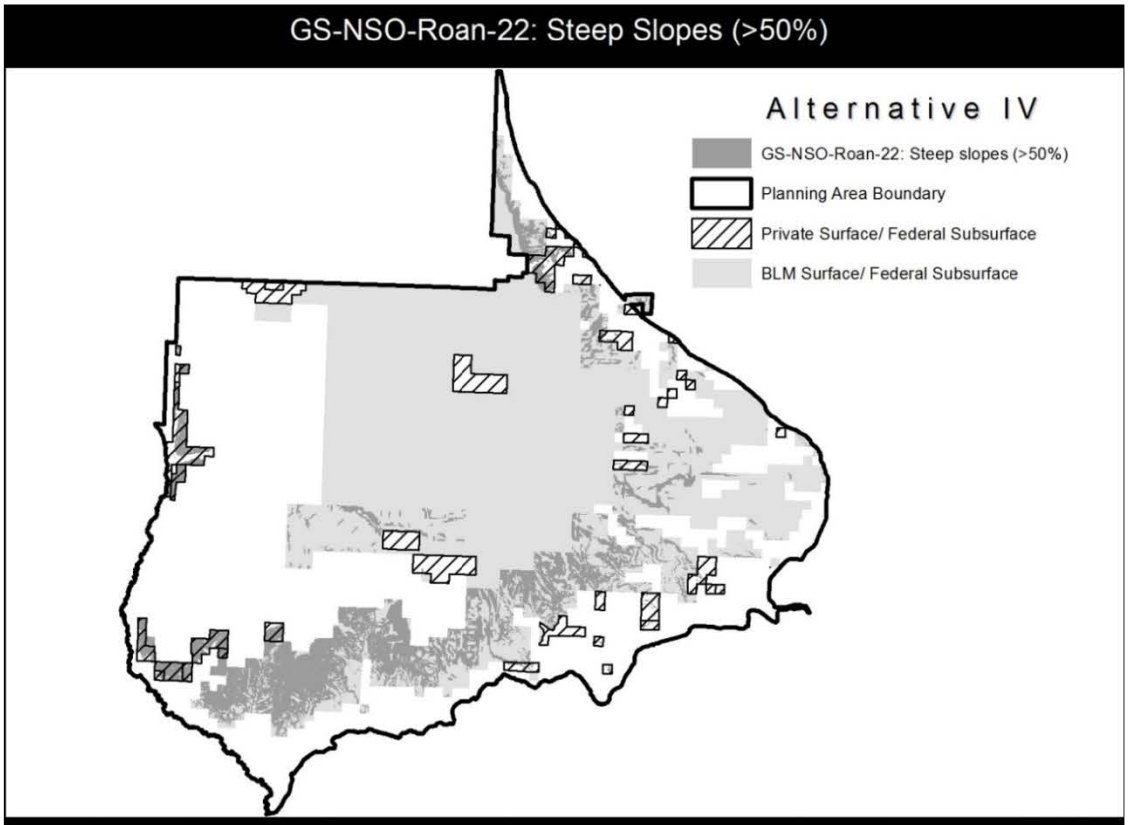
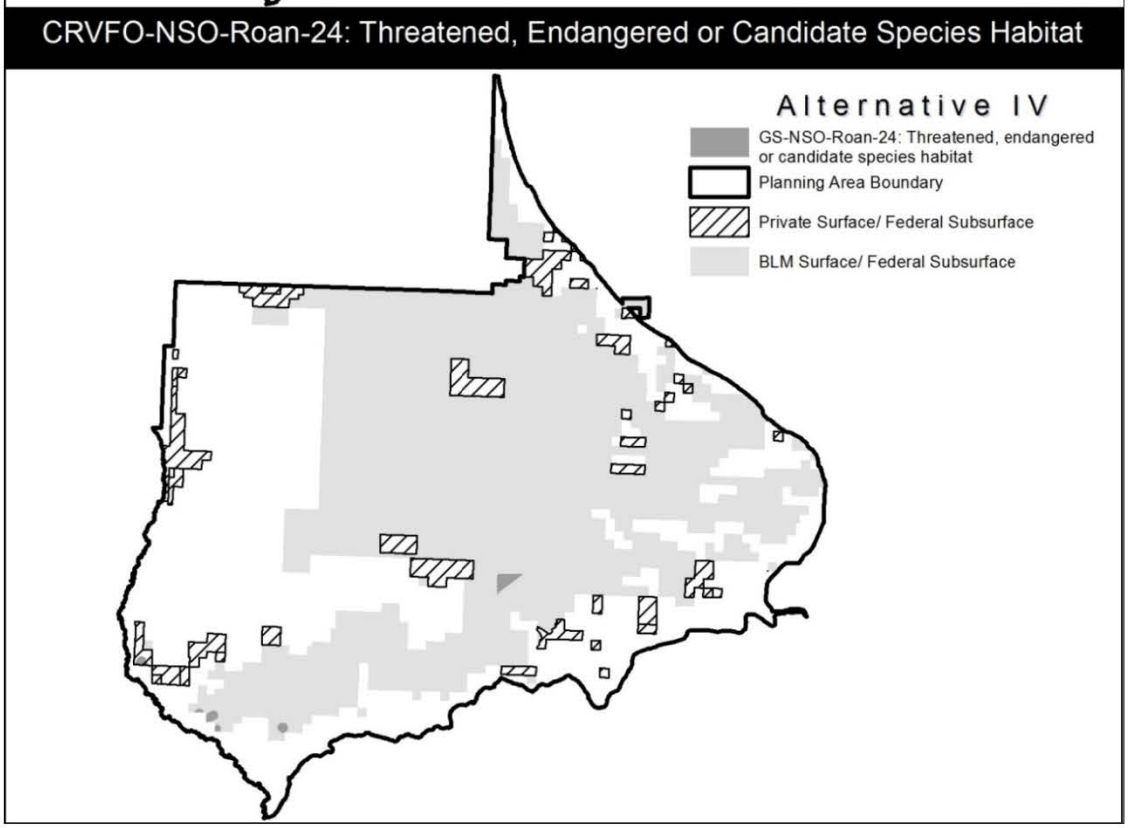
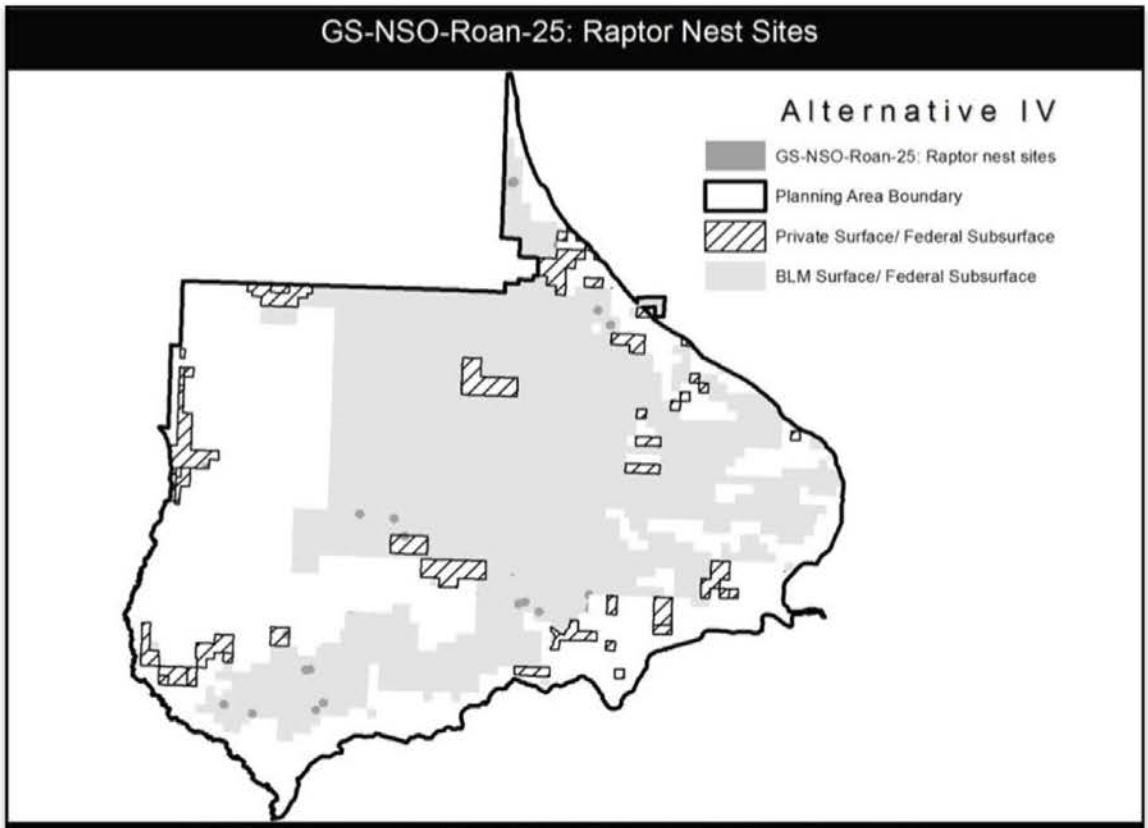
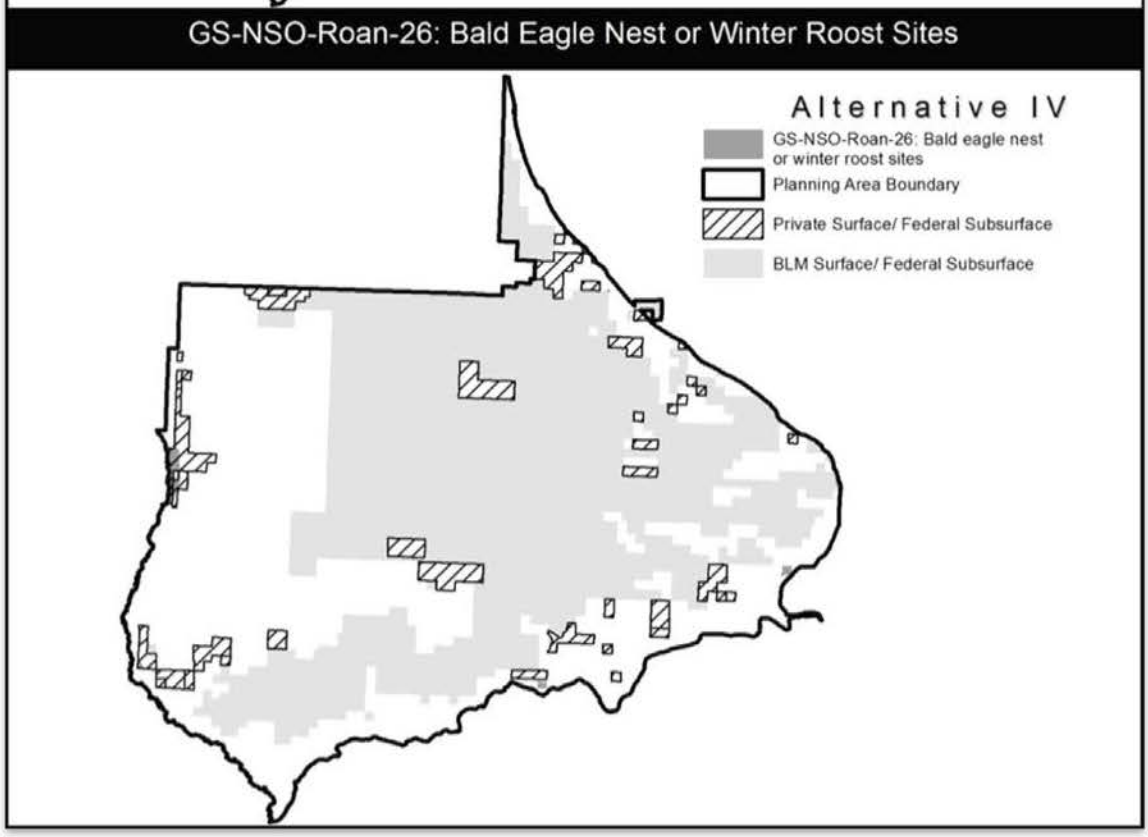
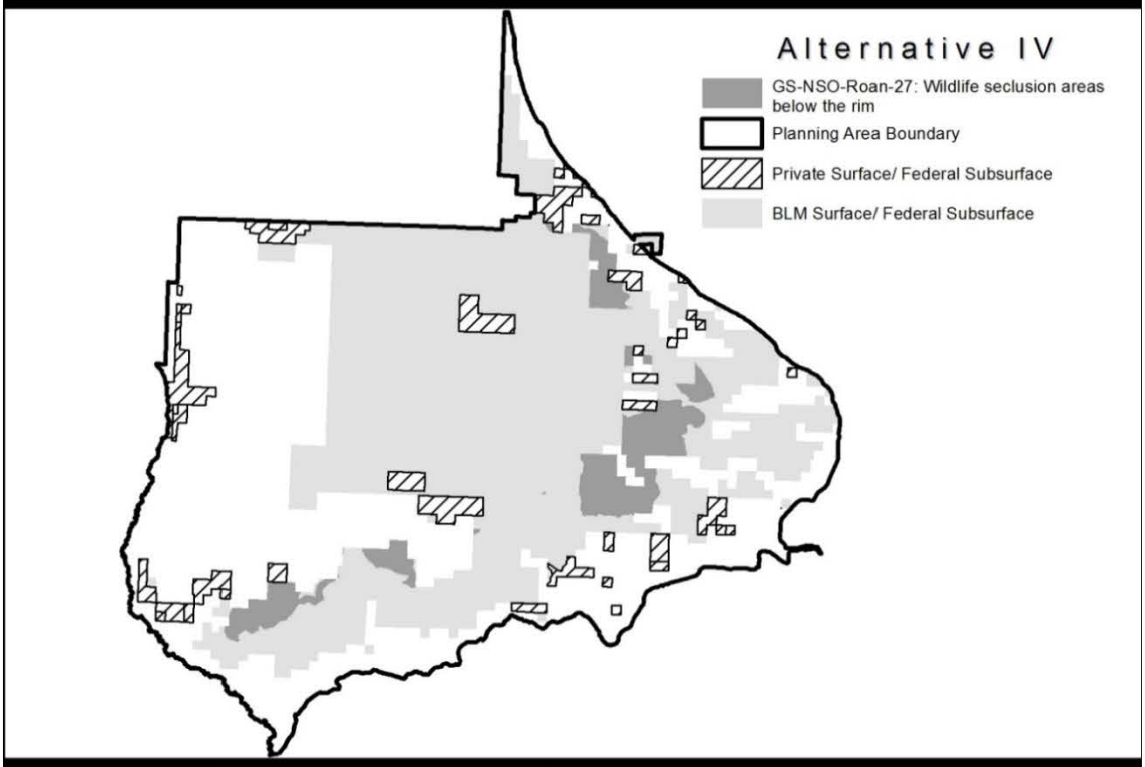

GS-NSO-Roan-22: Steep Slopes (>50%)
Alternative IV
GS-NSO-Roan-22: Steep slopes (>50%)
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


CRVFO-NSO-Roan-24: Threatened, Endangered or Candidate Species Habitat
Alternative IV
GS-NSO-Roan-24: Threatened, endangered or candidate species habitat
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

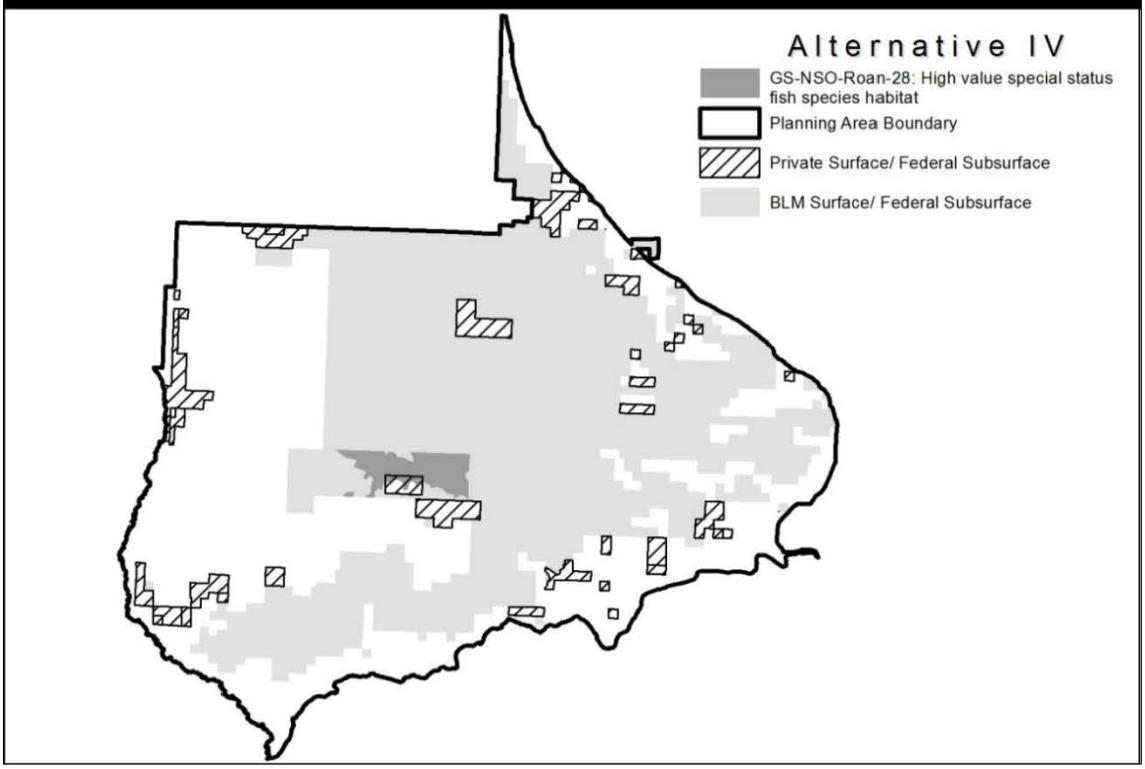

GS-NSO-Roan-25: Raptor Nest Sites
Alternative IV
GS-NSO-Roan-25: Raptor nest sites
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


GS-NSO-Roan-26: Bald Eagle Nest or Winter Roost Sites
Alternative IV
GS-NSO-Roan-26: Bald eagle nest or winter roost sites
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

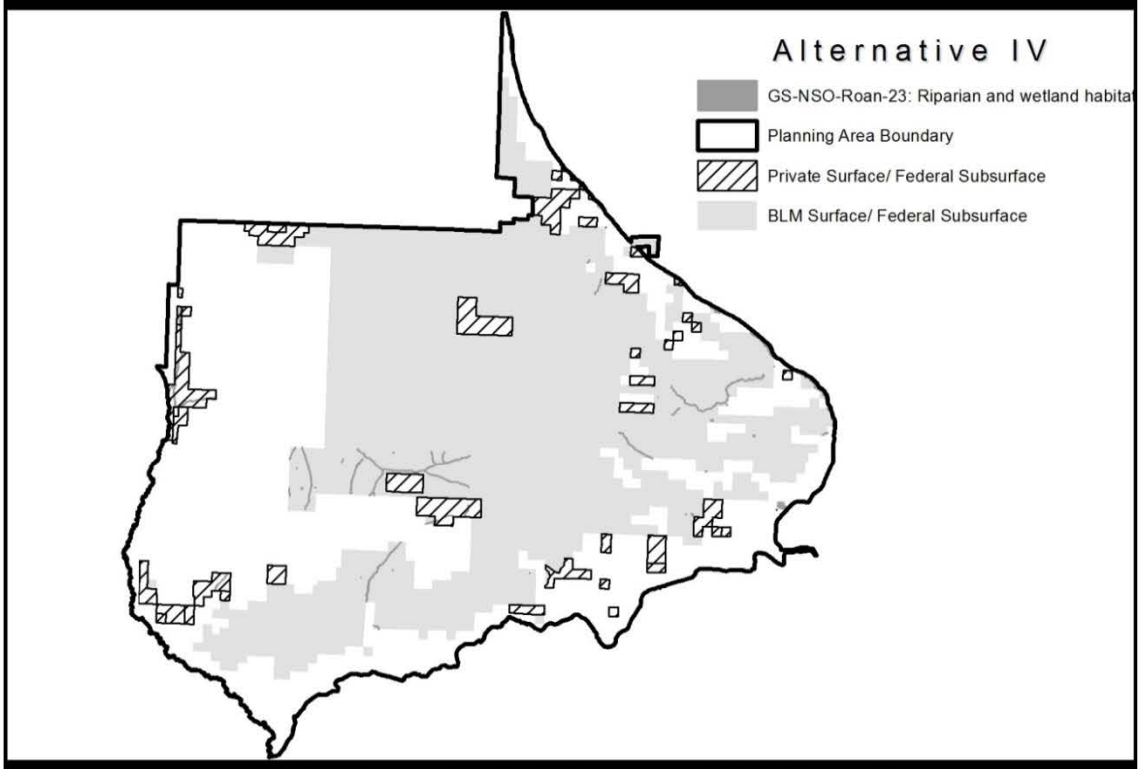
GS-NSO-Roan-27: Wildlife Seclusion Areas Below the Rim



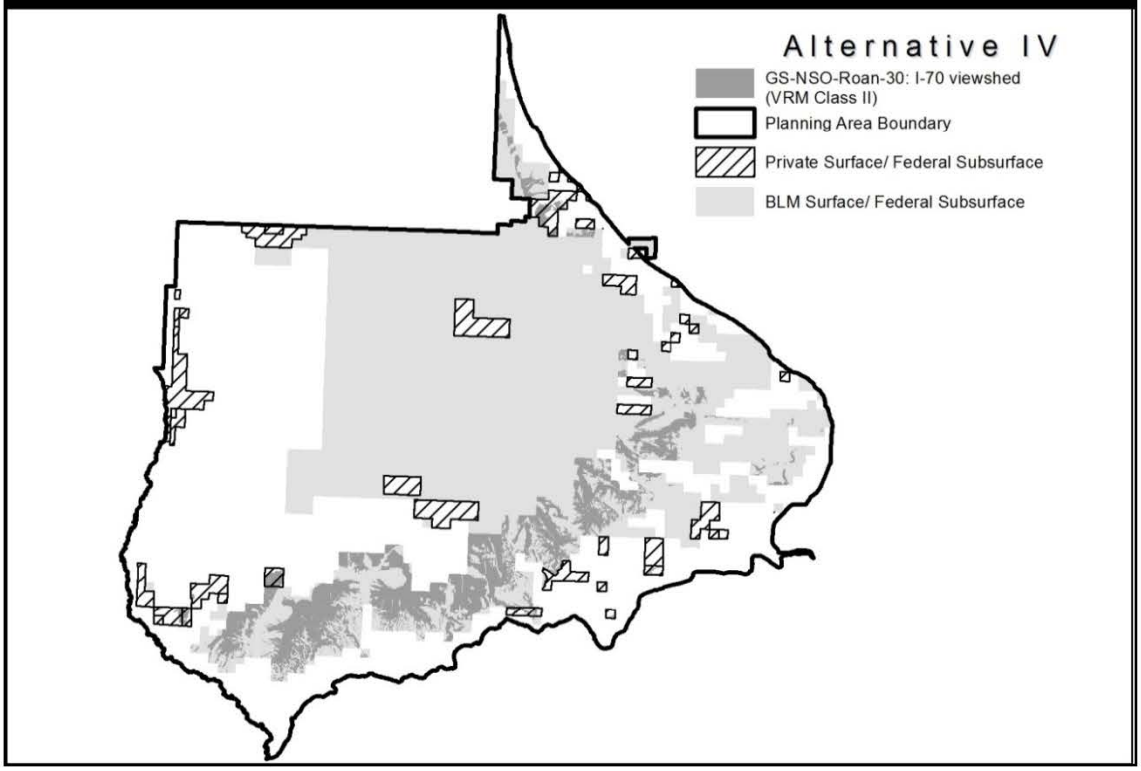
GS-NSO-Roan-28: High Value Special Status Fish Species Habitat



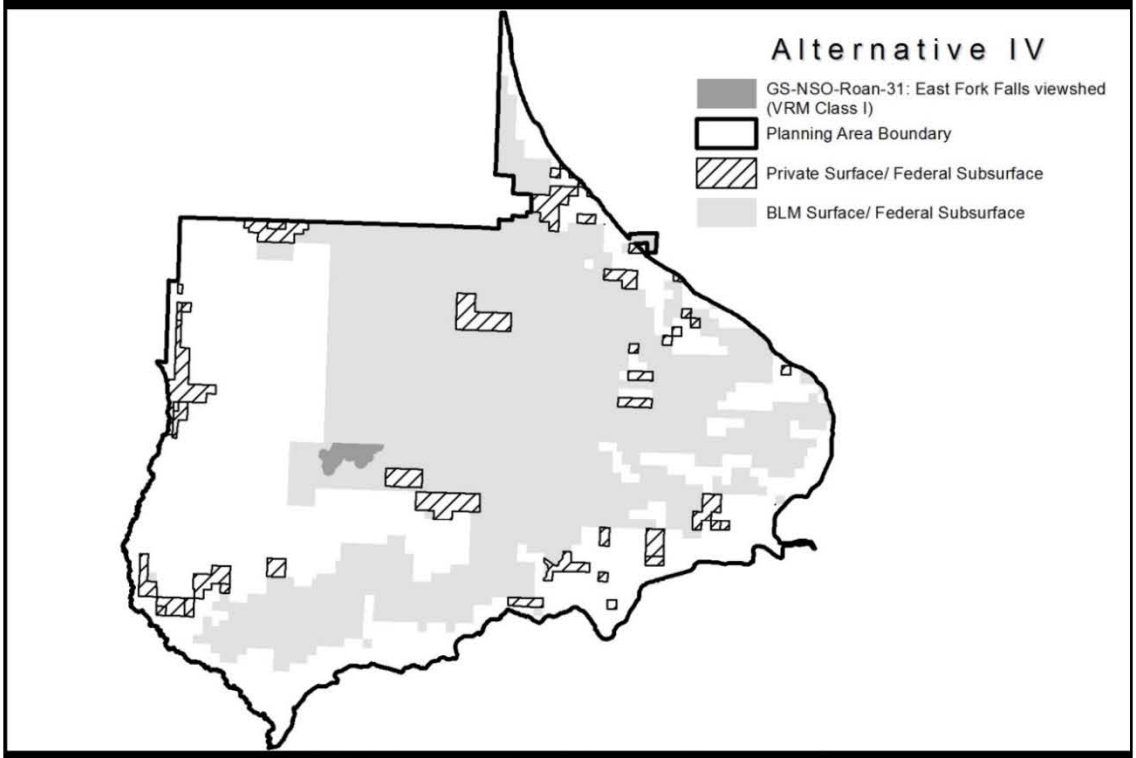
GS-NSO-Roan-23: Riparian and Wetland Habitat



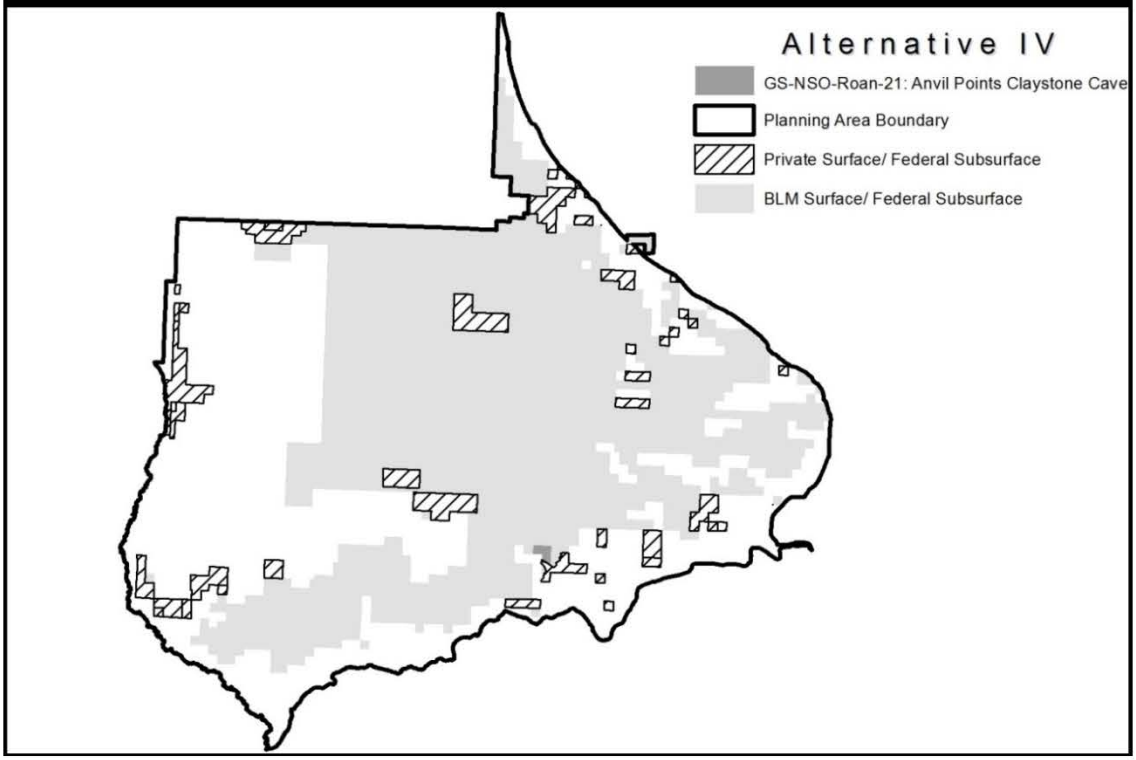
GS-NSO-Roan-30: I-70 Viewshed (VRM Class II)

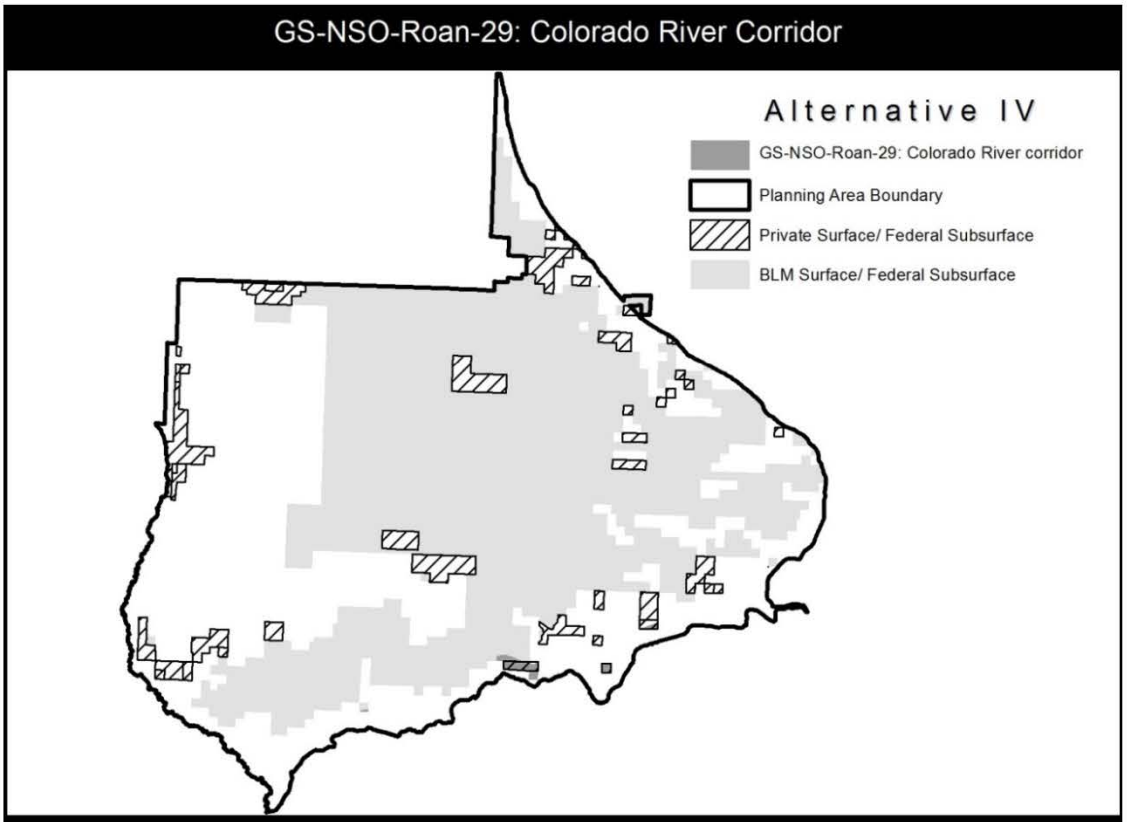


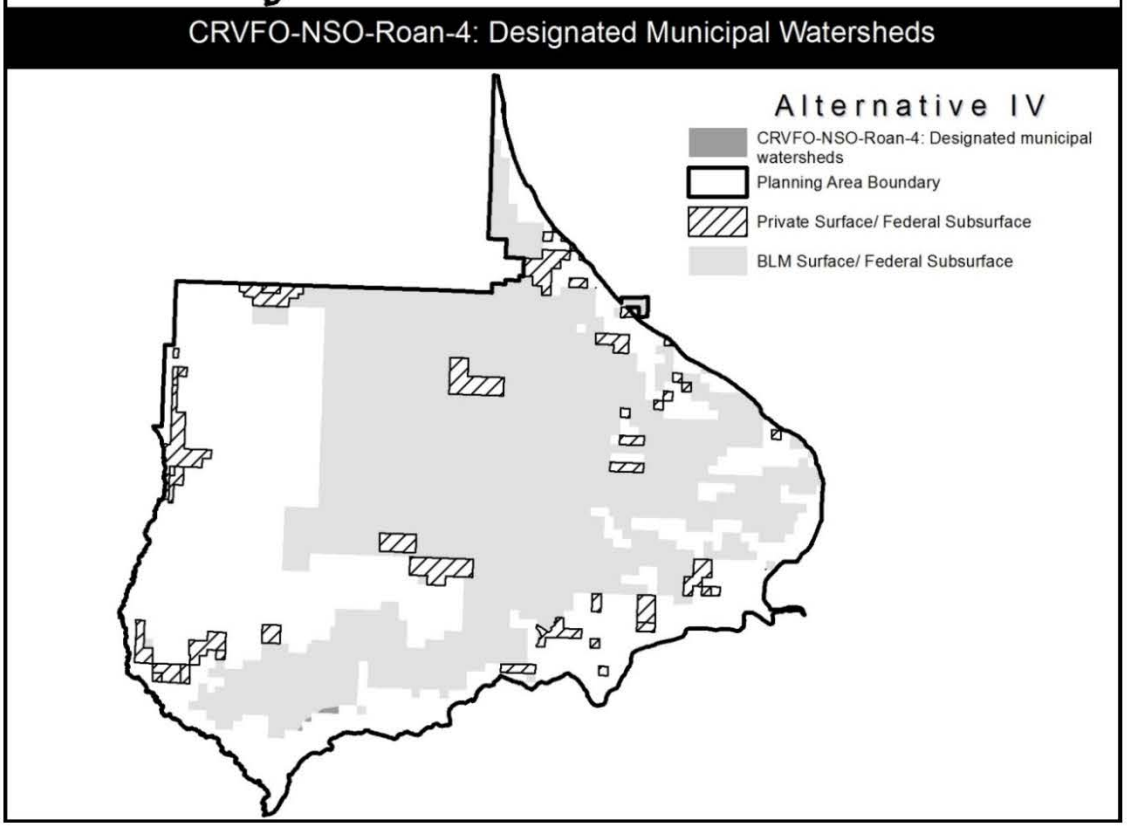
GS-NSO-Roan-31: East Fork Falls Viewshed (VRM Class I)

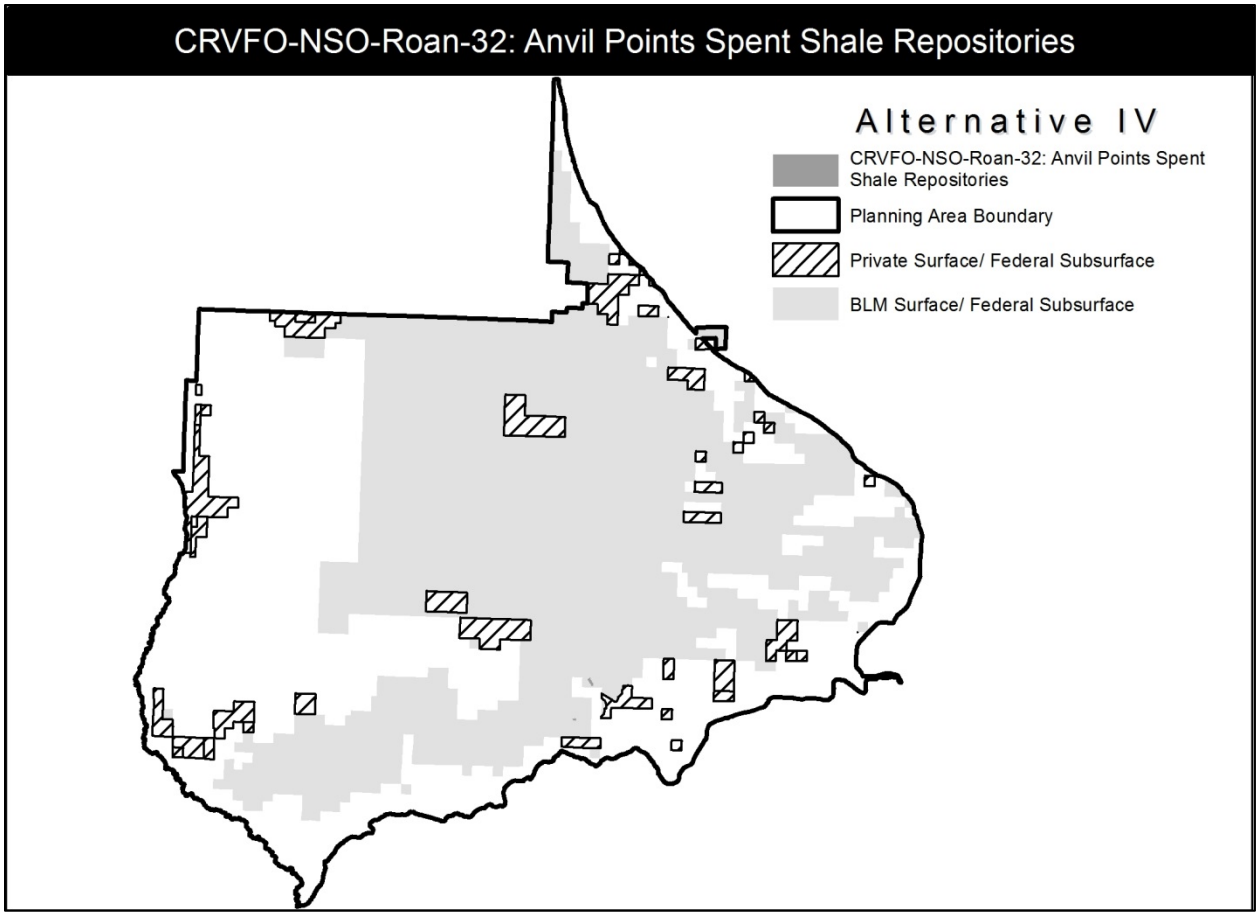


GS-NSO-Roan-21: Anvil Points Claystone Cave

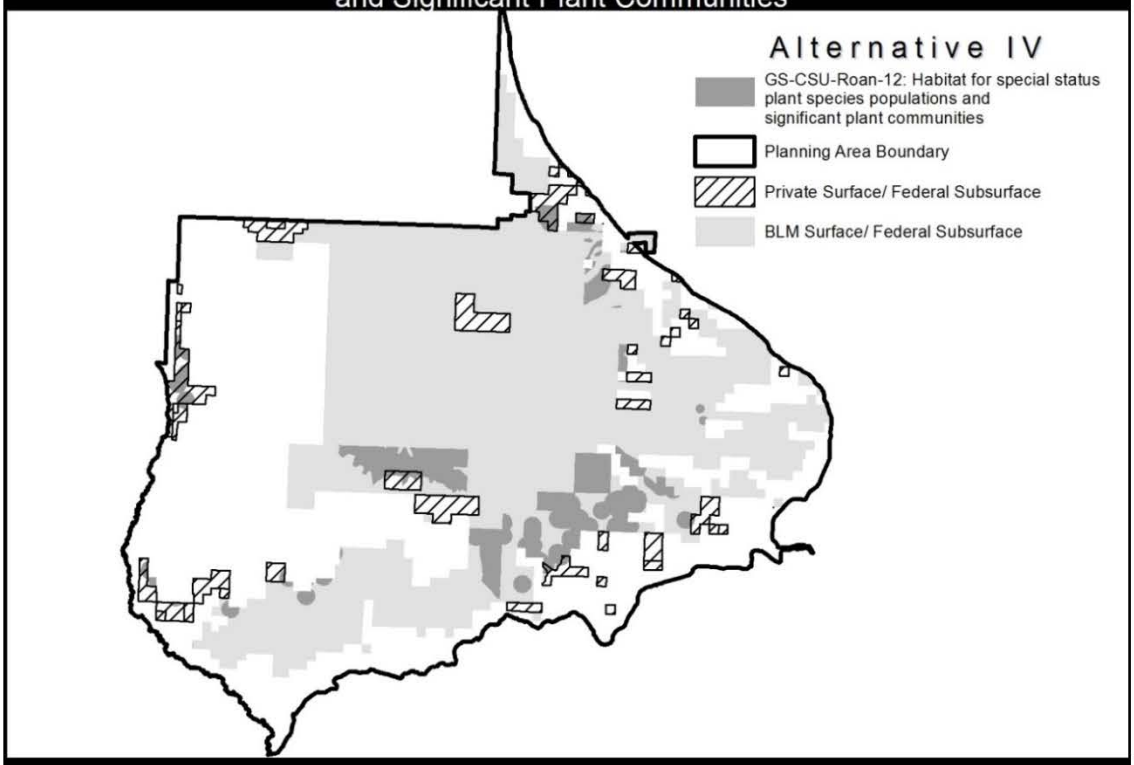



GS-NSO-Roan-29: Colorado River Corridor
Alternative IV
GS-NSO-Roan-29: Colorado River corridor
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

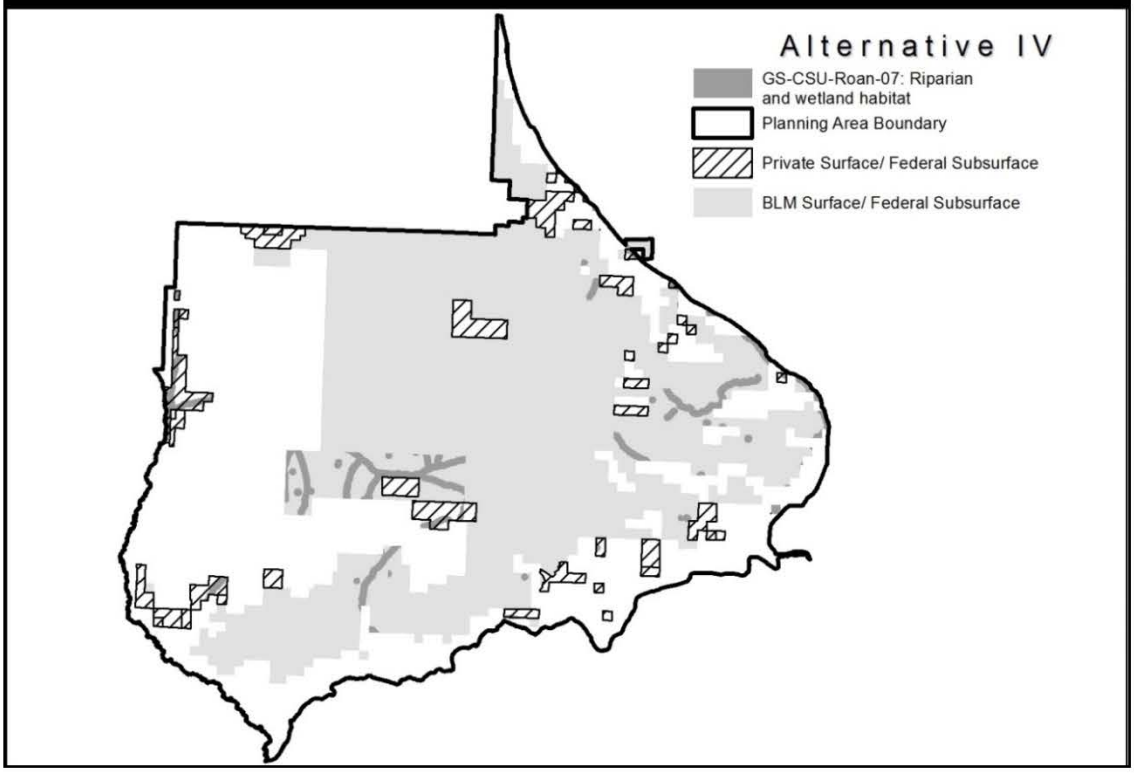

CRVFO-NSO-Roan-4: Designated Municipal Watersheds
Alternative IV
CRVFO-NSO-Roan-4: Designated municipal watersheds
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

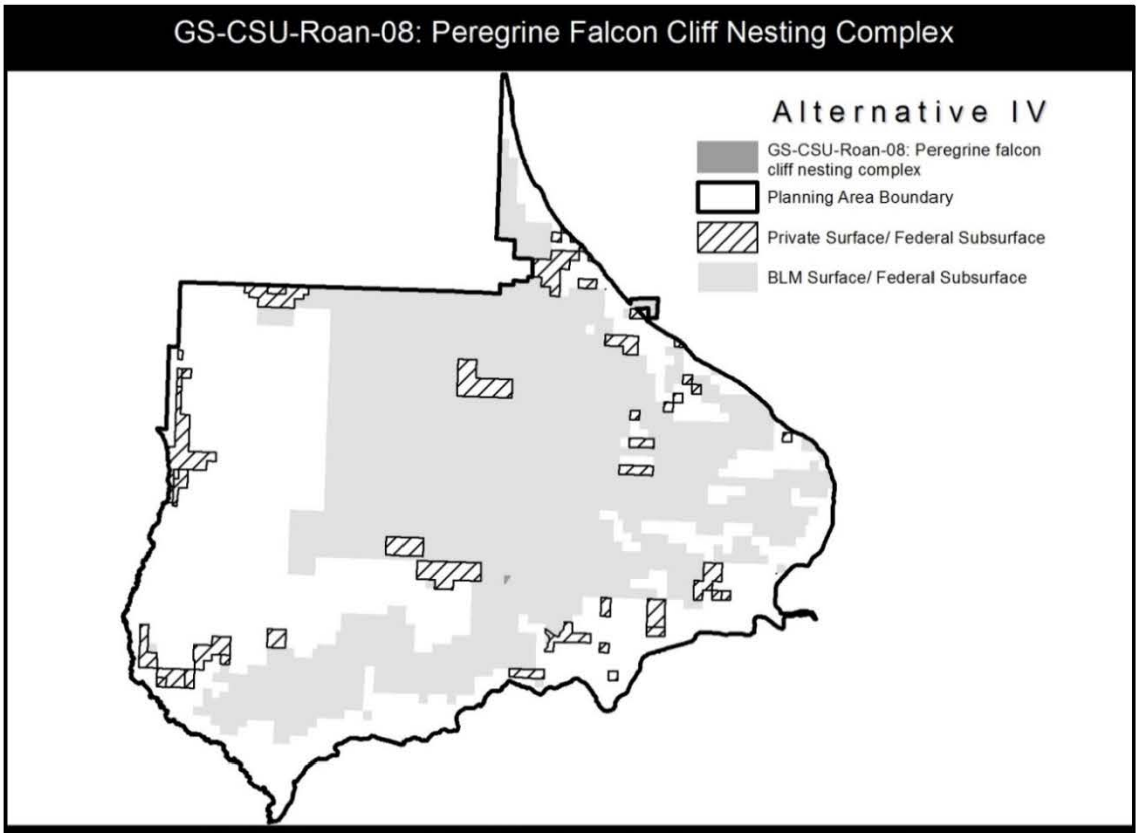

CRVFO-NSO-Roan-32: Anvil Points Spent Shale Repositories
Alternative IV
CRVFO-NSO-Roan-32: Anvil Points Spent Shale Repositories
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

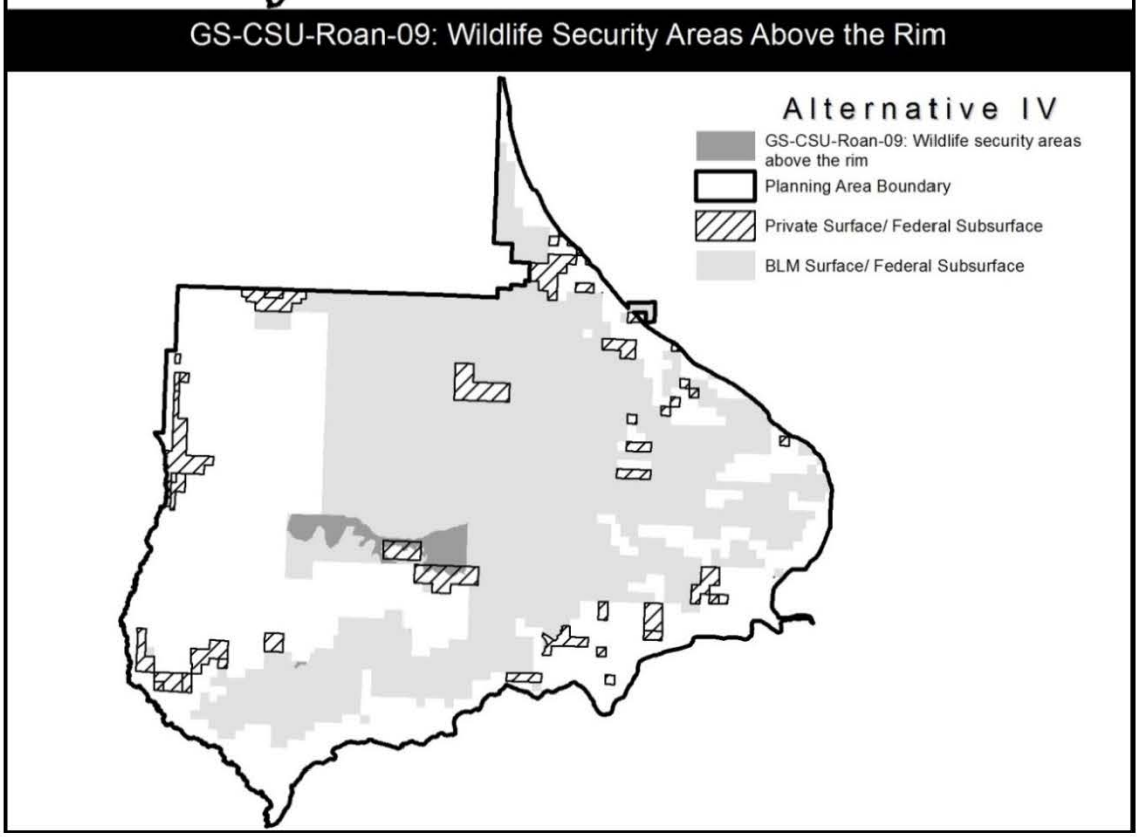
GS-CSU-Roan-12: Habitat for Special Status Plant Species Populations and Significant Plant Communities



GS-CSU-Roan-07: Riparian and Wetland Habitat




GS-CSU-Roan-08: Peregrine Falcon Cliff Nesting Complex
Alternative IV
GS-CSU-Roan-08: Peregrine falcon cliff nesting complex
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


GS-CSU-Roan-09: Wildlife Security Areas Above the Rim
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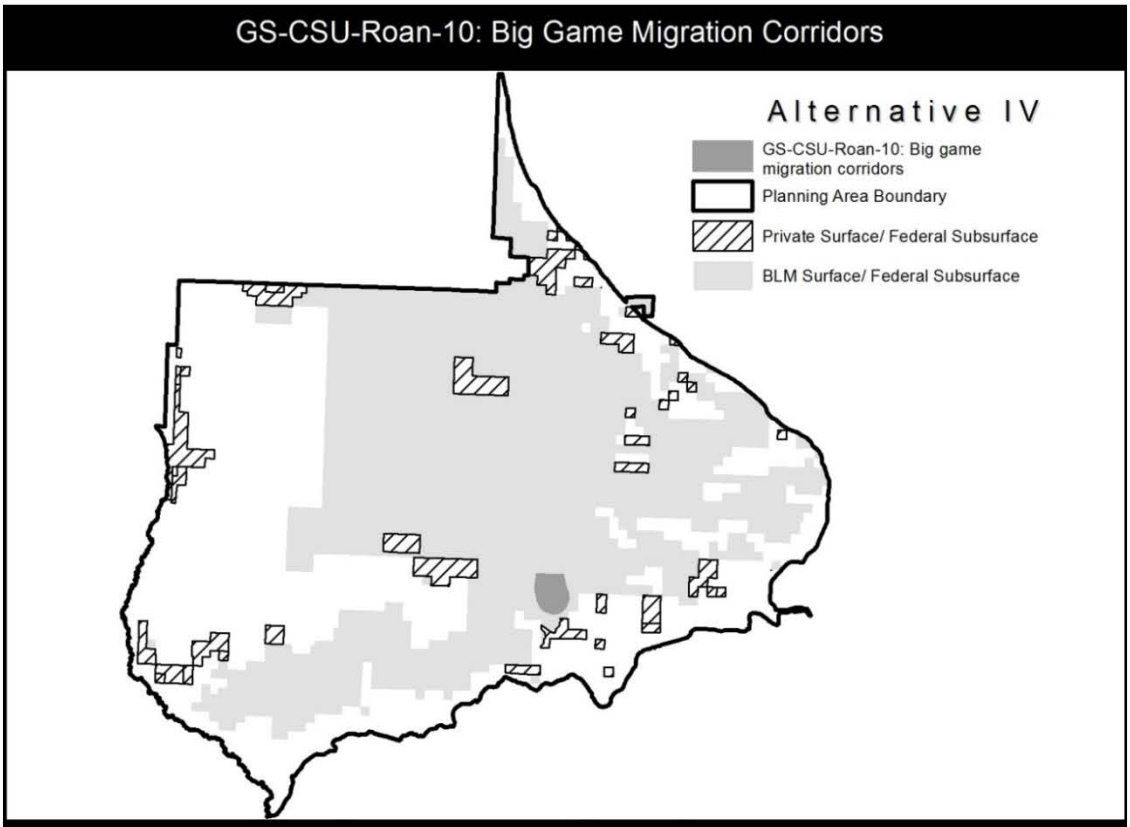
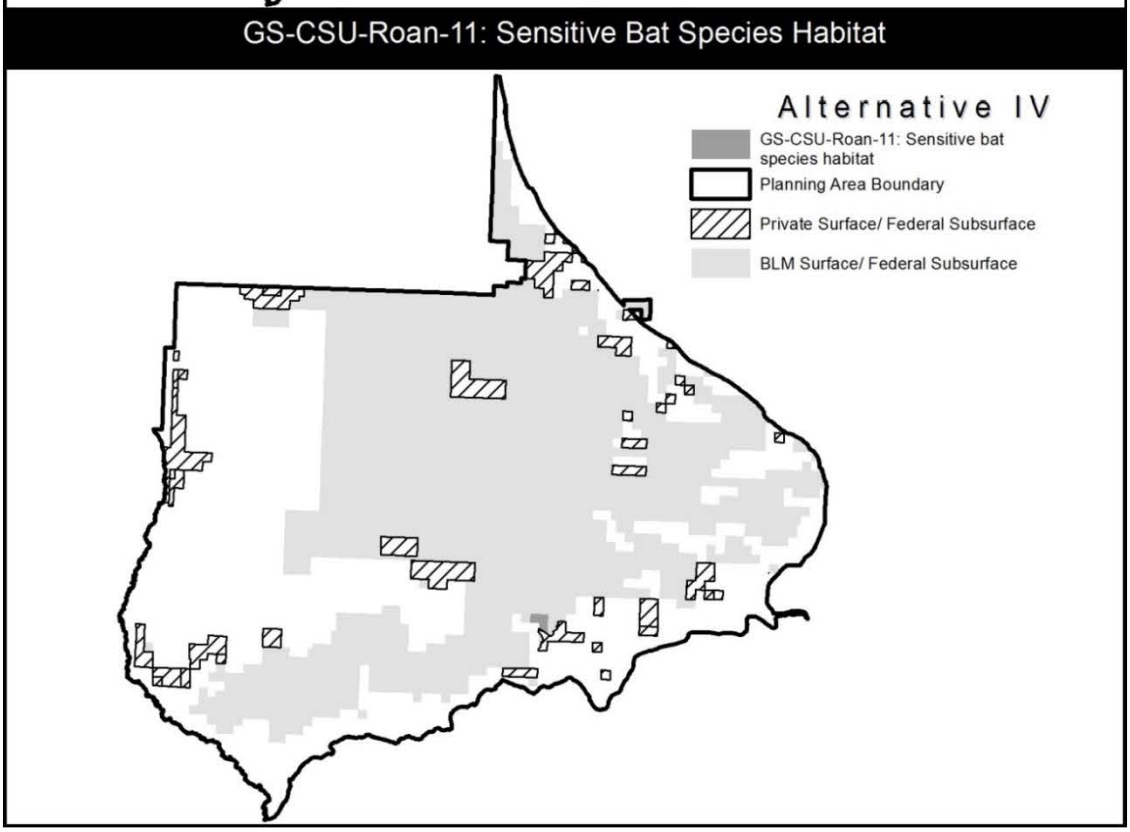
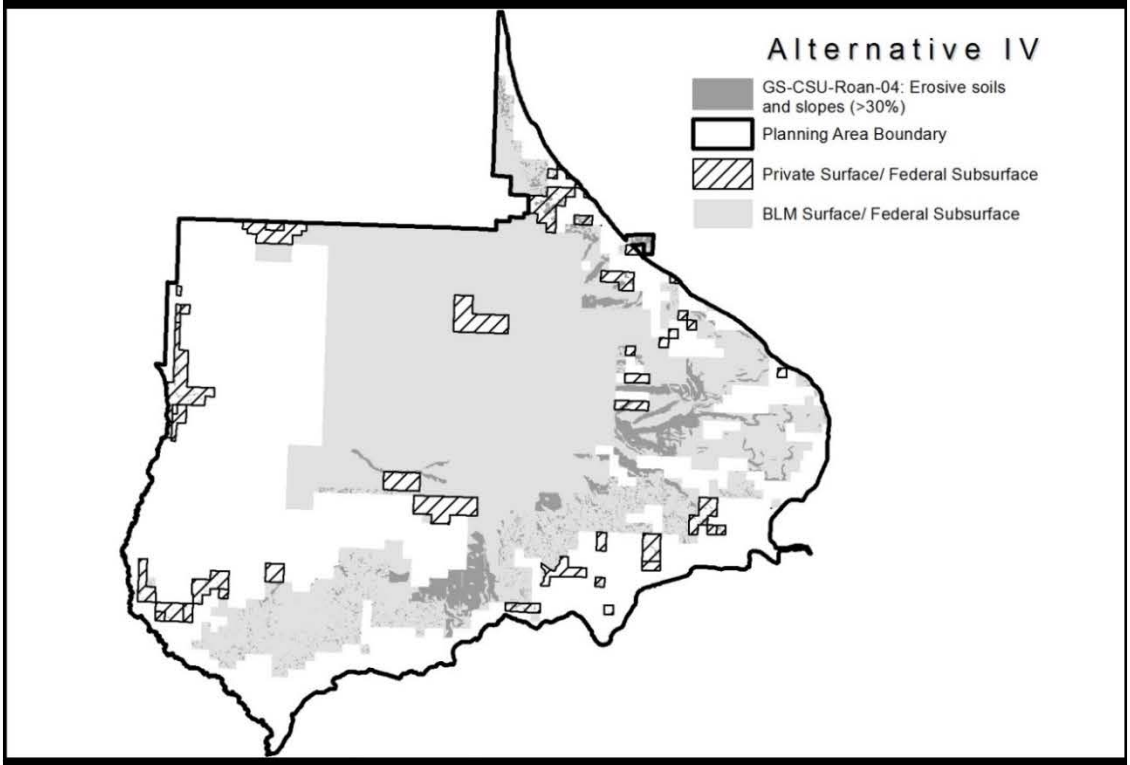
BLM Surface/ Federal Subsurface

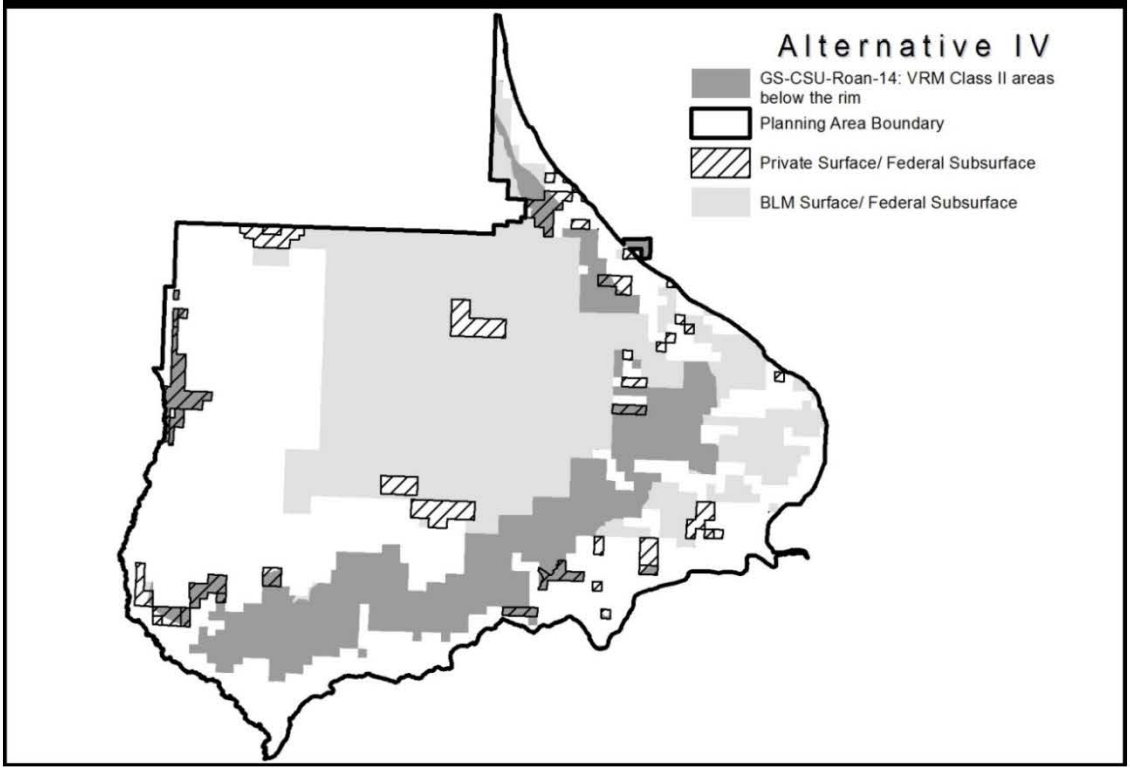

GS-CSU-Roan-10: Big Game Migration Corridors
Alternative IV
GS-CSU-Roan-10: Big game migration corridors
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


GS-CSU-Roan-11: Sensitive Bat Species Habitat
Alternative IV
GS-CSU-Roan-11: Sensitive bat species habitat
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

GS-CSU-Roan-04: Erosive Soils and Slopes (>30%)



GS-CSU-Roan-14: VRM Class II Areas Below the Rim



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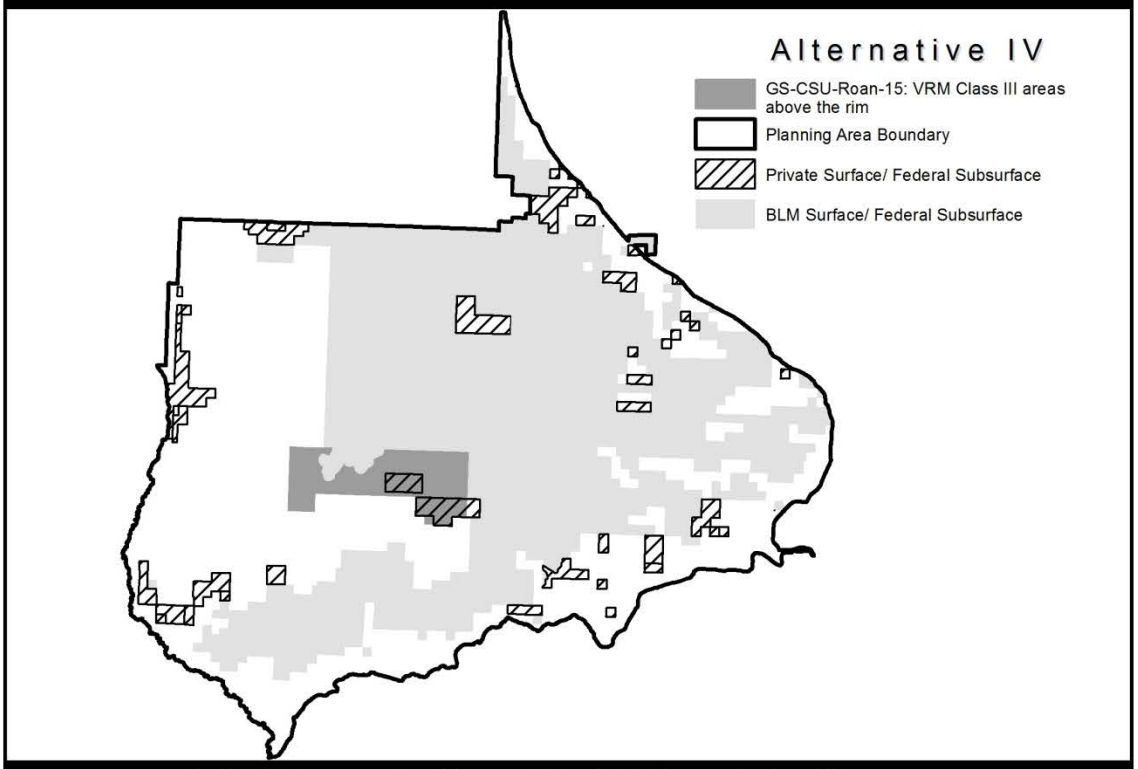
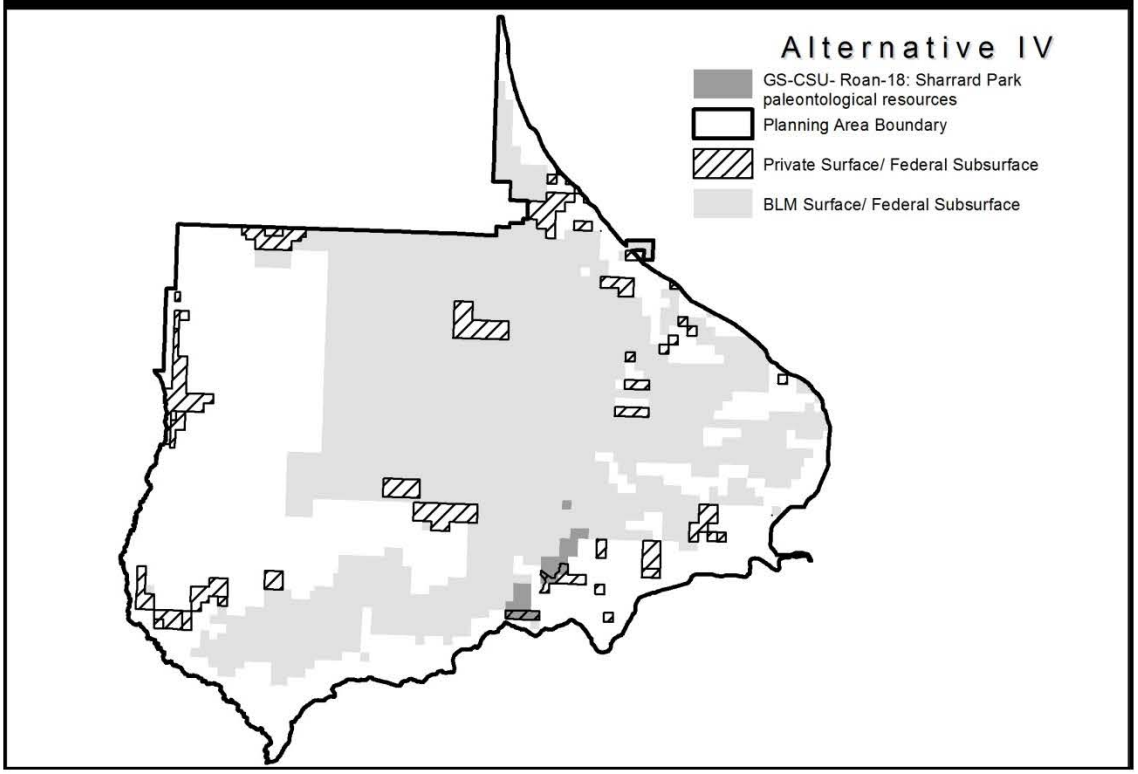
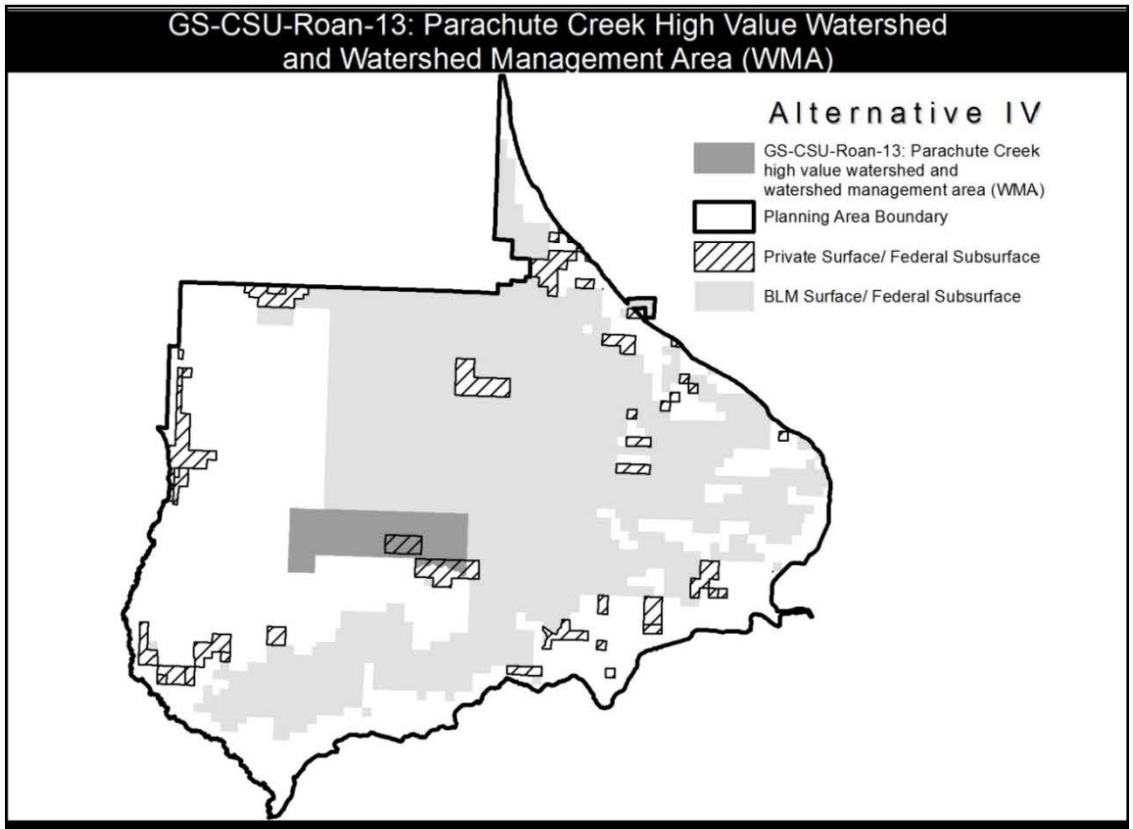


GS-CSU- Roan-18: Sharrard Park Paleontological Resources




GS-CSU-Roan-13: Parachute Creek High Value Watershed and Watershed Management Area (WMA)
Alternative IV
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Planning Area Boundary
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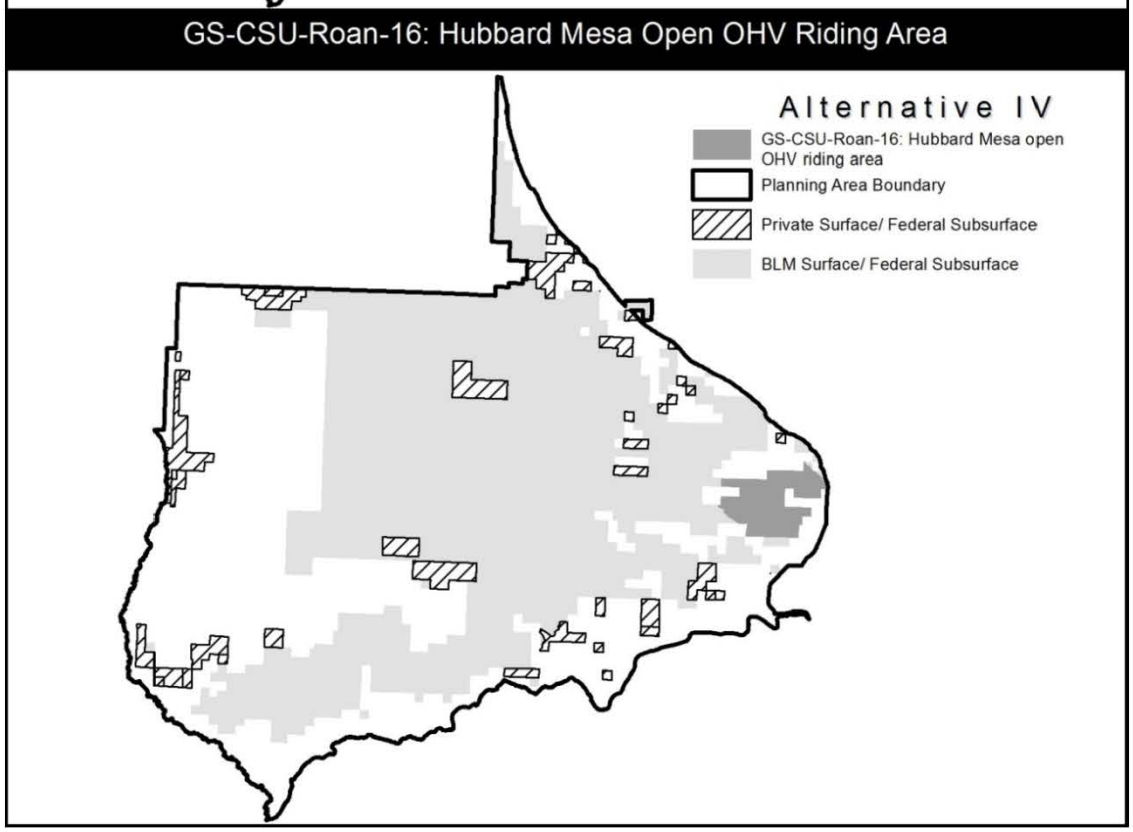
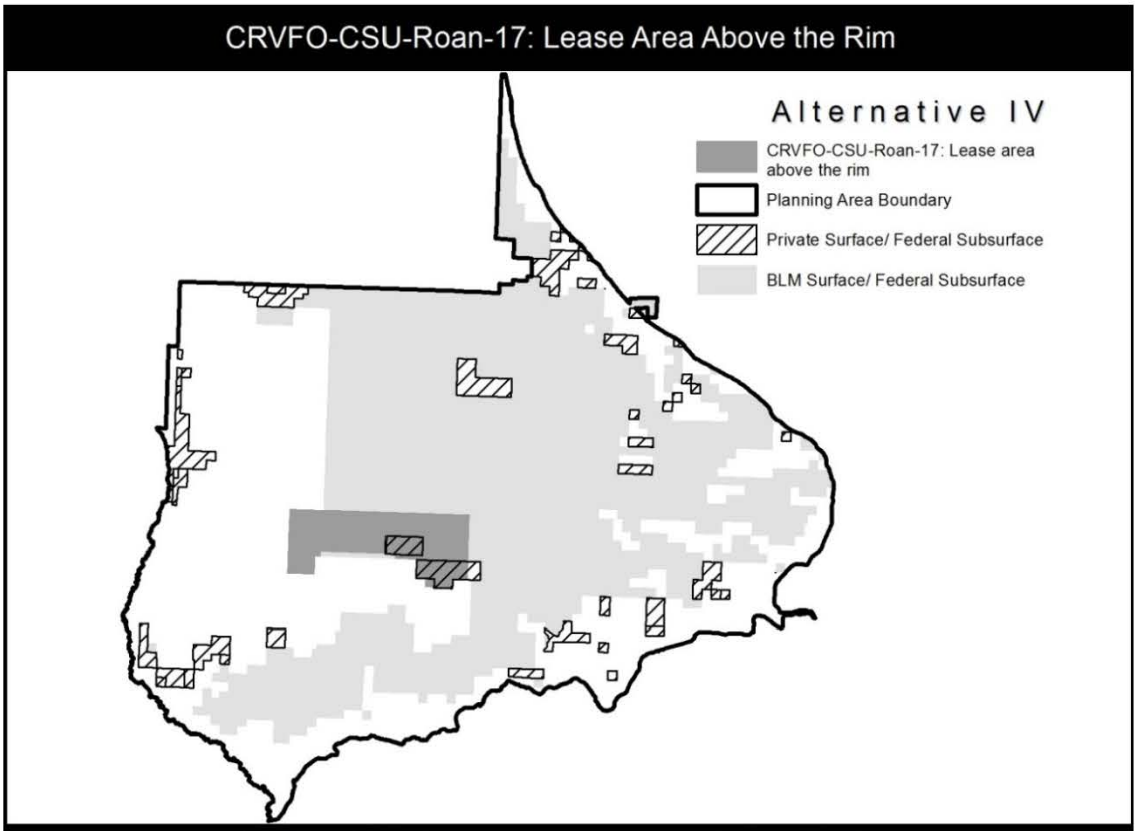
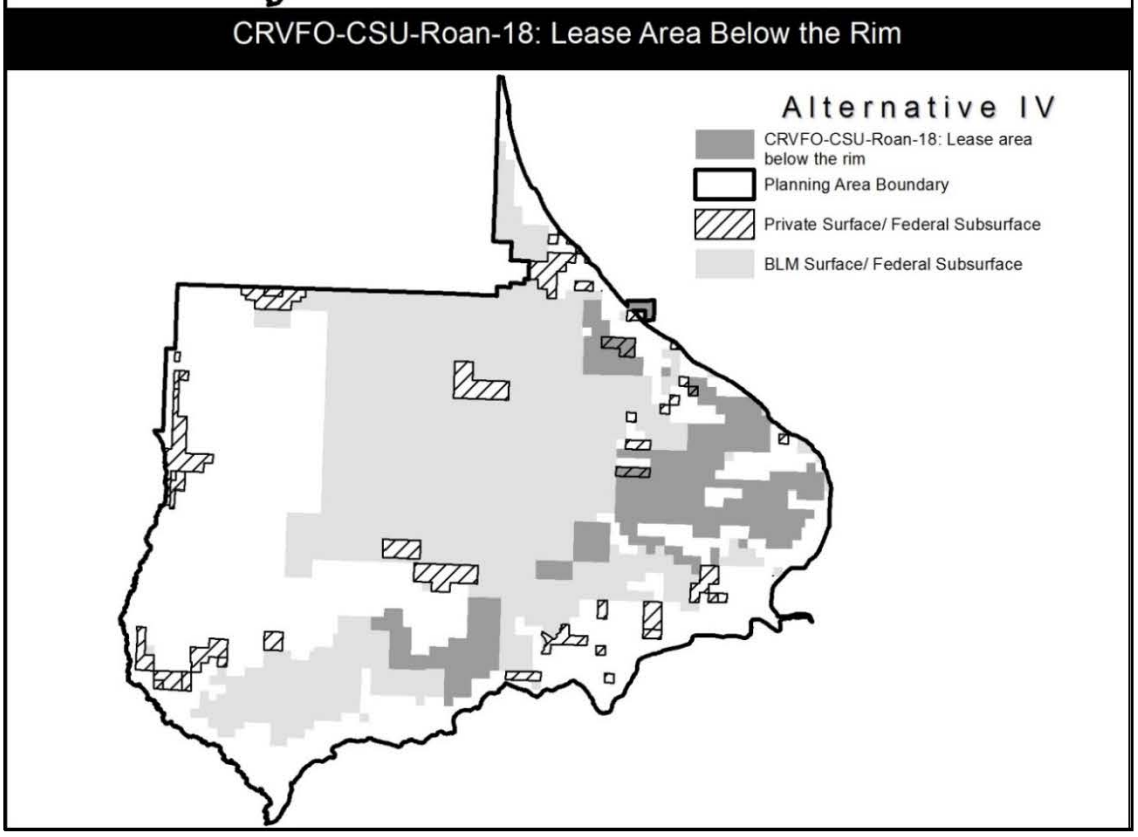
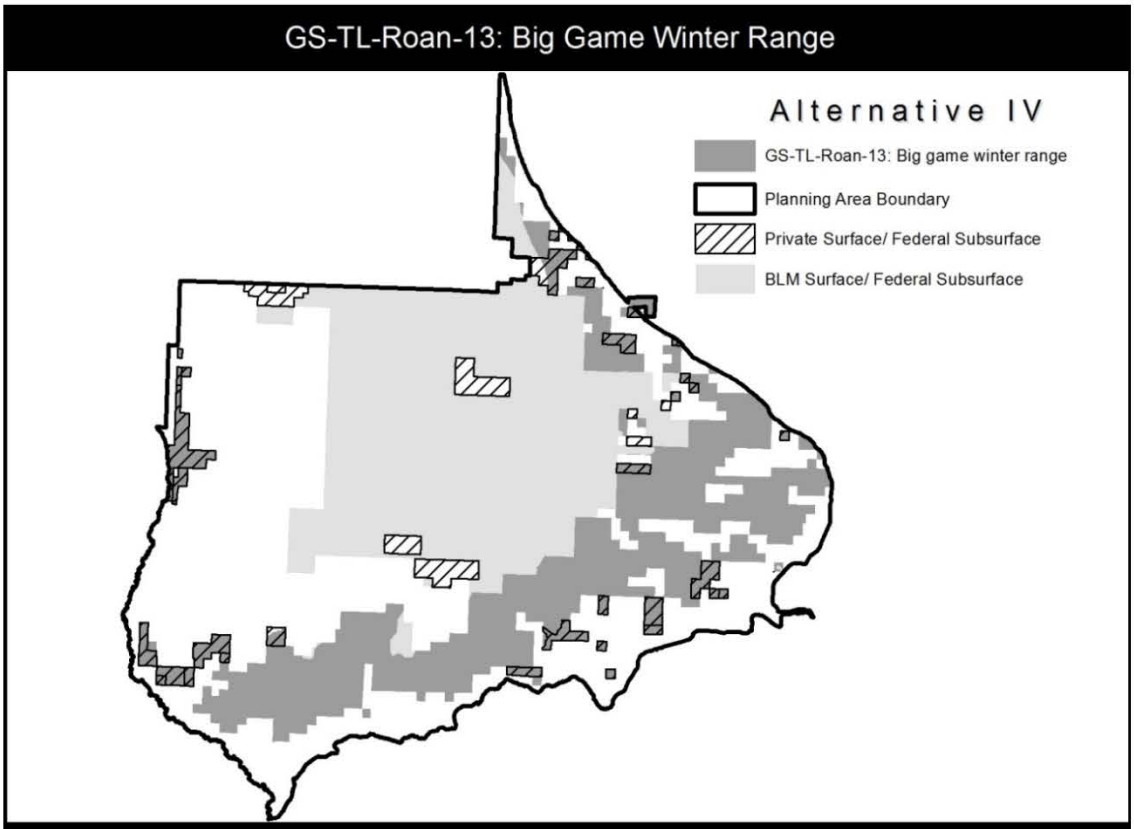
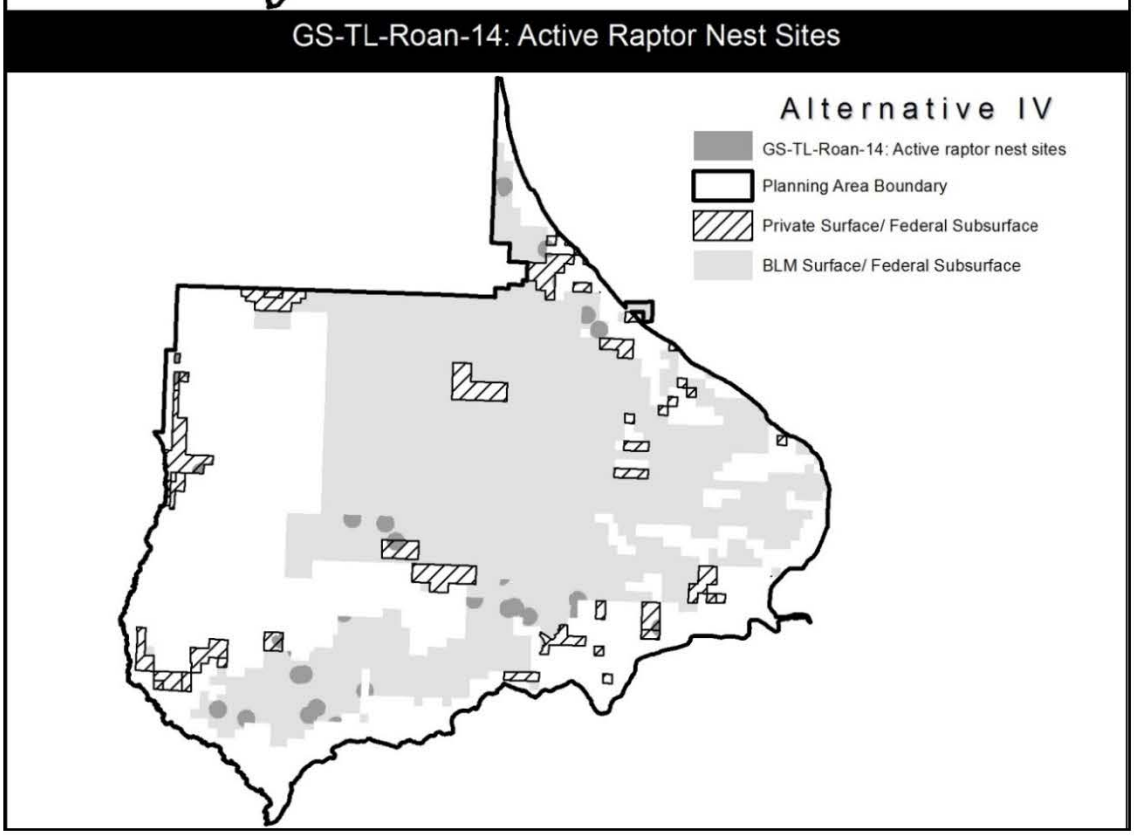
BLM Surface/ Federal Subsurface

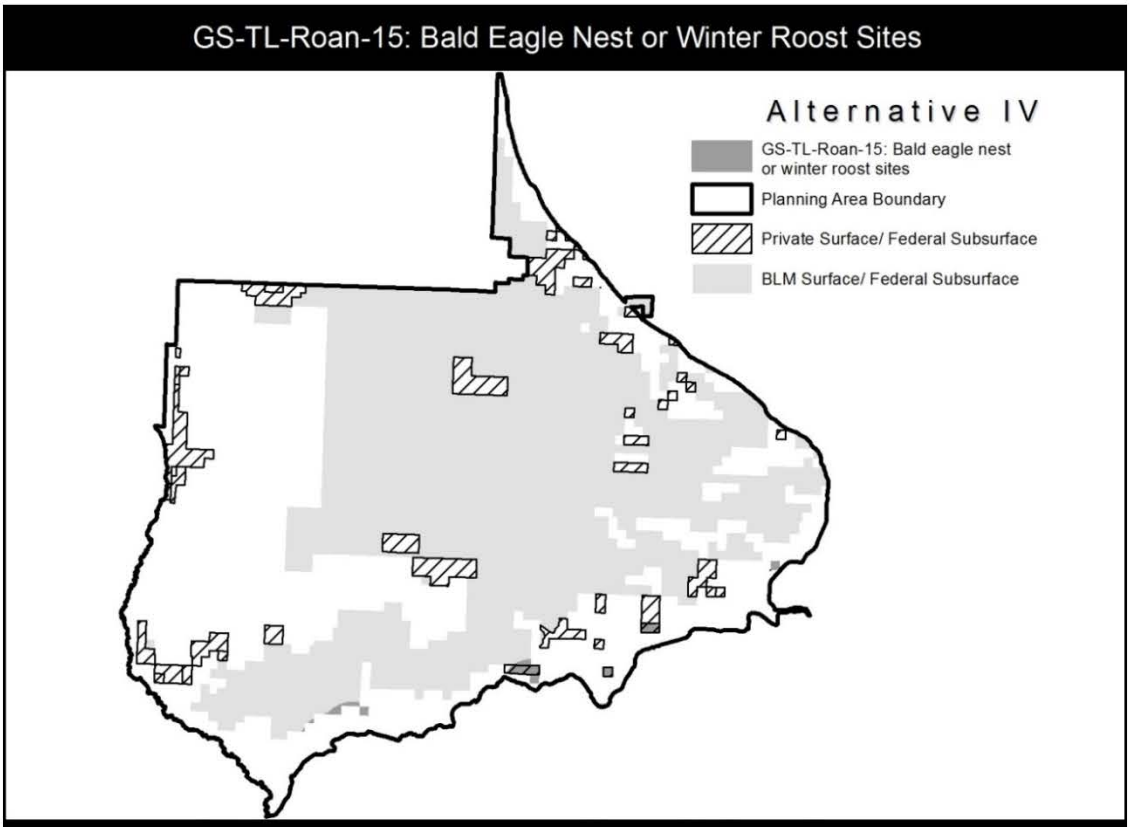

GS-CSU-Roan-16: Hubbard Mesa Open OHV Riding Area
Alternative IV
GS-CSU-Roan-16: Hubbard Mesa open OHV riding area
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

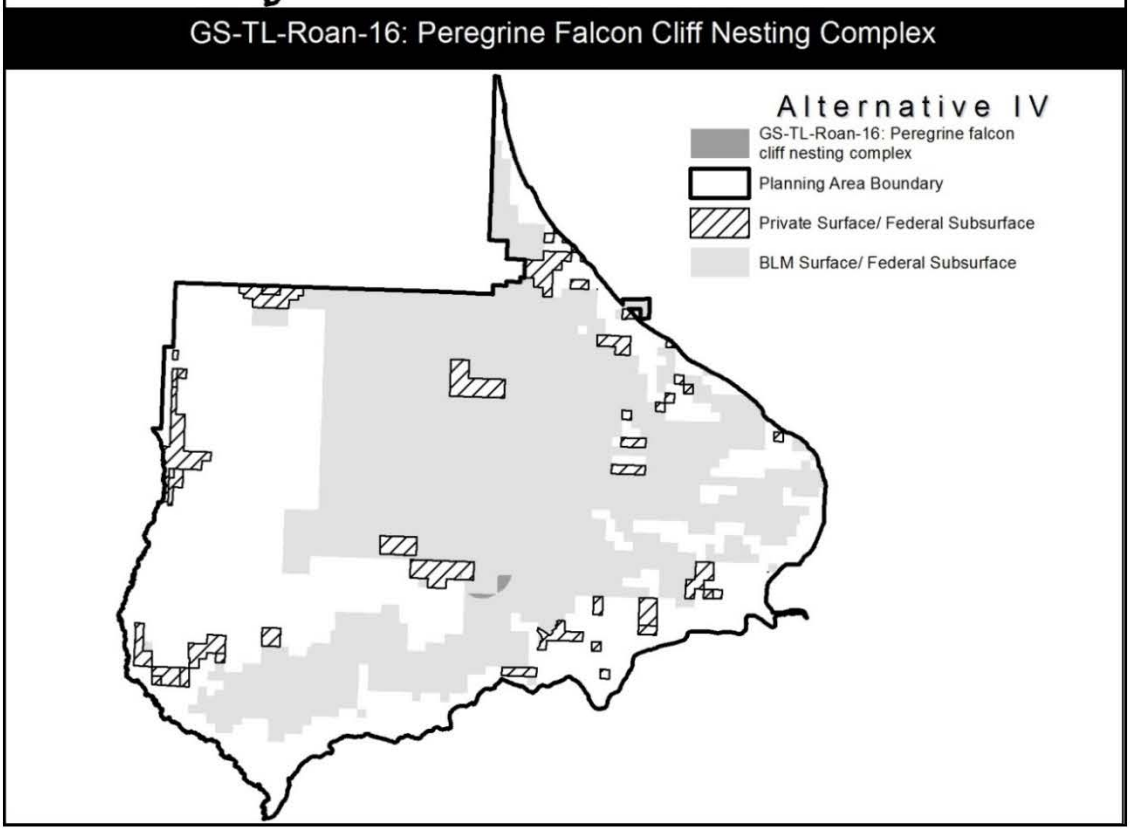

CRVFO-CSU-Roan-17: Lease Area Above the Rim
Alternative IV
CRVFO-CSU-Roan-17: Lease area above the rim
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

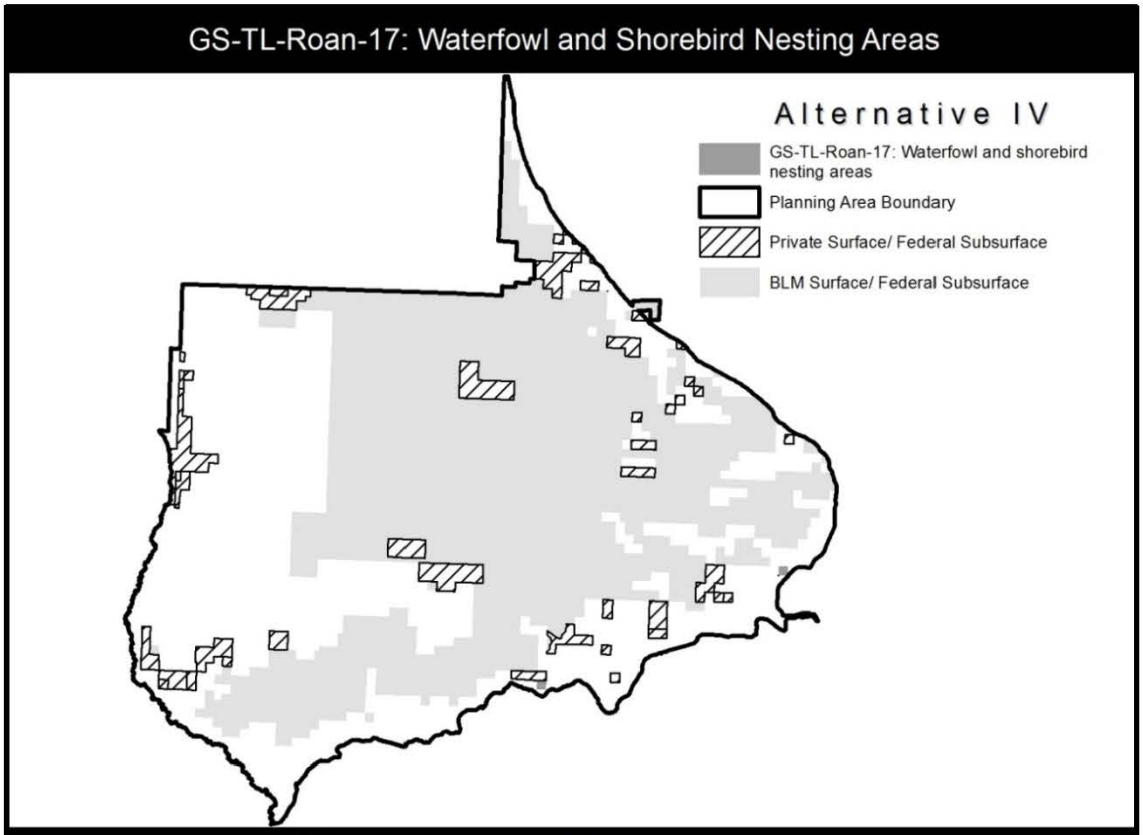

CRVFO-CSU-Roan-18: Lease Area Below the Rim
Alternative IV
CRVFO-CSU-Roan-18: Lease area below the rim
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

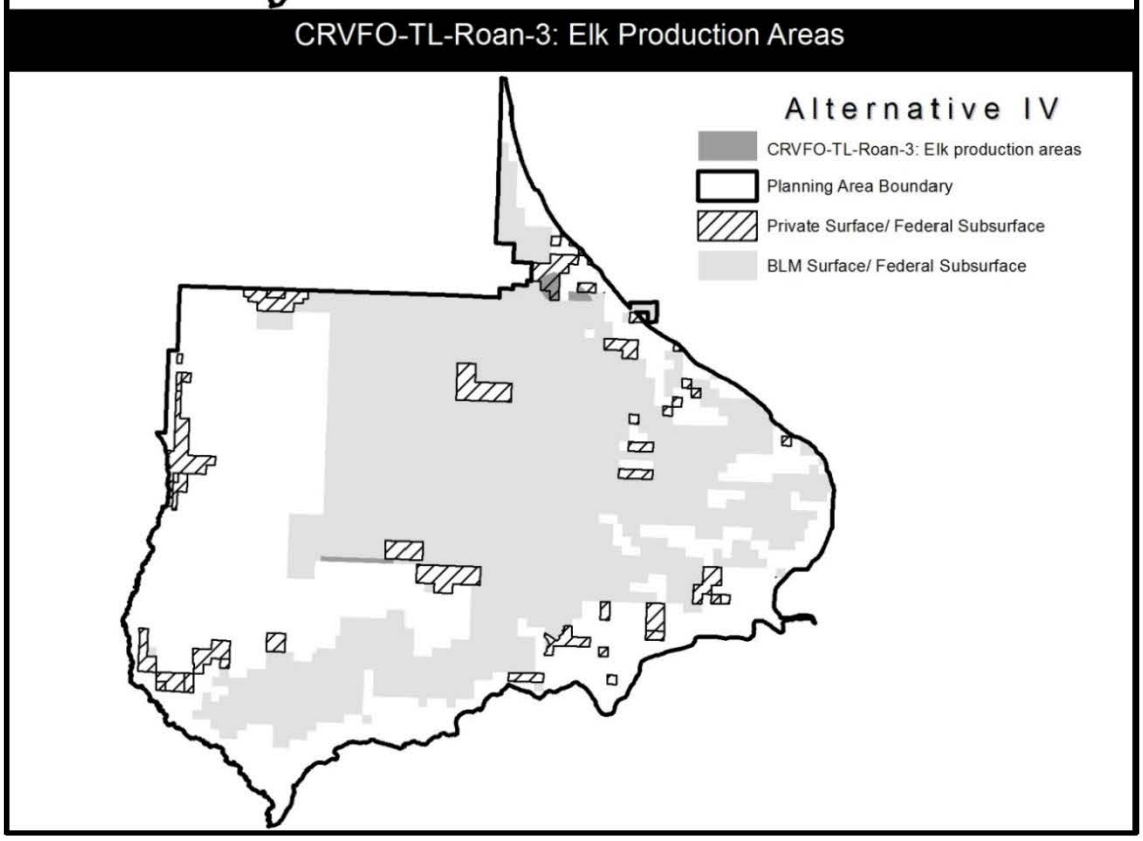

GS-TL-Roan-13: Big Game Winter Range
Alternative IV
GS-TL-Roan-13: Big game winter range
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

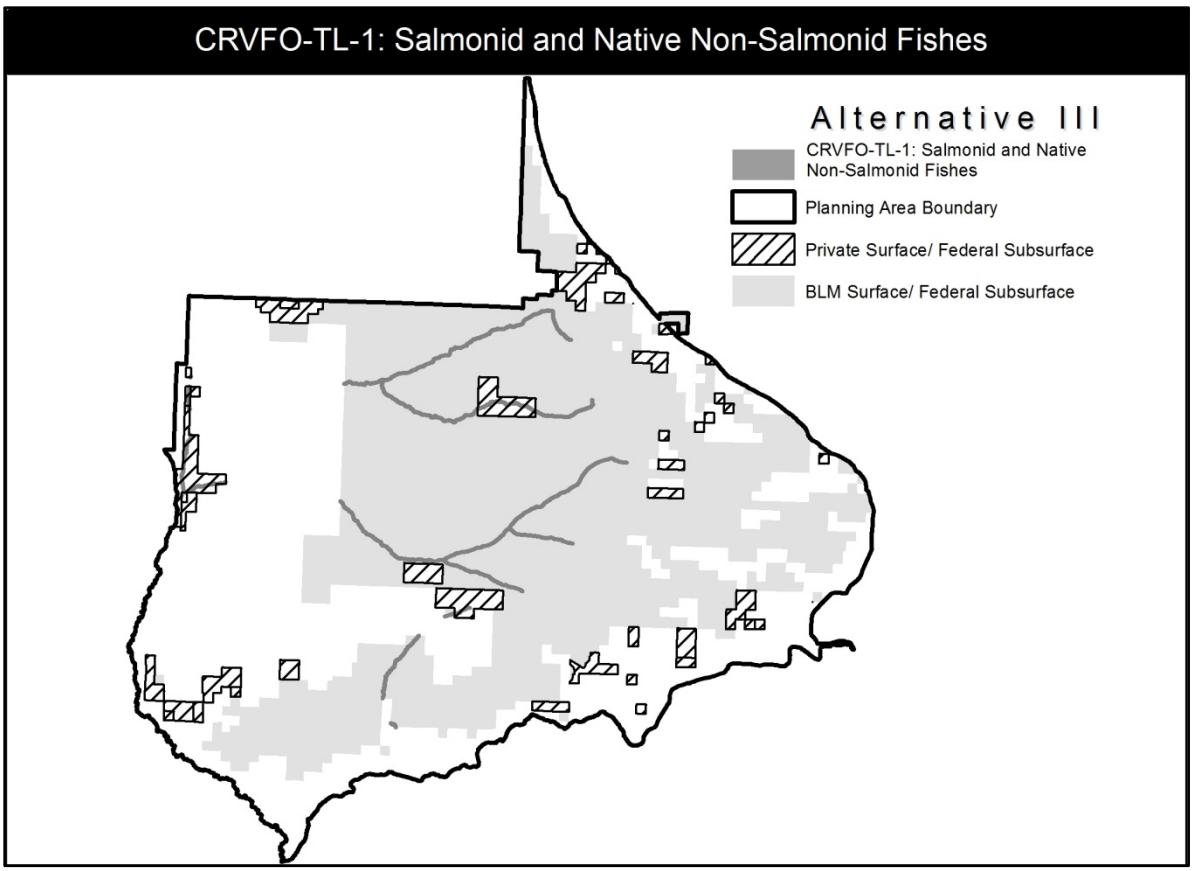

GS-TL-Roan-14: Active Raptor Nest Sites
Alternative IV
GS-TL-Roan-14: Active raptor nest sites
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


GS-TL-Roan-15: Bald Eagle Nest or Winter Roost Sites
Alternative IV
GS-TL-Roan-15: Bald eagle nest or winter roost sites
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


GS-TL-Roan-16: Peregrine Falcon Cliff Nesting Complex
Alternative IV
GS-TL-Roan-16: Peregrine falcon cliff nesting complex
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


GS-TL-Roan-17: Waterfowl and Shorebird Nesting Areas
Alternative IV
GS-TL-Roan-17: Waterfowl and shorebird nesting areas
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


CRVFO-TL-Roan-3: Elk Production Areas
Alternative IV
CRVFO-TL-Roan-3: Elk production areas
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface


CRVFO-TL-1: Salmonid and Native Non-Salmonid Fishes
Alternative III
CRVFO-TL-1: Salmonid and Native Non-Salmonid Fishes
Planning Area Boundary
Private Surface/ Federal Subsurface
BLM Surface/ Federal Subsurface

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Appendix D

Visual Resource Management (VRM) Classes and Objectives

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Appendix D.

Visual Resource Management (VRM) Classes and Objectives

Purposes of Visual Resource Classes

Visual resource classes are categories assigned to public lands and serve two purposes: (1) an inventory tool that portrays the relative value of the visual resources, and (2) a management tool that portrays the visual management objectives. Visual resource classes are labeled Class I, Class II, Class III, and Class IV.

Visual Resource Inventory Classes

Visual resource inventory classes are assigned through the inventory process and are based on a combination of scenic quality, sensitivity level, and distance zones. Inventory classes provide the basis for considering visual values in the land use planning process. Inventory data is recorded and maintained in GIS within a BLM geodatabase data standard. This data will be used to ensure scenic values of the public lands are considered and documented in land use plans, and available for project level NEPA analysis of impacts on visual values. All BLM Field offices must use these standards when inventorying, recording, amending, or maintaining VRI data sets.

Visual Resource Management Classes

Visual resource management (VRM) classes are assigned through RMPs. The assignment of visual management classes is ultimately based on the management decisions made in RMPs. However, visual values must be considered throughout the RMP process. All actions proposed during the RMP process that would result in surface disturbances must consider the importance of the visual values and the impacts that the project may have on those values. Management decisions in the RMP must reflect the value of visual resources. In fact, the value of the visual resource may be the driving force for some management decisions. For example, highly scenic areas that need special management attention may be designated as scenic Areas of Critical Environmental Concern (ACECs) and classified as VRM Class I based on the importance of the visual values. A map is developed in each RMP showing the approved visual resource management classes.

Objectives for Visual Resource Classes

Class I. The objective for this class is to preserve the existing character of the landscape. This call provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II. The objective for this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III. The objective for this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape may be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV. The objective for this class is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape may be high. These management activities may dominate the view and be the major focus of view attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Monitoring

The visual contrast rating system described in BLM Manual 8400 will be used, where appropriate, in assessing proposals for projects on public lands or private lands with federal subsurface mineral rights. Potential projects are assessed for changes in existing form, line, color, and texture to determine their compatibility and contrast with the existing VRM class. Procedures assess, and as needed revise and implement, measures of visual mitigation and rehabilitation activities conducted for surface-disturbing activities.

Visual Simulations

Many proposed actions will require visual simulations to be done by the proponent or private contractors. Visual simulations will be done for selected Key Observation Points (KOPs) as identified by the BLM. The simulations must be accurate, reliable, valid, and representative of the real-world depiction of the finished or interim proposed action on the landscape. Simulations will be prepared to scale depicting any and all parts of the proposed action. This includes all structures and supporting infrastructure (roads, utilities, etc.) and the resulting disturbances to the surrounding landscape.

All requested simulations will be evaluated by the BLM staff to determine their accuracy and will become an official part of the documentation files (SEIS, EA, CX, etc.) for the proposed actions. Analysis and mitigation measures will be based on these simulations, and the proponent's end product will be held to the final visual simulation documents. If the end result is not what was represented within the visual simulations, the proponent will be out of compliance with the project proposal and the Environmental Assessment.

Appendix E

BLM Recreation Guidelines to Meet Public Land Health Standards in Colorado

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E-1. BLM Recreation Guidelines to Meet Public Land Health Standards in Colorado
Recreation Guidelines to Meet Public Land Health Standards 1 and 2
1. Manage recreational activities to maintain sufficient vegetation on upland areas to protect the soil from wind and water erosion and to buffer temperature extremes. 2. Minimize disturbances and manage recreation use in riparian areas to protect vegetation, fragile soils, springs, and wetlands. 3. Plan and locate routes, trails, and developments away from riparian and wetland areas and highly erodible soils. 4. Reduce stream crossings to the minimal number dictated by the topography. Reduce sedimentation and compaction associated with stream crossings. 5. Manage watercraft types and uses as appropriate to protect riparian systems and water quality from adverse impacts.
Recreation Guidelines to Meet Public Land Health Standard 3
1. Manage recreational use on public lands to promote the survival and health of native plants and animals. 2. Protect against the establishment or spread of noxious weeds. 3. Protect wildlife habitat by preserving connectivity and avoiding fragmentation. 4. Minimize wildlife disturbances and artificial attractions such as feeding wild animals or improper disposal of garbage. 5. Protect plant and animal communities by limiting recreational use by type, season, intensity, distribution, or duration.
Recreation Guidelines to Meet Public Land Health Standard 4
1. Protect habitat for Federal and State threatened or endangered species and other special-status species.
Recreation Guidelines to Meet Public Land Health Standard 5
1. Manage recreational uses in coordination with other uses on public lands to achieve or exceed applicable water quality standards. 2. Control water quality impacts resulting from recreational use, such as human waste, trash, and other elements.

E-2. BLM Recreation Setting Characteristics Matrix			
ROS Class	**Physical Setting Description**	**Social Setting Description**	**Operational Setting Description**
Urban	Near urban areas. Substantially modified environment. Numerous facilities to manage and accommodate intensive use.	High concentrations of people commonplace. In constant contact with other people.	Onsite management controls and regulations are numerous and cannot go unnoticed. Intensively managed. Multiple activities may occur. Regular highway vehicles are present
Rural	Within 0.5 mile developed areas and primary highways. Substantially modified environment having natural and manmade features (includes agricultural lands). Moderate number of facilities to manage use may exist.	Moderate to high degree of contact with others. Culturally modified landscape. People are almost continually in view.	Onsite management controls and regulations are numerous and easy to see. Land uses obvious.
Front Country	Within 0.5 mile of light-duty roads and areas with high route density. Resource modifications evident but balanced by the surrounding natural appearing environment.	Moderate to high degree of contact with others. See an average of 30 or more groups per day and fewer when away from roads. Human use alterations may be dominant.	Visitor management controls are noticeable but harmonize with the landscape. Basic visitor information facilities are present. Land uses like grazing are evident but fit into the natural landscape. OHV use occurs.
Middle Country	Within 0.5 mile of primitive motorized routes (4wd, high clearance). Resource modifications evident but balanced by the surrounding natural appearing environment. Some rustic facilities such as bulletin boards signs and motorized trails.	Moderate to high degree of contact with others. See an average of 15 or more groups per day and less when away from roads. Human use alterations easily noticeable.	A few subtle management controls or visitor information facilities present. Land uses are still subtle but still easy to see. Motorized use occurs (4wds, ATVs, and motorcycles).
Back Country	At least ½ mile from primitive motorized routes but not greater than 3 miles from all motorized routes. Largely unmodified natural appearing environment. Few primitive facilities such as signs and trails.	Little contact with others. See an average of 6 to 15 groups per day. Evidence of others subtly noticeable but not drawing attention when recreating.	A few subtle management controls or visitor information facilities present. Land uses are subtle. No motorized use.

E-2. BLM Recreation Setting Characteristics Matrix			
ROS Class	**Physical Setting Description**	**Social Setting Description**	**Operational Setting Description**
Primitive	Greater than 3 miles from all motorized routes. Unmodified natural environment, at least 5,000. Few to no facilities.	Very little contact with others. See an average of 6 or fewer groups per day. Evidence of others unnoticeable.	No onsite visitor management or information facilities. Land uses generally unnoticeable. No motorized or mechanized uses.

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Appendix F

Proposed Management and Setting Prescriptions
for Lands with Wilderness Characteristics

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Proposed Management and Setting Prescriptions for Lands with Wilderness Characteristics

Management activities would be guided by the principle of doing the minimum necessary to manage these lands in order to preserve their wilderness characteristics. Cultural, paleontological, vegetation, geologic and terrestrial/aquatic wildlife resources are important supplemental values to an area's wilderness characteristics. The following management and setting prescriptions are intended to protect these values along with wilderness characteristics (i.e., naturalness and outstanding opportunities for solitude or primitive recreation).

Surface-Disturbing Activities

Management Action and Allowable Use Decisions

- Apply a no surface occupancy stipulation (CRVFO-NSO-Roan 2) on use and occupancy of the land surface for fluid mineral exploration and development and other surface-disturbing activities (Alterntive III).

Valid Existing Rights

Management Action and Allowable Use Decisions

- New discretionary uses that create valid existing rights are not allowed if they would detract from the wilderness values. Specific exemptions/allowances are made for prior-existing rights may continue.

Forest/Vegetation Management

Management Action and Allowable Use Decisions

- These lands are closed to commercial timber harvest, firewood cutting, and special forest product harvest.

Best Management Practices to Guide Implementation-level Planning

- Vegetative manipulation to control insect and disease outbreaks or control invasive species is allowed when there is no effective alternative and when the control is necessary to maintain wilderness characteristics and maintain supplemental values.
- Control/manipulation methods may include hand (e.g., tools or chain saws), chemical (e.g., spraying weeds), and biological treatment provided it would not cause adverse impacts (apparent evidence of human intervention on the landscape) to the wilderness characteristics.

Wildlife Management

Management Action and Allowable Use Decisions

- Introduction of threatened, endangered, or other special-status species native to North America may be allowed.
- Management activities on these lands would emphasize natural processes for wildlife management.

Best Management Practices to Guide Implementation-level Planning

- These resources would be managed to maintain that character.
- Fishing, hunting, and trapping are allowable activities on these lands. The State of Colorado establishes regulations and enforcement for these uses. Nothing would be construed as affecting the jurisdiction or responsibilities of the State agencies with respect to fish and wildlife management on these lands.
- Stocking of wildlife and fish species native to the area is permitted.

Cultural and Paleontological Resource Management

Best Management Practices to Guide Implementation-level Planning

- Resource inventories, studies, and research involving surface examination may be permitted.
- Paleontological resource projects such as excavations would be evaluated on a case-by-case basis. These evaluations would ensure any impact to wilderness characteristics are temporary and wilderness characteristics are protected over the long-term.
- Rehabilitation, stabilization, reconstruction, and restoration work on historic structures; excavations; and extensive surface collection may also be permitted if they maintain the area's wilderness character.
- Permanent physical protection, such as fences, would be limited to those measures needed to protect resources eligible for the National Register of Historic Places and would be constructed so as to minimize impacts on naturalness.

Visual Resource Management

Management Action and Allowable Use Decisions

- Manage areas under VRM Class II objectives unless otherwise managed as VRM Class I.

Wildland Fire Management

Best Management Practices to Guide Implementation-level Planning

- Fire suppression and management would be consistent with the CRVFO Fire Management Plan (FMP). Wildland fire suppression and management objectives would recognize maintaining wilderness characteristics.
- Reduce the negative effects of wildland fire suppression by applying minimum impact suppression tactics (MIST).
- Placement of large fire camps would be outside of these areas.
- Perform rehabilitation of fire suppression impacts and emergency stabilization/restoration (ESR) as defined by the resource advisor to restore visual and wilderness characteristics.
- The use of natural firebreaks and roads to contain a wildland fire is encouraged.

Livestock Grazing Management

Best Management Practices to Guide Implementation-level Planning

- Within areas managed to maintain wilderness characteristics, existing livestock grazing and the activities and facilities that support a grazing program are permitted to continue.
- Adjustments in the numbers and kind of livestock permitted to graze would be made as a result of land health assessments and grazing compliance.
- The construction of new grazing facilities would be permitted if they are primarily for the purpose of protecting wilderness characteristics and more effective management of resources, rather than to accommodate increased numbers of livestock.
- The use of motorized equipment for emergency purposes is allowed for livestock management.

Recreation and Visitor Services Management

Management Action and Allowable Use Decisions

- Permanent recreation structures are not permitted.
- No new special recreation permits would be authorized unless they are necessary for helping people realize the primitive and unconfined recreational values (e.g., upland outfitting service).

- When commercial special recreation permits (SRP) are renewed, the terms and conditions of the SRP would be modified as necessary to comply with the *Management and Setting Prescriptions for Areas with Wilderness Characteristics.*
- No competitive events would be authorized.

Best Management Practices to Guide Implementation-level Planning

- Primitive and unconfined recreational activities such as hiking, camping, rock climbing, caving, fishing, hunting, trapping etc., are emphasized on these lands.
- Recreational or hobby collecting of mineral specimens when conducted without location of a mining claim may be allowed. This use would be limited to hand collection and detection equipment.

Comprehensive Trails and Travel Management

Management Action and Allowable Use Decisions

- The construction of new permanent or temporary routes would not be allowed.
- All lands are closed to over-snow travel.
- Access is granted for BLM administrative use.

Best Management Practices to Guide Implementation-level Planning

- BLM authorization to exercise valid and existing rights and for emergency and other purposes as authorized under 43 CFR 8340.0-5(a) (2), (3), (4) and (5).
- The use and the construction of temporary roads, structures, and installations are allowed for emergency purposes, but must be conducted to achieve the least disturbance and reclaimed as soon as possible.
- Unauthorized travel off designated routes would not be allowed.
- Motorized and mechanized routes would be minimized and restoration of unnecessary routes would be preformed to enhance and protect wilderness characteristics.
- For all authorizations that allow off-route motorized/mechanized travel, specify the following: what type of use is allowed and for what purpose, times, dates or seasons of access; and where motorized/mechanized vehicle travel off designated routes is allowed.
- In areas with limited travel designations, motorized/mechanized travel is allowed up to 300 feet from designated motorized/mechanized routes for direct access to dispersed campsites provided that: 1) no resource damage occurs; 2) no new routes are created; and 3) such access is not otherwise prohibited by the BLM Field Manager.

Land and Realty Management (Land Disposals, Rights-of-Ways (ROWs) and Use Authorizations)

Management Action and Allowable Use Decisions

- Lands with wilderness characteristics would be retained in public ownership. They would not be disposed through any means, including public sales, exchanges, patents under the Recreation and Public Purposes Act, State selections or other actions (except where a vested right was established prior to October 21, 1976).
- Prior existing rights, such as leases under the Recreation and Public Purposes Act, leases/permits under 43 CFR 2920, and rights-of-ways (ROWs) may be renewed.
- These lands would be designated as ROW exclusion areas. New authorizations, leases, or ROWs would not be authorized that are not compatible with the defined values.

Best Management Practices to Guide Implementation-level Planning

- The BLM would acquire State and private in-holdings when practicable. In unique situations and subject to public review, exchanges may be made involving Federal and non-Federal lands when such action would significantly benefit that area's wilderness characteristics.

- Adequate access to in-holdings that are compatible with the defined values would be authorized.
- New administrative use authorizations would be granted on a case-by-case basis if it is: 1) compatible with the defined values, or 2) necessary to administer and protect the lands with wilderness characteristics, and 3) necessary to protect the health and safety of persons within the area.

Fluid Minerals (Oil and Gas, Tar Sands, & Geothermal Resources) Management

Management Action and Allowable Use Decisions

- *No Fluid Mineral Leasing* - Close unleased federal mineral estate to oil and gas leasing and geophysical development.

Locatable Minerals, Mineral Materials, & Non-Energy Leasable Minerals Management

Management Action and Allowable Use Decisions

- Recommend for withdrawal to the Secretary of the Interior to close these lands to mining laws for locatable exploration or development.
- *Non-energy Solid Mineral Leasing* - All federal mineral estate within these lands would be closed to non-energy solid mineral leasing.
- *Mineral Material (salable) Disposal* - These lands are closed to mineral material (salable such as moss rock, top soil, sand and gravel, scoria, fill dirt) disposal.

Implementation-level Planning Guidance

- Within areas managed to maintain wilderness characteristics, existing mining operations would be regulated using the 43 CFR 3809 regulations to prevent unnecessary and undue degradation of the lands.
- Within areas managed to maintain wilderness characteristics, existing mineral leases represent a valid existing right. These rights are dependent upon the specific terms and conditions of each lease. Existing leases would be regulated through conditions of approval to prevent unnecessary or undue degradation.

Appendix G

Reasonable Foreseeable Development
Roan Plateau Planning Area

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Reasonable Foreseeable Development
Roan Plateau Planning Area

Prepared By:

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Bureau of Land Management

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11/17/2014 Revision for updated surface disturbance calculations

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List of Abbreviations

AU ..... Assessment Unit
BCF ..... One Billion Standard Cubic Feet of Gas
BLM ..... Bureau of Land Management
CA ..... Communitization Agreement
CBNG ..... Coalbed Natural Gas
COGCC ..... Colorado Oil and Gas Conservation Commission
CRVFO ..... Colorado River Valley Field Office
DOE ..... Department of Energy
EIA ..... United States Energy Information Administration
EIS ..... Environmental Impact Statement
EPCA ..... Energy Policy and Conservation Act
EUR ..... Estimated Ultimate Recovery
FAN ..... Final Abandonment Notice
GJFO ..... Grand Junction Field Office
MCF ..... One Thousand Standard Cubic Feet of Gas
mD ..... Millidarcy
MMBTU ..... One Million British Thermal Units
MMCF ..... One Million Standard Cubic Feet of Gas
MWX ..... Multiple Well Experiment
NGL ..... Natural Gas Liquids
NOSR ..... Naval Oil Shale Reserves
NSO ..... No Surface Occupancy
NYMEX ..... New York Mercantile Exchange
RFD ..... Reasonable Foreseeable Development Scenario
RMPA ..... Resource Management Plan Amendment
SCF ..... One Standard Cubic Foot of Gas
SEIS ..... Supplemental Environmental Impact Statement
TCF ..... One Trillion Standard Cubic Feet of Gas
TPS ..... Total Petroleum System
USFS ..... United States Forest Service
USGS ..... United States Geological Survey
WRFO ..... White River Field Office

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Summary

This Reasonable Foreseeable Development Scenario (RFD) was prepared to support the Resource Management Plan Amendment (RMPA) and Supplemental Environmental Impact Statement (SEIS) for the Roan Plateau Planning Area (RPPA) of the Colorado River Valley Field Office (CRVFO), Colorado. It provides the interdisciplinary planning team with an estimate of the oil and gas development activities that are reasonably likely to occur on BLM-administered lands within the RPPA over the next 20 years.

The RPPA is in the southern part of the Piceance Basin, which is part of the greater geologic basin known as the Uinta-Piceance Basin. Current development is focused on the Mesaverde Formation. There currently are 2,661 wells in the RPPA, and oil and gas activities have switched from exploration to developmental. Little development has occurred on top of the plateau, but development below its rim (top of the cliffs) has been extensive, and approximately 50% of the acreage available for development has been developed.

The Bureau of Land Management (BLM) Energy Office staff at the CRVFO compiled data from various sources including historical oil and gas development trends and natural gas prices to estimate future development for the RPPA. The CRVFO estimates that 17.1 trillion cubic feet of gas (TCF) is technically recoverable from the Mesaverde Formation in the RPPA. Over the next 20 years, it is projected that 5,470 federal and fee wells could be drilled into the RPPA, with 1,070 federal wells on top of the plateau and 2,450 federal wells below the rim, see Table 3. This development is estimated to create an additional 5,928 aces of net disturbance, including 1,898 acres on federal lands.

Background

The development of the initial Roan Plateau RMP Amendment began with scoping in 2000. The Draft Environmental Impact Statement (EIS) was published in November 2004. The Final EIS was published in August 2006. The BLM then issued two Records of Decision, one in June 2007 and a second, pertaining to Areas of Critical Environmental Concern, in March 2008. A lawsuit filed in July 2008 that challenged the BLM's oil and gas leasing and management decisions for the Roan Plateau resulted in a June 22, 2012, ruling by the United States District Court for the District of Colorado. The Court set aside the Plan amendment and remanded the matter to the BLM for further action in accordance with the Court's decision.

In response to the Opinion and Order of the United States District Court for the District of Colorado on June 22, 2012, the RMPA/SEIS for the RPPA is being prepared. A Notice of Intent to initiate scoping for the SEIS was published to the Federal Register on January 28, 2013. The RMPA/SEIS will analyze options for future management of the RPPA consistent with the 2012 Court Order. It will also address significant new information arising since publication of the original Records of Decision (RODs) in August 2007 and March 2008 and issues identified by the scoping process.

Reconsideration of oil and gas development was a component of the Court Order and an issue identified during scoping; therefore, the BLM has concluded that it is appropriate to update the RFD prepared November 2005 for the RPPA in conjunction with the earlier 2006 RMPA/EIS.

A RFD is a long-term scenario used as a baseline for adjusting the projected amount of oil and gas activity for each alternative in the Draft Resource Management Plan. It is not a decision and does not authorize or approve any development. It is a rational estimate of development based under the assumption that all potential productive areas are open for oil and gas leasing and developed under standard lease terms and conditions, except those areas designated as closed to leasing by law, regulation,

or executive order. The RFD estimates the potential oil and gas activity on all lands, including private and state lands. The BLM only has jurisdiction over the activity on federal surface or federal minerals.

This RFD is intended for input into the RMPA/SEIS by:

- Describing the potential level of fluid mineral exploration and production to occur over the next 20 years and estimating the surface disturbance associated with that activity. This information will provide the planning team the basis for assessing the impacts to other resources within the RPPA. The analysis of impacts and associated mitigation measures will be described in the RMPA/SEIS and other National Environmental Policy Act (NEPA) documents.
- Providing a description of past and present exploration and development activities in the RPPA.
- Discussing ancillary facilities and surface impacts from past and current activity.
- Analyzing the geology, technologies, and methodologies that occur within the CRVFO in order to support assumptions and projections for the RFD.

The RFD was prepared in accordance with Instruction Memorandum No. 2004-089; subject "Policy for Reasonable Foreseeable Development (RFD) Scenario for Oil and Gas," dated January 16, 2004.

Description of Geology

Geologic Setting

The Piceance Basin is an elongated northwest-southeast trending structural basin about 100 miles long and 40 to 50 miles wide located in northwestern Colorado. The basin is bounded by the Grand Hogback monocline and the White River Uplift to the east, the Axial Basin Arch to the north, the Douglas Creek Arch to the west, and the Uncompahgre and Sawatch uplifts to the south. The general stratigraphy of the Piceance Basin ranges from Cambrian to Tertiary in age.

During the Cretaceous period 145 to 65.5 million years ago (Mya), the Piceance Basin region was situated on the on the western foreland margin of the Western Interior Seaway, which extended from the Gulf of Mexico to Canada. During Turonian through Campanian time, sediment was shed from the Sevier thrust belt in central Utah and southwestern Wyoming, transported eastward in fluvial depositional systems, and ultimately deposited in shoreline environments that rimmed the epeiric (inland) seaway. Costal-plain swamps developed landward of the Cretaceous shorelines that later formed the prolific coal-bearing successions of the Cameo coal and overlying coal intervals of the Williams Fork Formation. Regression of the seaway resulted in a general eastward progradation of the shorelines and concomitant eastward migration of the coal-bearing deposits.

During this time, several thousand feet of subsidence and accumulation of continental and marginal-marine sediment occurred. At the close of the Cretaceous, Laramide uplifts in the Sawatch Uncompahgre, Douglas Creek, and Uinta regions began to rise as is evident by either regionally extensive unconformities or thinning of the deposits over the incipient uplifts. The Laramide orogeny intensified during the Paleocene and continued throughout the Eocene, resulting in deposition of coarser-grained clastic detritus proximal to the uplifts and accumulation of finer-grained sediment in the intermountain basins.

A wide spectrum of local lithostratigraphic terms are used for facies-equivalent, correlative units of the Piceance Basin. For example, regression of the Western Interior Seaway during Late Campanian time is expressed as high stand progradational parasequence sets that constitute the Corcoran, Cozzette, and Rollins Members of the Mount Garfield Formation in the Book Cliffs area and the Iles Formation in the

Grand Hogback area. The overlying succession of fluvial strata is referred to as the Hunter Canyon Formation of the Mesaverde Group in the Book Cliffs area and the Williams Fork Formation in the Grand Hogback area. These fluvial deposits are succeeded by a 50- to 150-foot-thick interval of coarse-grained sandstone to conglomerate that, in some localities, possess a distinctive white appearance and are overlain by the brightly variegated Eocene Wasatch Formation. This coarse-grained interval has been referred to as the Ohio Creek Conglomerate and the Ohio Creek Member of the Mesaverde Group (Patterson, Kronmueller and Davies).

USGS Oil and Gas Assessment Units

When discussing geology, plays, assessment units (AU), and total petroleum systems (TPS) within the RPPA, it is necessary to include basin wide information. The majority of kerogen rich source rocks and gas bearing formations are contiguous throughout the basin, with the exception of transition zones and basin structural boundaries (i.e. the Grand Hogback, Douglas Arch, and the White River uplift.) The basin-centric nature of the RPPA's geographic and geophysical location means that it overlies all the hydrocarbon bearing formations that are prolific in other fields within the greater CRVFO planning area. Therefore, this document draws heavily from the RFD developed for the CRVFO's RMP.

An oil and gas "play" is a set of known or postulated oil and gas accumulations sharing similar geologic, geographic, and temporal properties, such as source rock, migration pathway, timing, trapping mechanism, and hydrocarbon type. A play may or may not differ from an AU, and an AU can include one or more plays. Conventional plays are plays associated with structural or stratigraphic traps, commonly bounded by a down-dip water contact, and therefore affected by the buoyancy of petroleum in water. Unconventional plays have the following characteristics: (1) are generally very large accumulations occupying the more central, deeper parts of basins; (2) have an absence of down-dip water contacts; (3) are abnormally over- or under-pressured; (4) contain gas that is in the pressuring phase; (5) produce little or no water; (6) have a permeability of less than 0.1 millidarcy (mD); (7) are overlain by a normally pressured transition zone containing gas and water; (8) contain thermogenic gas; (9) have a source of gas that is local—typically from either interbedded or adjacent lithologies; (10) have a 0.75 to 0.9 percent vitrinite reflectance at the top of accumulations; (11) consist only secondarily in structural and stratigraphic traps and; (12) are "sealed" by the presence of multiple fluid phases in low-permeability reservoirs. The U.S. Geological Survey (USGS) has prepared a schematic, shown in Figure 1, illustrating the different types of oil and gas resources.

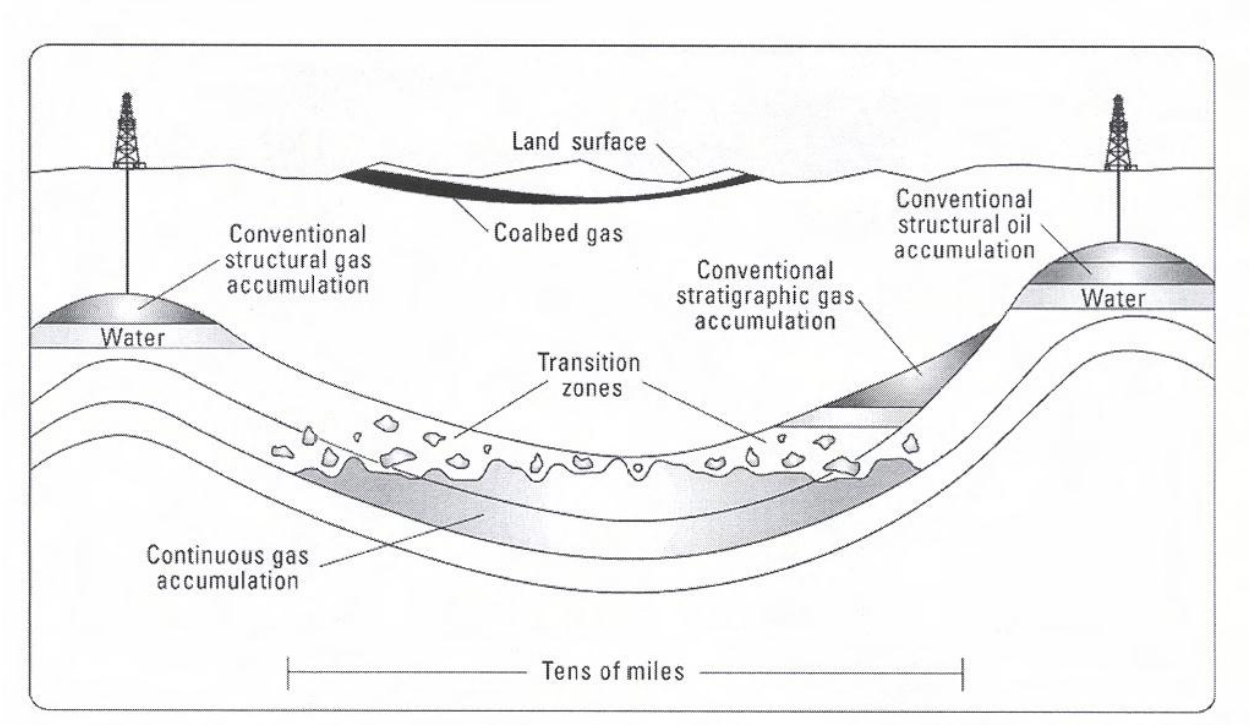

Figure 1. Schematic diagram showing the types of oil and gas resources in USGS assessment.

For the purposes of this RFD, a homogeneous distribution of resources within a play boundary is assumed because of the lack of more geologically specific information. However, gas resources are generally not distributed homogeneously within a play. This is particularly true for conventional accumulations but less so for continuous accumulations. Despite the assumption of homogeneity, various oil and gas densities can be mapped due to play stacking. Following is a discussion of the plays with AU and TPS that pertain to the Piceance Basin.

Piceance Tertiary Conventional Play

This play includes conventional sandstone reservoirs in the Tertiary Green River and Wasatch Formations. This play is included in the Piceance Green River Conventional Oil and Gas AU, located in the extreme western part of the CRVFO. Gas from the Green River Formation is considered to be sourced from the Green River TPS, and gas produced from the Wasatch Formation is considered to be sourced from the Mesaverde TPS. Approximately 11% of the mapped AU is actually mapped within the CRVFO boundary, mostly within the RPPA. In the Piceance Basin, the Green River Formation overlies and inter-fingers with the Wasatch Formation and was deposited in lacustrine environments of the Eocene Lake Uinta. The Green River Formation near the center of the basin is more than 5,000 feet thick. Most of the gas produced from this formation, originating from marginal lacustrine (lake-deposited) rocks or basal transgressive (marine) beds, has been produced in the central part of the basin. Source rocks appear to be from the underlying Mesaverde Group and from organic rocks within the Green River Formation itself. Traps are primarily stratigraphic and structural-stratigraphic. Seals are enclosing shale, mudstone, and siltstone.

Gas produced from the Wasatch Formation is sourced from the underlying Mesaverde Group also. Some oil production also occurs from the Green River Formation, despite the low maturity of the lacustrine source rocks there. Although there are producing wells, the fields are small. This play has been only moderately explored despite being penetrated by numerous wells drilled to Mesaverde objectives. The

Tertiary gas reservoirs are under-pressured, mostly fluvial sandstone, and many of these shallow gas reservoirs may have been bypassed. Due to the higher Mesaverde gas-per-well recoveries, these wells are completed first in the Mesaverde and, after depletion, possibly recompleted in the Wasatch Formation. Green River Formation produces minimal oil or gas within the RPPA. Gas production from the Wasatch Formation, mostly the G Sand, can be found in nearly 200 wells, most of which are located within or near the mapped AU boundary. The USGS expects that 12 more nonassociated gas accumulations will be found within this AU and that a maximum of 65 such accumulations may exist. Within the CRVFO, it is expected that one more field will be discovered, and a maximum of seven fields may exist.

Mesaverde Continuous Gas AU

This AU is defined as that area of the Piceance Basin where a basin-centered continuous gas accumulation developed from the generation and predominantly vertical migration of gas from thermally mature coal and carbonaceous shale source rocks in the lower part of the Mesaverde Group. The boundary of the assessment unit is defined solely by the isoreflectance line being Ro=1.10 percent (Ro = vitrinite reflectance in oil). Stratigraphically, the AU extends vertically from the base of the Cameo coal zone in the Mesaverde Group (Williams Fork Formation) to the base of the Green River Formation. Fluvial channel sandstones in the Mesaverde Group and Wasatch Formation are the primary gas reservoirs. Gas accumulations are sealed by relatively impermeable mud-rock that surrounds many of the sandstone units and by the process of capillary seal within the basin-centered accumulation (Dickinson, and Law). Much of the established production is from fields within valleys cut by the Colorado River and its tributaries. Unloading of overburden because of this down cutting and erosion may have increased permeability by opening up pore throats and fractures (Dickinson, and Law).

Gas production from fields, in this AU, within the CRVFO is primarily from the Williams Fork Formation at total depths ranging from 6,000 to 9,000 feet. Initial production in new wells using modern hydraulic fracturing techniques ranges from 800 one thousand cubic feet (MCF) of gas per day to 1,400 MCF/day on 10-acre spacing. Mesaverde wells usually produce a minor amount of condensate and the USGS determined that average amount to be about 4,324 barrels per well over the life of the well. Only small amounts of water are produced with the gas. Gas is trapped in a 1,700- to 2,400-foot interval of stacked, very low permeability, highly discontinuous fluvial sandstones that are part of a large, basin-centered gas accumulation where the lower two-thirds of the Williams Fork Formation is continuously gas-saturated down dip of water-bearing sandstones.

A widespread, thin shale interval in the upper part of the Williams Fork may have been important as a top seal for overpressuring of the basin-centered gas accumulation. This interval ties closely with a seismic reflector that can be correlated over much of the Piceance Basin. Outcrop and subsurface studies indicate that the typical size of the Williams Fork sandstone reservoirs is small, with typical lateral extents of 500 to 800 feet. In general, the small size of these sandstones is the result of deposition as point bars by meandering streams. Seismic data and well control indicate early movement of Laramide structures. This movement has effected deposition of the Iles and Williams Fork strata.

Many attempts to produce this vast basin-centered resource were unsuccessful until modern hydraulic-fracturing technology made it possible to produce wells at economic rates. Natural fracturing is the primary control of well productivity, and 3D seismic can be used to identify structurally favorable areas. A combination of natural fractures and man-made factures is what makes this play economic. Areas within the Mesaverde Continuous Gas AU that contain gas resources but have little natural fracturing may not be economic to produce even with current hydraulic fracturing techniques. The low permeability and highly lenticular nature of the fluvial sandstones require 20-acre or denser well spacing to drain the Williams Fork reservoir (Cumella and Ostby).

Wasatch reserves are second in size only to the Mesaverde reserves. The Wasatch Formation consists of multiple, lenticular, sandstone lenses interbedded with bentonitic, varicolored shales and siltstones. The sands of the Wasatch were deposited as channels cut into the shales and siltstones. The sands, which usually contain high clay content, are considered tight with low permeability. Most of the Wasatch production is expected to be derived from stratigraphic traps in the G Sand of the Molina Member. Production has been established in the G Sand in several fields within the CRVFO. Much like the Williams Fork, the best production from the Wasatch is dependent on natural fractures as well as induced fracturing. In this area, the Wasatch has been developed at depths between 2,000 and 3,000 feet, with initial well productions of 200 to 300 MCF/day on 160-acre spacing. The Wasatch wells do not produce condensate

It is likely that reserves growth will be experienced within most of the fields portions of in this AU within the CRVFO from improved drilling and completion techniques and from additional infill drilling. Expansion of existing fields will also occur with drilling in untested areas that have geologic characteristics similar to those in the existing fields. New fields may be discovered as a result of new drilling and completion techniques in untested areas. These areas may or may not have the significant natural fracturing that is critical to economic production today. Future fracturing techniques may be able to unlock gas even in areas without significant natural fractures.

Mesaverde Transitional Gas AU

This AU surrounds the Mesaverde Continuous Gas AU and is defined as the area in the Piceance Basin where strata in the Mesaverde TPS include and overlie source rocks in the lower part of the Mesaverde Group, with Ro values between 0.75 percent and 1.10 percent. The AU extends stratigraphically from the base of the Cameo coal to the base of the first significant lacustrine shale in the Green River Formation. Gas accumulations are thought to result primarily from vertical migration of gas from underlying thermally mature coal and carbonaceous shale. Gas saturation is probably less complete than in the Mesaverde Continuous Gas AU because some of the source rocks high in the Mesaverde units are less mature. Consequently, a higher percentage of water-saturated sandstone reservoirs are anticipated in this AU. Reservoir pressures vary from being moderately overpressured in the lower part of the AU to being normally pressured or under pressured in the upper part. Some of the gas-charged reservoirs may have conventional permeability (>0.1 mD) as well as gas-water contacts, particularly in upper stratigraphic intervals of the Mesaverde TPS.

Within the CRVFO, much of the gas production is from the Divide Creek and Parachute fields. Most production is from fluvial channel sandstones in the Mesaverde Group Formations, with lesser production from fluvial channel reservoirs in the Wasatch Formation. Because this AU overlies thermally mature source rocks, gas can be found throughout the entire extent of the AU. However, the number of fields to be discovered could be limited in number and size because of incomplete gas saturation and the increased chance of penetrating water-wet reservoirs. Future fields may be best found in areas where structures can enhance gas migration and accumulation. The USGS predicts that additional reserves in the next 20 years will be found primarily in existing fields.

Mesaverde Group Coalbed Natural Gas AU

This AU represents areas where the Williams Fork Formation in the Piceance Basin contains significant coalbeds at depths estimated to be 7,000 feet or less. The depth cutoff was extended to 7,000 feet in the Piceance Basin in order to include all coalbed natural gas production (CBNG) in the Grand Valley and Parachute fields. The top of the Rollins Sandstone Member of the Iles Formation, which marks the base of the Cameo coal group in the lower part of the Mesaverde Group, was used to define the location of the 7,000-foot depth cutoff. More than 5,000 feet of erosion and down cutting in the Colorado River drainage in the Piceance Basin has decreased the drilling depths to higher rank (more thermally mature) coalbeds.

Thermally mature coal in the Williams Fork Formation is present in a belt as much as 10 miles wide along the southwestern margin of the Piceance Basin and in an area as much as 7 miles wide on the northeastern flank of the Divide Creek Anticline. Unfortunately, much of the coal has low permeability.

Total net coal thickness in the Cameo coal group varies from near zero in the extreme southeastern part of the Piceance Basin to greater than 180 feet in the northeastern corner. Throughout most of the basin, however, the zone contains from 20 to 80 feet of total net coal; in the southwestern part of the basin, total net coal thickness near the Utah-Colorado border decreases to less than 20 feet (Kirschbaum and Hettinger). Coalbed gas content is approximately 600 standard cubic feet per ton (SCF/ton) at depths of 7,000 feet and may be as high as 765 SCF/ton at 7,100 foot depths (Johnson and Rice).

Coalbed natural gas wells have been drilled within the CRVFO. Wells completed in the Cameo coals within the Great Divide field have high water production. Individual wells have reported as much as 3 million barrels of water produced within a 6-year period while producing 1,200 MCF/day. Water within the Great Divide field averages around 9,000 milligrams per liter (mg/L) of total dissolved solids (TDS). This does not meet State surface discharge standards and, as a result, injection of the water into the deeper Cozzette Sandstone is being considered. Analysis of the Cameo coals, in areas where coalbed natural gas is considered viable, show excellent gas saturation.

Many wells today have production from the Cameo coal zone commingled with production from adjacent sandstones. This is evident in the Parachute and Grand Valley fields. According to PI Dwights Production Data, the Parachute field has more than 700 wells of which 29 are classified as CBNG wells. The same database show the Grand Valley field with more than 1000 producing wells and 40 of these wells being classified as CBNG wells. The perforation zones range from 200 to more than 500 feet, which is much thicker than the coals zones and encompasses many gas sands as well.

Because of the lack of progress in solving the problems in producing commercial quantities of coalbed gas in the Mesaverde Coalbed Gas AU during the past, it is difficult to estimate how much of the included area has potential for additions to reserves over the next 20 years. This AU is largely untested but has the potential for new discoveries of coalbed gas. In the future, coalbed gas production may result largely from recompleting existing gas wells after depletion of the gas resource in associated sandstone reservoirs. Recompletion in existing wells is far cheaper than drilling new wells and may make coalbed gas economically viable. Additional sweet spots may be found in untested areas that will augment coalbed gas production from recompleted wells in established fields, and new advanced recovery techniques could increase the productivity, especially in areas of thick coal accumulation. If disposal of produced water becomes successful and economical, then increased interest in future coalbed gas exploration and drilling will occur. Currently, operators in the area have been experimenting with water quality improvement processes. If successful in the future, these may lead to acceptable surface discharge scenarios that may be more economical than underground injection.

Mancos/Mowry Continuous Gas AU

This AU includes three groups of reservoirs: (1) a lower group consisting of units in the Morrison Formation (including Salt Wash and Brushy Basin Members), and Dakota Sandstone; (2) a middle group consisting of units in the Frontier Formation, Mancos Shale, and Mancos B; and (3) an upper group consisting of units in the Sego Sandstone, Morapos Sandstone Member, and sandstones of the Iles Formation or equivalents (Corcoran, Cozzette, and Rollins Sandstone Members), all within the Mancos/Mowry TPS. Reservoirs in this AU are usually tight and may be overpressured. Production is dependent on fracture permeability. Locally non-associated gas is produced from the Cozzette, Corcoran, and Dakota Sandstones and in two Morrison Formation wells within the Shire Gulch field located just west of the CRVFO boundary. Several wells with some Mancos production are also present in the Grand Valley and Rulison fields.

The total area that has potential for additions to reserves in the next 20 years is most likely in areas of current production and mostly limited to the lower (Morrison and Dakota) and upper (Iles sandstones) reservoir groups. The best potential comes from (1) isolated sweet spots in the Rulison, Divide Creek, Baldy Creek, Grand Valley, and Mamm Creek fields; (2) areas where there are porous and permeable sandstones in the Morrison and Dakota; and (3) infill drilling and recompletions from the upper group of reservoirs of the Iles and its equivalents. New fields developing resources within this AU are likely.

Plays Identified by Industry

The plays discussed below are the Industry submissions and do not represent all potential plays within the CRVFO. Many of the operators/lessees with interests in the CRVFO were not part of this process. Some declined invitations to participate. As a result, not all current and future plays are discussed here. Some of the USGS plays discussed above are also discussed here because they are the plays most likely to be explored and developed.

Mesaverde Gas Play

Most of the major oil and gas operators in the CRVFO area are interested in this play, which includes all production from the Mesaverde Group, including the Corcoran, Cozzette, and Rollins Sandstone Members of the Iles Formation and the Williams Fork Formation. The latter includes the Cameo coal zone. The large majority of the oil and gas reserves within the RPPA are associated with this play, which extends across the entire area. It is assumed that this play will continue to be developed on 10-acre spacing using multi-well pads.

Wasatch Gas Play

This play is second in reserves only to the Mesaverde play. Most of the production is expected to be from the G Sand of the Molina Member. Infill drilling will continue in the sweet spots such as the Rulison, Parachute, and Grand Valley fields. Much of the future production will be from existing wellbores through recompletions when the Mesaverde gas is depleted. New drilling will also occur outside the established production areas and spacing is assumed to be at 160 acres. The number of wells to be drilled specifically to exploit the Wasatch has not been identified by Industry, but some of the projected wells for the Mesaverde Gas Play will have multiple completions in the Mesaverde and Wasatch.

Niobrara Gas Play

Five Niobrara wells are currently producing within the RPPA boundary. The Niobrara is ultimately a small member within the larger Mancos marine shale. This play is mostly for gas. It is hoped that the Niobrara has significant natural fracturing within the indurated shales that will act as secondary, not primary, porosity. Ultimate spacing has not been determined at this time.

Past and Present Oil and Gas Exploration Activity

Although it has been known for decades that the Williams Fork Formation contains significant gas resources, very low permeability of the sandstones made it difficult to complete wells that would produce at economic rates. With the advent of advanced completion techniques, true dry holes are now rare. For the most part, the lower two thirds of the Williams Fork is gas saturated.

Production from the Williams Fork was established in the Rulison field in the 1960s, and repeatable commercial production from the Williams Fork first occurred in the mid-1980s. The Grand Valley field was discovered in 1984. In 1981, the Department of Energy (DOE) performed a multi-well experiment in the Rulison field. This experiment involved three wells being drilled on a tight pattern of 100 to 200 feet of each other. A horizontal DOE well was also drilled in the same section in the Cozzette Member of the

Iles Formation. These experiments have greatly expanded the knowledge about the tight gas sand reservoirs within the southern Piceance Basin. Better completions as a result of this knowledge have increased estimated ultimate recoveries (EUR) of previously drilled wells in this area from as little as 0.15 billion cubic feet (BCF) to wells drilled in 1994 that have maximum EURs of 1.9 BCF.

Further experimentation by operators drilling and producing from the Williams Fork Formation has shown field growth reserves can be expanded considerably by drilling on 10-acre spacing. This spacing has been proven effective in draining a vast majority of the reservoir that was not occurring at greater spacing intervals. This tight spacing coupled with improved completion techniques has led to the expansion of existing fields and the development of new fields producing from the Williams Fork Formation.

Other new fields being developed today involve coalbed natural gas from the Cameo coal zone such as is present in the Divide Creek field. The Cameo coals' gas content exceeds 750 SCF/ton and was classified as world class. These coals produce a lot of marginally fresh water. If the produced water can be disposed in an economical way, new fields in areas of known Cameo coal gas reserves will also be developed.

Presently the Niobrara Formation is being drilled with hopes of producing natural-fracture gas reservoirs. These fractures are a result of the indurated shales being stretched and folded over the point of greatest flexure on anticlinal fold axis. The fractures act as the primary porosity for the gas, and the reservoir is sealed by a more fissile shale layer above.

Past and Present Oil and Gas Development Activity

Leasing Activity

The BLM issues two types of leases for oil and gas exploration and development on lands owned or controlled by the Federal Government: competitive and noncompetitive. Congress passed the Federal Onshore Oil and Gas Leasing Reform Act of 1987 to require that all public lands that are available for oil and gas leasing be offered first by competitive leasing. Noncompetitive oil and gas leases can only be issued after the lands have been offered competitively at an oral auction and not received a bid. The maximum competitive lease size is 2,560 acres in the lower 48 States and 5,760 acres in Alaska. The maximum noncompetitive lease size in all States is 10,240 acres. Since passage of the Energy Policy Act of 1992, both competitive and noncompetitive leases are issued for a 10-year period. Both types of leases continue for as long thereafter as oil or gas is produced in paying quantities.

Currently almost all of the BLM Federal mineral estate is leased as seen in Figure 23 on page 44. The total acres of BLM mineral estate is 73,730 acres. Approximately, 54,630 acres of the leases in the RPPA are suspended due to ongoing litigation. These leases will be analyzed under the BLM's SEIS. Lands remaining available to be leased include approximately 3,540 acres. Most of the unleased land is located in the northeastern corner of the RPPA. No United State Forest Service (USFS) or Colorado State mineral estate is located within the RPPA boundary. The majority of the federal minerals are below federal surface as seen in Figure 22 on page 43. Only 9.4% of the federal mineral acreage is split estate (private surface underlain by federal mineral estate). The total private mineral estate is 53,270 acres. The different acreages are summarized in

Table 1.

Table 1. Current leasing in the RPPA.

Mineral Ownership	Total Mineral Estate (acres)	Leased Lands (acres)	Lands Available for Lease (acres)
BLM (split estate)	6,950	6,140	910
BLM (surface & mineral)	66,780	64,160	2,630
BLM (total)	73,730	70,300	3,540
Fee	53,270	-	-

Unit Agreements

The objective of unitization is to proceed with a program that will adequately and timely explore and develop all committed lands within the unit area without regard to internal ownership boundaries. Exploratory units normally embrace a prospective area that has been delineated based on geological and/or geophysical inference. Exploratory unit agreements normally encompass all oil and gas interests in all formations within the unit area and provide for the allocation of unitized production to the committed lands that have been reasonably proven productive of unitized substances in paying quantities on the basis of the surface acreage included within the controlling participating area. By effectively eliminating internal property boundaries within the unit area, unitization permits the most efficient and cost-effective means of developing the underlying oil and gas resources.

The BLM approves a unit agreement when appropriate in the interest of conserving the natural resources and when it is determined to be necessary or advisable in the public interest. When such a determination is made and lands are committed to the unit, the BLM has a responsibility to ensure that unit development proceeds in a way that continues to serve the public interest, regardless of whether the Federal lands comprise only a small fraction or a major part of the unit area. Currently, the RPPA does not contain a unit agreement.

Communitization Agreements

When a lease or a portion thereof cannot be independently developed and operated in conformity with an established well spacing or well development program, the BLM may approve drilling agreements or communitization of such lands with other lands, upon a determination that it is in the public interest.

Communitization is widely used within the RPPA. Currently 87 Communitization agreements (CA) involving approximately 23,080 acres are in effect. The physical acreage is smaller than the total CA acreage. Since CAs are formation specific, there can be multiple CAs at the same location. Refer to Figure 24 on page 45 for a plat of the existing CAs in the RPPA. Currently, 42 of the CAs in the RPPA communitize gas production from the Mesaverde, 14 CAs in the RPPA communitize production from the Williams Fork Formation, and 31 CAs in the RPPA communitize production from the Wasatch Formation.

Spacing Requirements

The current State of Colorado spacing requirement is 40 acres (600-foot setbacks from the lease line) for wells greater than 2,500 feet in depth, but this spacing can be increased or decreased depending on geology and reservoir characteristics and has been greatly modified in the Piceance Basin. The Colorado Oil and Gas Conservation Commission (COGCC) use the term “default spacing” with modification

occurring through Cause Orders. These adjustments are meant to maximize production of the resource while minimizing surface disturbance and expense. In the case involving production from the Williams Fork Formation, 10-acre spacing has been justified and approved. Currently, the Wasatch Formation is being drained on 160-acre spacing in selected areas. New spacing regulations may be necessary to accommodate new drilling and production techniques in the RPPA. Future production from previously undeveloped plays such as the Niobrara play in the Mancos Formation may also require spacing changes. Tight sands, compartmental geology, and reservoir characteristics may increase the demand for tighter spacing in the future in reservoirs other than the Williams Fork Formation.

Drilling and Completion Statistics

The current drilling and production within the RPPA exists in the Southern and Western areas below the rim of the Roan Plateau. The current surface hole locations for all the wells in the RPPA are shown in Figure 23 on page 44.

As of September 2013, there are approximately 2,800 wells within the RPPA based on surface hole location. Well data was pulled from the COGCC's public database and IHS Enerdeq, a private company's database for global energy data and information. According to IHS Enerdeq, there are 2,766 active wells in the RPPA and according to COGCC data there are 2,661 active wells in the RPPA. This difference is possibly due to data entry lag. According to BLM's Automated Fluid Mineral's Support System, 890 of these wells are federal wells. Using the COGCC well data, the completion dates for wells in the RPPA were determined and broken out by year in Table 2 (COGCC Library: Production and Prices).

Table 2. Wells spudded in the RPPA based on COGCC data.

Year	Wells Spudded above the Roan's Rim	Wells Spudded below the Roan's Rim	Total Wells Spudded in the RPPA
1960-1970	0	6	6
1970-1980	0	5	5
1980-1990	2	84	86
1990-2000	4	172	176
2000	0	39	39
2001	0	73	73
2002	0	106	106
2003	0	59	59
2004	0	182	182
2005	3	237	240
2006	3	337	340
2007	22	428	450
2008	29	369	398
2009	5	134	139
2010	9	154	163
2011	5	150	155
2012	0	44	44
Total:	**82**	**2579**	**2661**

Of the current wells, 47 of the wells are plugged and abandoned. The other wells are either producing gas wells or currently shut-in or temporarily abandoned. The wells in the RPPA are all classified as gas wells with some associated natural gas liquids (NGL). More than 2,600 RPPA wells are reported producing from the Mesaverde Formation. Approximately 90 wells are reported producing from the Wasatch Formation and 5 wells from the Mancos Formation (IHS Enerdeq). Current development is occurring below the plateau with some fee development above the rim using directional drilling.

Directional and New Technology Drilling Practices

Directional drilling in the RPPA and surrounding area occurs in the large majority of new wells, as it allows access to reservoirs from locations that are not directly over the reservoir, as well as the concentration of wells, facilities, roads, and associated surface disturbance in a single (and often smaller) area. Steep slopes or canyon (riparian) bottom areas may necessitate directional drilling to locate wells on mesa tops. Lease line locations and spacing may also force a directional drilling situation. Directional drilling is used extensively in the entire area. While new well pads are still being constructed, extensive use of directional drilling to multiple downhole locations from existing pads is also occurring. According to IHS Enerdeq (2013), 2,181 wells out of the 2,766 wells in the RPPA are s-curve directional wells and only 578 wells in the RPPA are vertical wells.

Operators in the CRVFO have directionally drilled as many as 52 wells from one pad (Webb). Many wells before the year 2000 were drilled vertically, but with the advent of more advanced completion techniques and with bottom hole densities at 10 acres for the Williams Fork Formation, the future will involve multi-well directional drilling from a single pad. Encana Oil & Gas (USA) Inc. proposed 60 wells on the WF H15 596 pad (DOI-BLM-CO-N040-2011-0110-EA). In the north Parachute field area, lateral reaches of the bottomhole location from the surface hole location are able to approach 4,877 feet (Webb). This kind of offset is dependent on the geology and reservoir characteristics, and most of the directional drilling within the CRVFO has a lateral reach around 2,500 feet. Economics is a major consideration—since directional drilling is generally more costly than drilling vertically, gas reserves need to be significant enough to recover costs in a reasonable amount of time and at a reasonable rate of return.

Slim-hole (diameter < 6”) drilling and completion, coiled tubing applications, high-energy gas fracturing, and new methods of well stimulation are currently being used within and around the RPPA and may play a part in an increased number of wells being drilled. These technologies make it more practical to explore in moderate- to high-risk wildcat areas. Slim holes cost less than large-diameter wells because the smaller rigs require less transportation and site preparation. In addition, the smaller wellbores record faster drilling times and have less expensive drilling tools, casing, and cement jobs.

Horizontal Drilling Practices

Currently horizontal drilling is still in the exploratory phase in the RPPA. Only seven (0.25%) of the wells in the RPPA are horizontal wells. According to IHS Enerdeq, six horizontal exploratory wells were drilled into the Mesaverde Formation group in the RPPA and one horizontal well was drilled into the Mancos Formation in the RPPA. Operators have since determined that horizontal drilling in the Mesaverde Formation group is not appropriate based on the Mesaverde geology. Refer to the Mesaverde geology description in the Description of Geology section for more information on the Mesaverde group.

To the west and south of the RPPA, operators have begun drilling horizontal wells into the Mancos formation. In general, the operators drill horizontal wells with one-mile horizontal legs that produce significant amounts of natural gas. The development is still exploratory and operators are attempting to determine the best drilling and completion practices for horizontal Mancos development.

Oil, Gas, and Water Production by Formation

Production within the RPPA is profiled by three producing gas horizons: the Mesaverde Formation, the Wasatch Formation, and the Mancos Formation. As of September 2013, the Mesaverde Formation was the most prolific with 1.74 TCF (96.7% of the total), while the Wasatch Formation totaled 56.17 BCF (3.1% of the total) and the Mancos Formation totaled 2.83 BCF (0.2% of the total). Rate verses time for the production of gas, oil, and water is illustrated for the Mesaverde Formation in Figure 2, Figure 3, and Figure 4. Figure 5, Figure 6, and Figure 7 illustrate the production history for the Wasatch Formation. Figure 8, Figure 9, and Figure 10 illustrate the production history for the Mancos Formation. The slight dip towards the end of each production curve reflects a partial year's production. The production data used to generate the production curves were retrieved from IHS Enerdeq Browser and created using PowerTools version 9.2 from IHS.

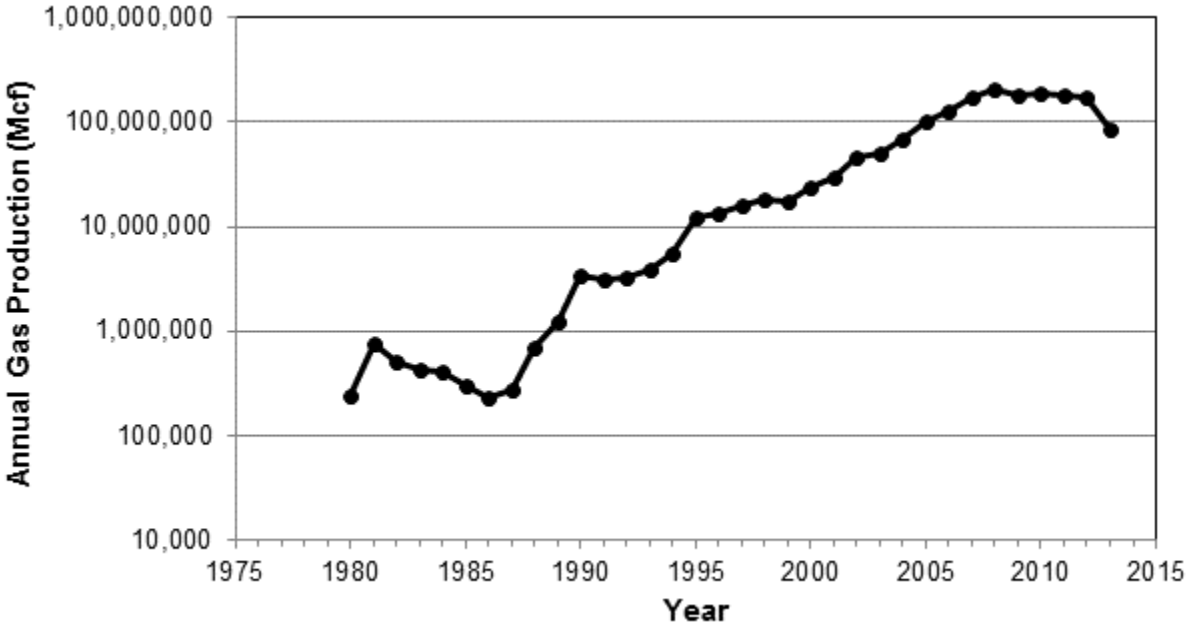

Figure 2. RPPA Mesaverde gas production history.

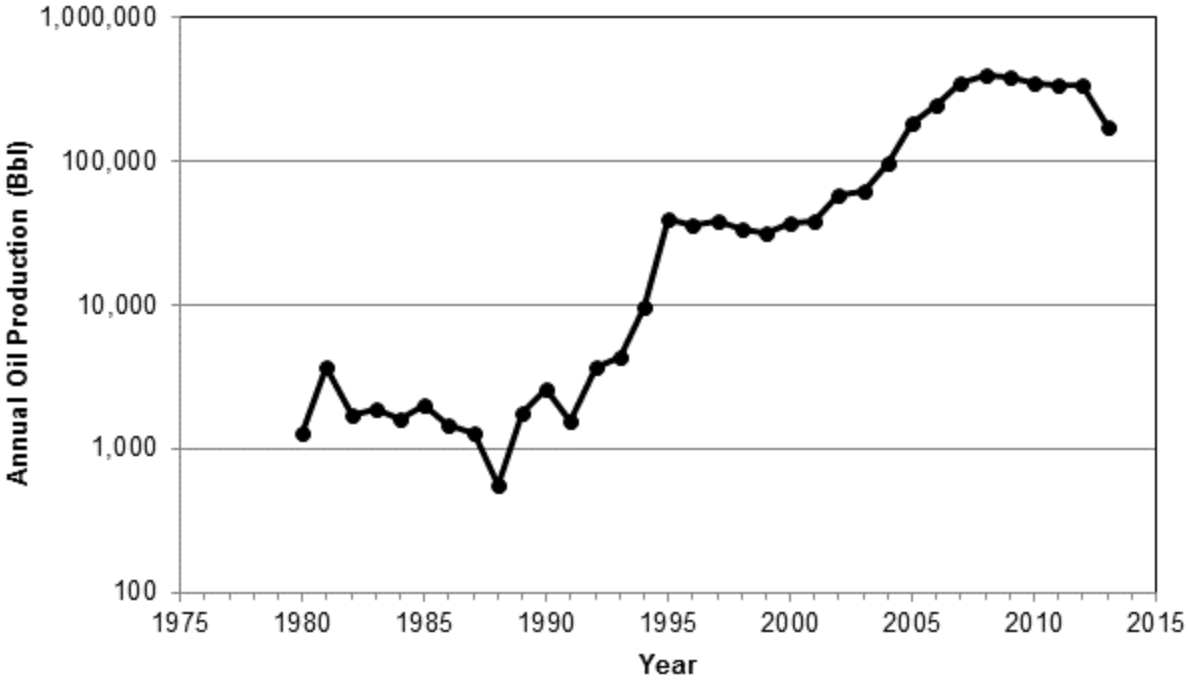

Figure 3. RPPA Mesaverde oil production history.

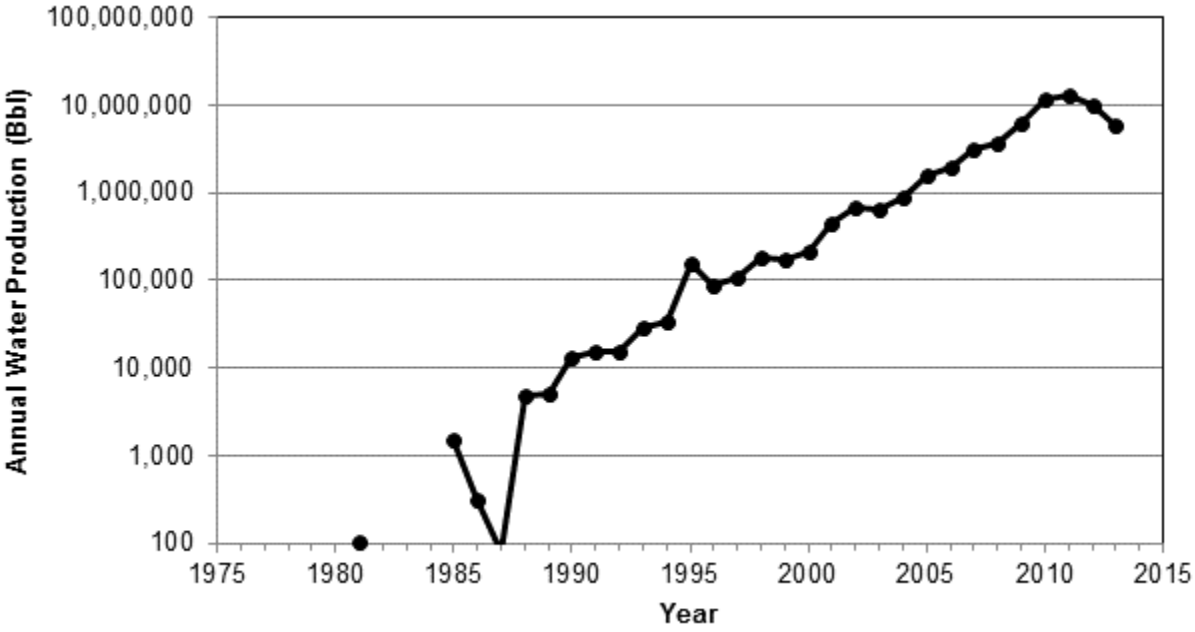

Figure 4. RPPA Mesaverde water production history.

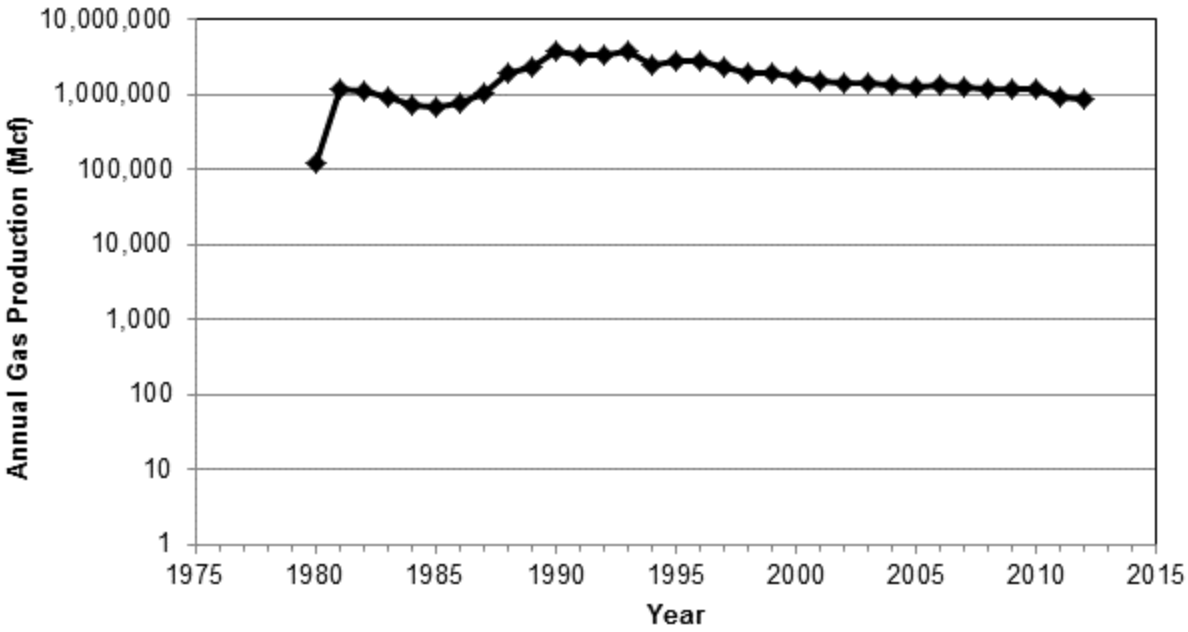

Figure 5. RPPA Wasatch gas production history.

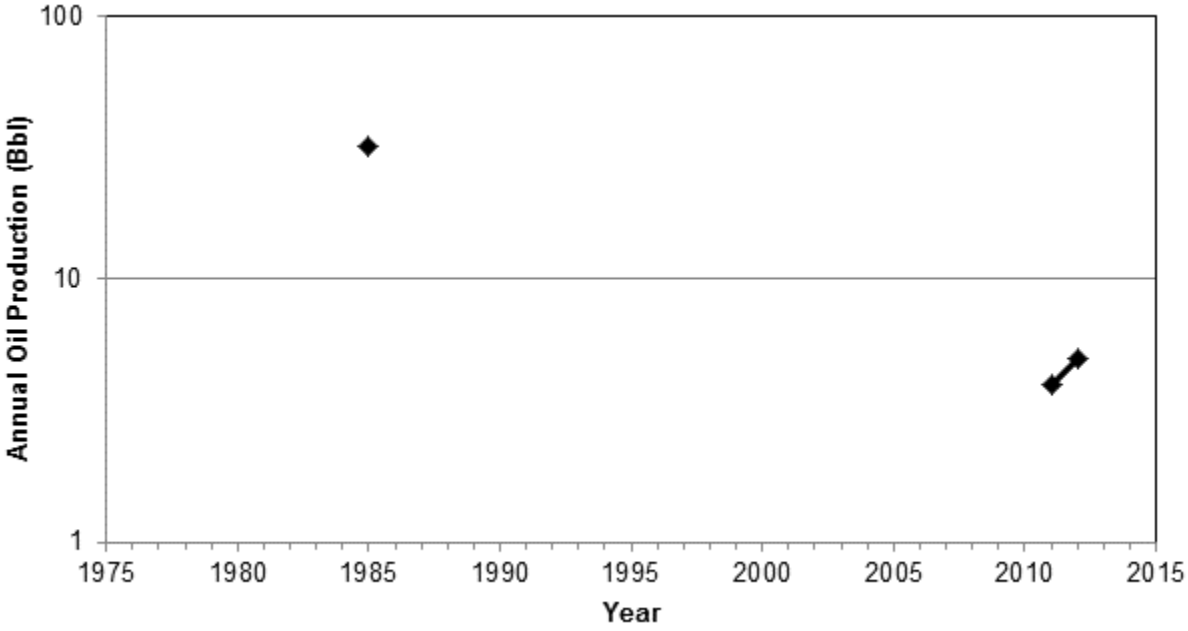

Figure 6. RPPA Wasatch oil production history.

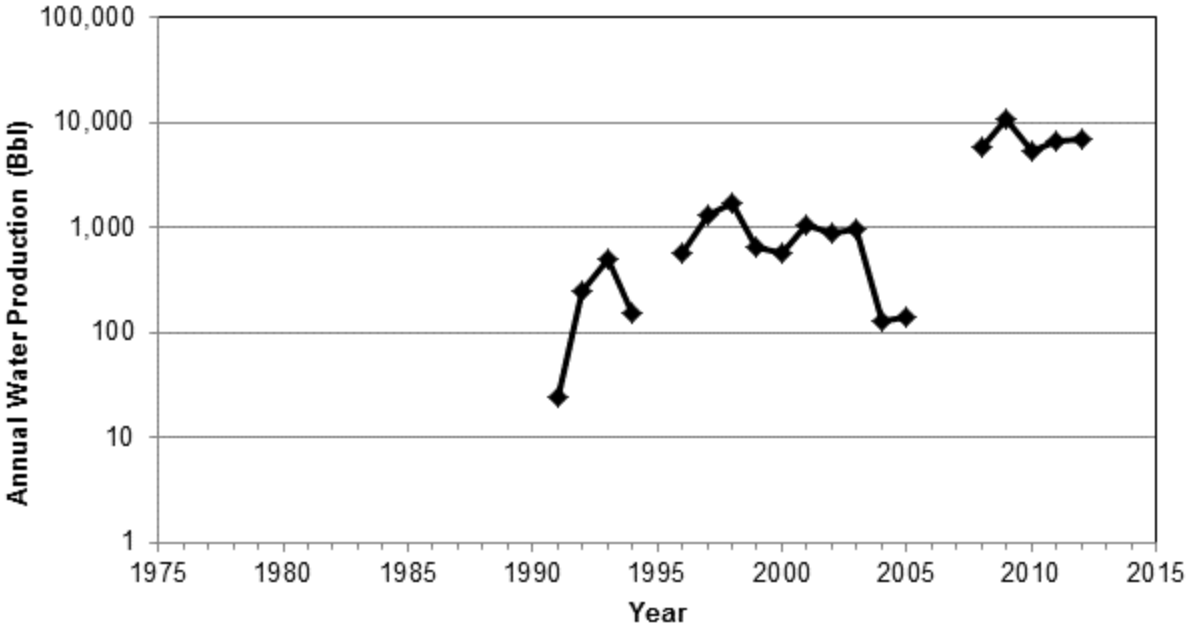

Figure 7. RPPA Wasatch water production history.

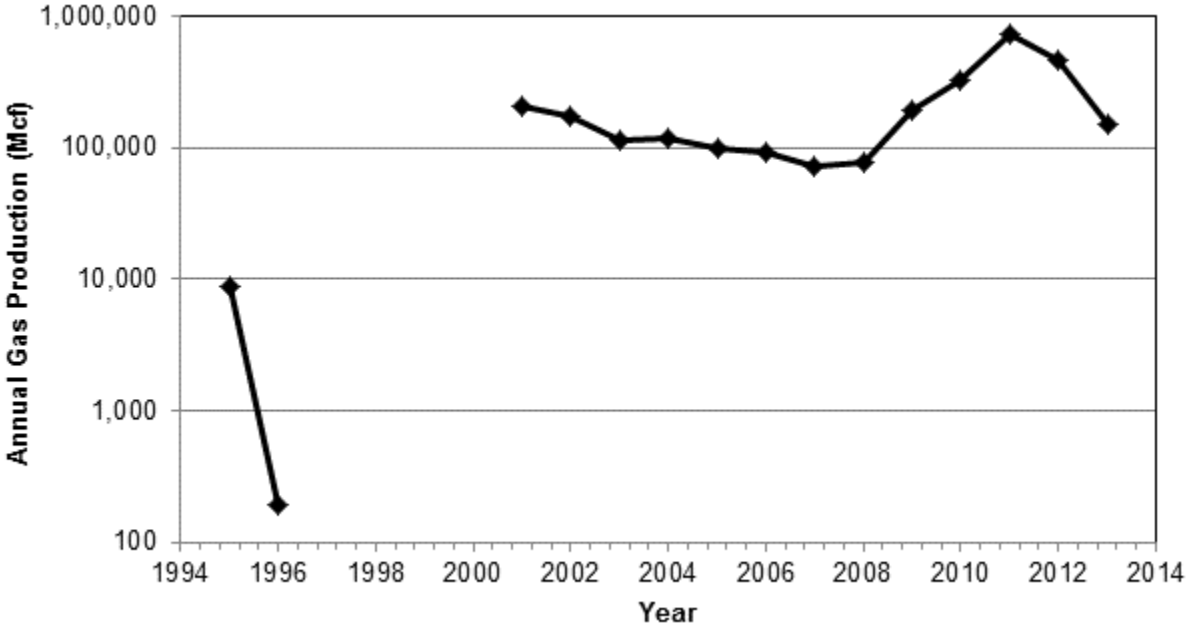

Figure 8. RPPA Mancos gas production history.

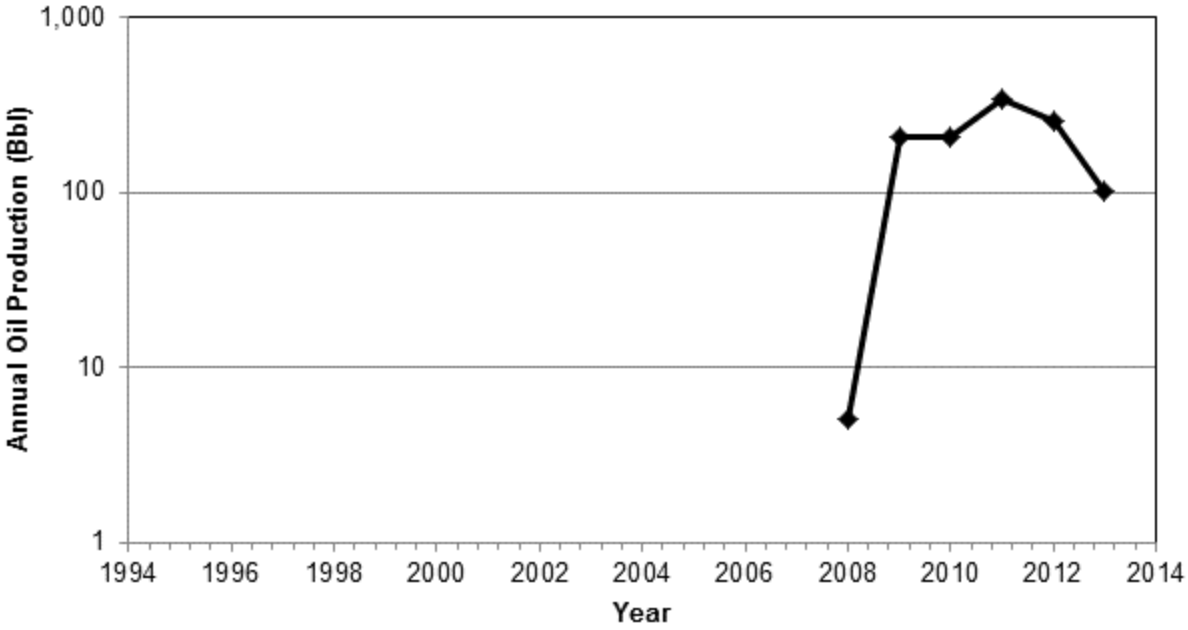

Figure 9. RPPA Mancos oil production history.

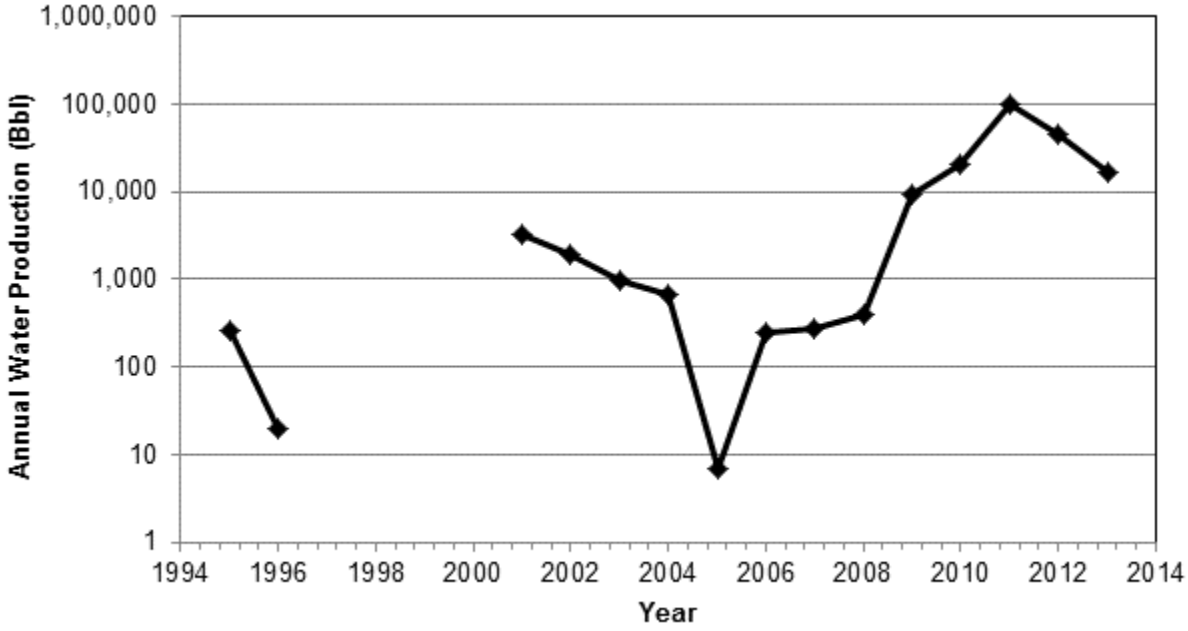

Figure 10. RPPA Mancos water production history.

Production Profiles

A normalized decline curve was generated using PowerTools analytical software to estimate the gas production rates for a typical well in the Mesaverde Formation within the RPPA. Gas production from approximately 2,670 Mesaverde wells was analyzed to generate a normalized production decline curve in Figure 11. The gas production rates were plotted versus time on a semi-logarithmic scale.

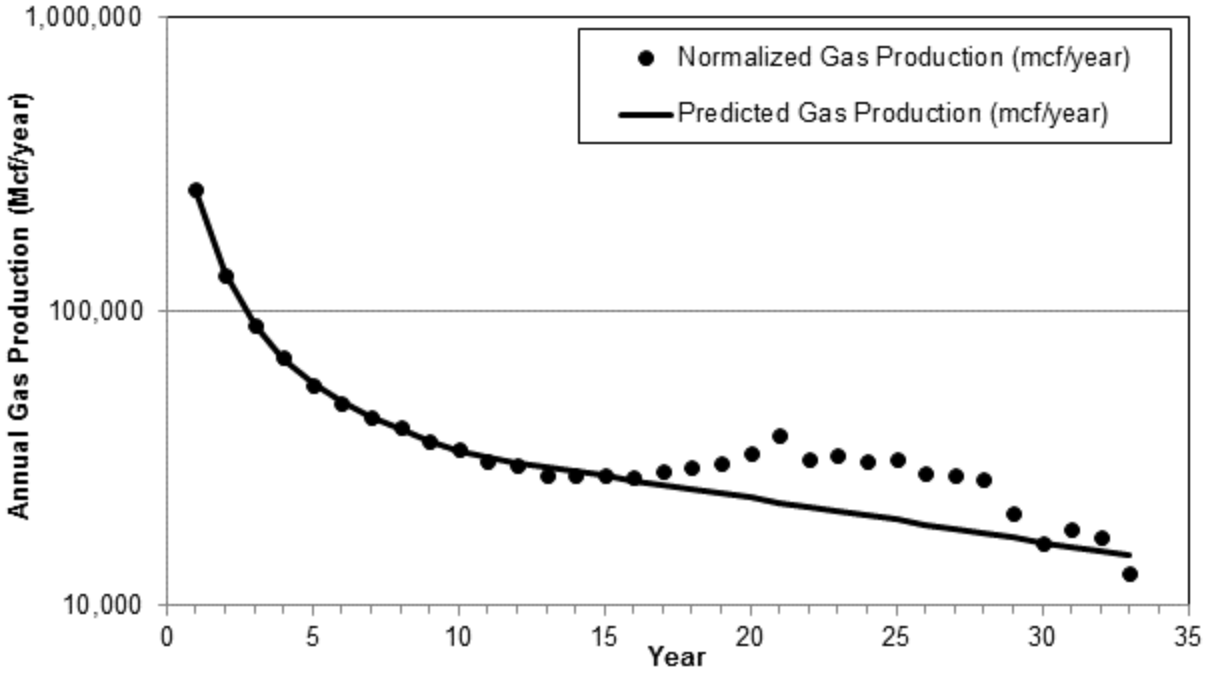

Figure 11. The normalized Mesaverde natural gas production decline curve.

It is believed the increase around year 16 in the normalized gas production is due to recompleting wells in additional productive zones in the Mesaverde Formation. Few of the Mesaverde wells in the RPPA are older than 15 years; therefore, the data past year 15 is generated by a smaller pool of wells and is less accurate. Year one used approximately 2,600 wells to determine the average production and year fifteen used an average of 106 wells. The gas production curve in Figure 11 approximates what a typical Mesaverde gas well might produce based on the expert and best fit method in PowerTools.

The decline curve shows a typical Mesaverde well has an initial natural gas production of approximately 260,000 MCF/year (712 MCF/day) and a final abandonment production of 16,500 MCF/year (45 MCF/day) in the thirty-third year. The gas production curve follows a hyperbolic decline for the first 9 years then an exponential decline for the rest of the well's life. PowerTools analysis shows an initial hyperbolic decline of 46.28%. After the ninth year, PowerTools estimates the production could decline at an exponential rate of 3.40%. The Reservoir Management Services and Gordon Engineering Inc. researched the low permeability wells in the Piceance Basin and determined that the Mesaverde well's production in the Piceance Basin is characterized by a sharp initial decline and then a slower exponential decline (Stright Jr. and Gordon). The decline curve generated in PowerTools matches the previous research.

Using these parameters, a typical Mesaverde well may ultimately recover approximately 1.35 BCF. Adjacent Reasonable Foreseeable Development Scenarios (RFD) have similar production values. The CRVFO office wide RFD estimated 1.15 BCF ultimate recovery and the Roan RFD from November 2005 estimated 1.17 BCF.

Similar to the natural gas production, the water and condensate production from the Mesaverde Formation were also analyzed in PowerTools. Both productions follow a similar decline path as the natural gas. Figure 12 displays the normalized Mesaverde water production and the best-fit decline curve from PowerTools. The water production rates were plotted versus time on a semi-logarithmic scale.

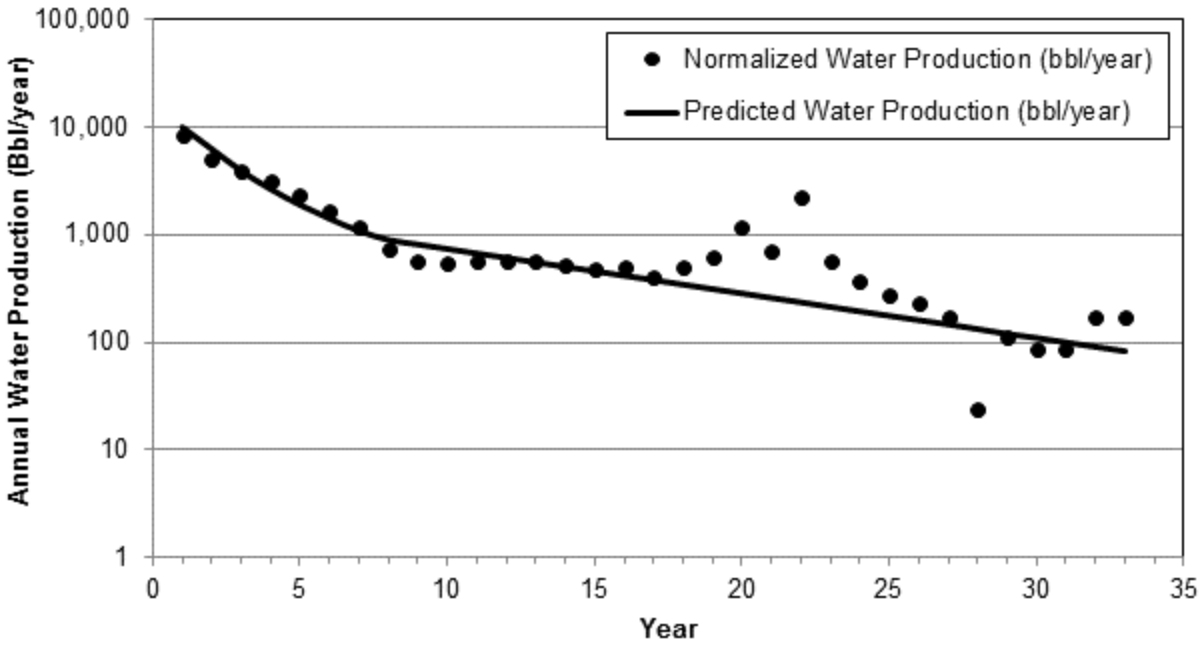

Figure 12. The normalized water production from the Mesaverde Formation.

The water production has an initial hyperbolic decline and an exponential decline after eight years. It is expected that a typical well producing from the Mesaverde Formation could produce approximately 38,000 barrels. The initial water production rates are projected to be an initial 8,500 barrels of water per year (bbl/year) that could fall off to around 100 bbl/year at the end of the well's life in year 33.

Although the Mesaverde Formation primarily produces natural gas, some condensate is also produced from the Mesaverde Formation in the RPPA. In the first year, a typical Mesaverde well could produce 550 barrels of condensate per year. By the end of the well's life, very little condensate production could remain. It is expected that a typical Mesaverde well could produce approximately 2,000 barrels of condensate by the end of the well's life. The oil and natural gas liquids produced from a typical well in the Mesaverde Formation is shown in Figure 13.

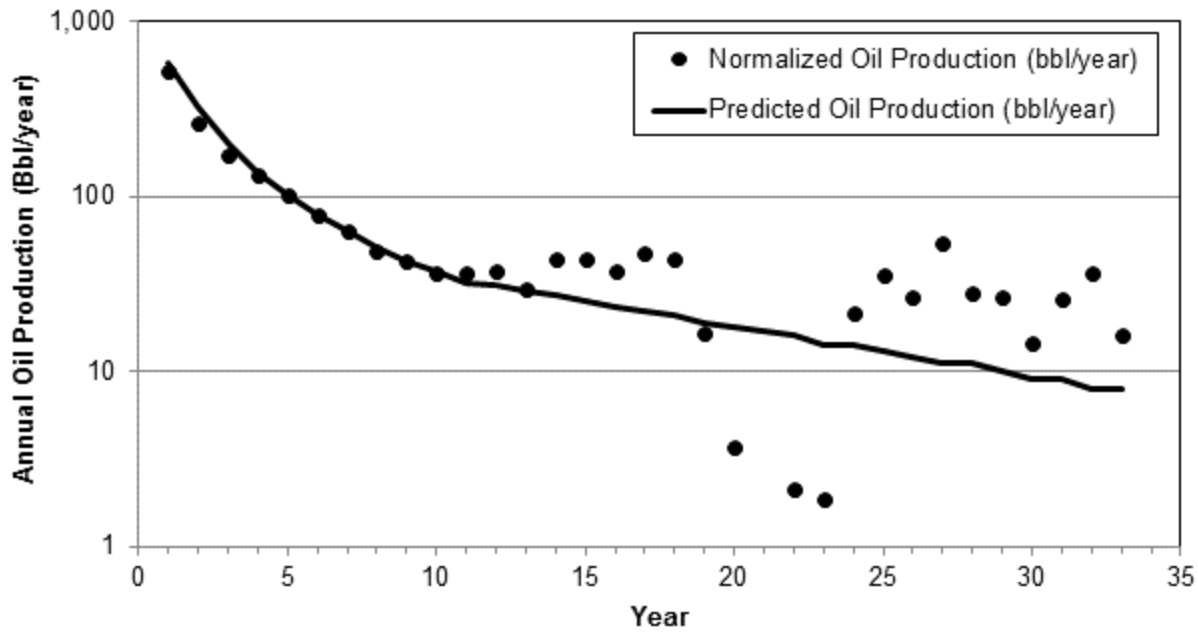

Figure 13. The normalized Mesaverde oil and NGL production decline curve.

Similar to the Mesaverde wells, the gas production from the 90 wells in the Wasatch Formation inside the RPPA was analyzed to generate a normalized production decline curve in Figure 14. The gas production rates were plotted versus time on a semi-logarithmic scale.

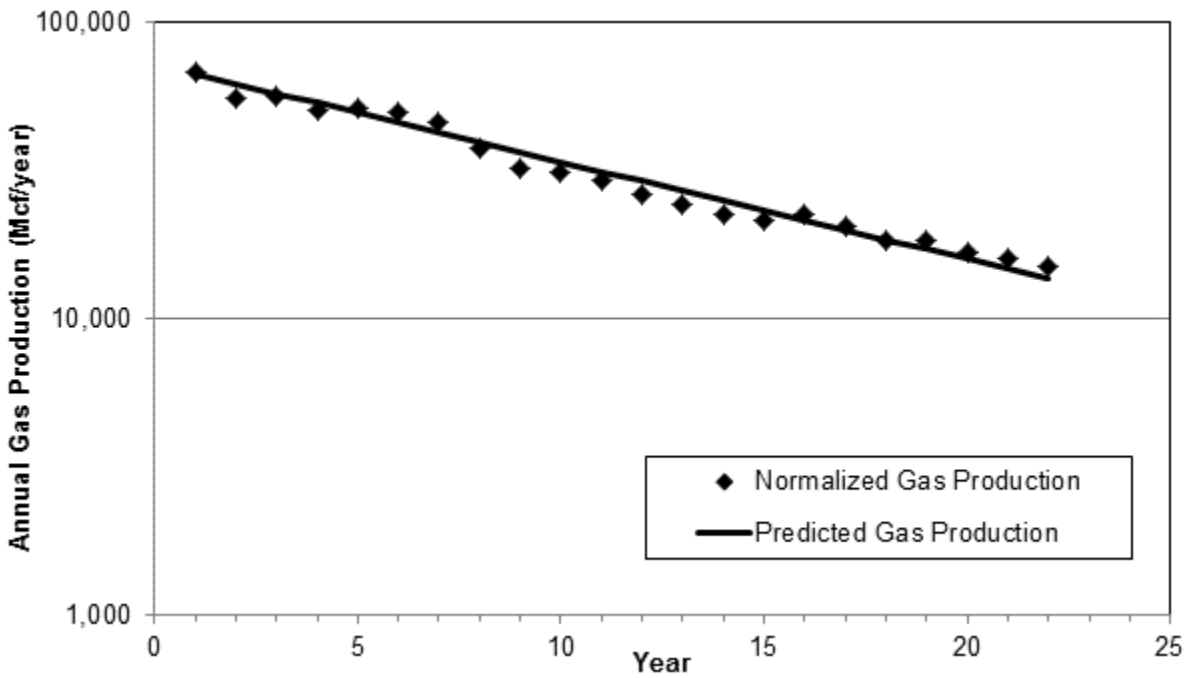

Figure 14. The normalized Wasatch production decline curve in the RPPA.

The decline curve shows a typical well in the Wasatch Formation has an initial production of approximately 67,000 MCF/year (183 MFC/day) and a final abandonment production of 15,000

MCF/year (41 MCF/day) in the twenty-second year. The gas production curve follows an exponential decline of 7.29%. Based on these parameters, a typical Wasatch well may ultimately recover approximately 0.74 BCF. The CRVFO office wide RFD had a similar estimate of 0.7 BCF.

The water production and condensate production were also reviewed in PowerTools. The Wasatch Formation produces a minimal amount of water. The normalized water production curve for the Wasatch Formation produces an average of 23 barrels of oil per year. The Wasatch Formation has little condensate production.

Not enough data was available to create a production profile for a typical well in the Mancos Formation. However, the surrounding fields suggest that decline curve for a well in the Mancos Formation could follow a similar decline path as the Mesaverde decline curve. Since the Mancos wells are usually horizontal wells, the Mancos wells produce more than the Mesaverde production but have a larger spacing requirement (Proctor).

Oil and Gas Prices, Finding and Development Costs

The price of oil and gas is dependent on the market. The industry standard is the New York Mercantile Exchange, Inc. (NYMEX), the world's largest physical commodity futures exchange and the preeminent trading forum for energy and precious metals. The NYMEX natural gas commodities contract is widely used as a national benchmark price. The price for natural gas is volatile and fluctuates with supply and demand and economic and political news. On September 24, 2013, posted prices ranged from $3.49 to $3.83 per million British thermal units (MMBTU) based on delivery at the Henry Hub in Louisiana. Based on data from the United States Energy Information Administration (EIA), Figure 15 shows the historical daily price trend from 2000 to 2013 and the future predicted prices (Annual Energy Outlook 2013).

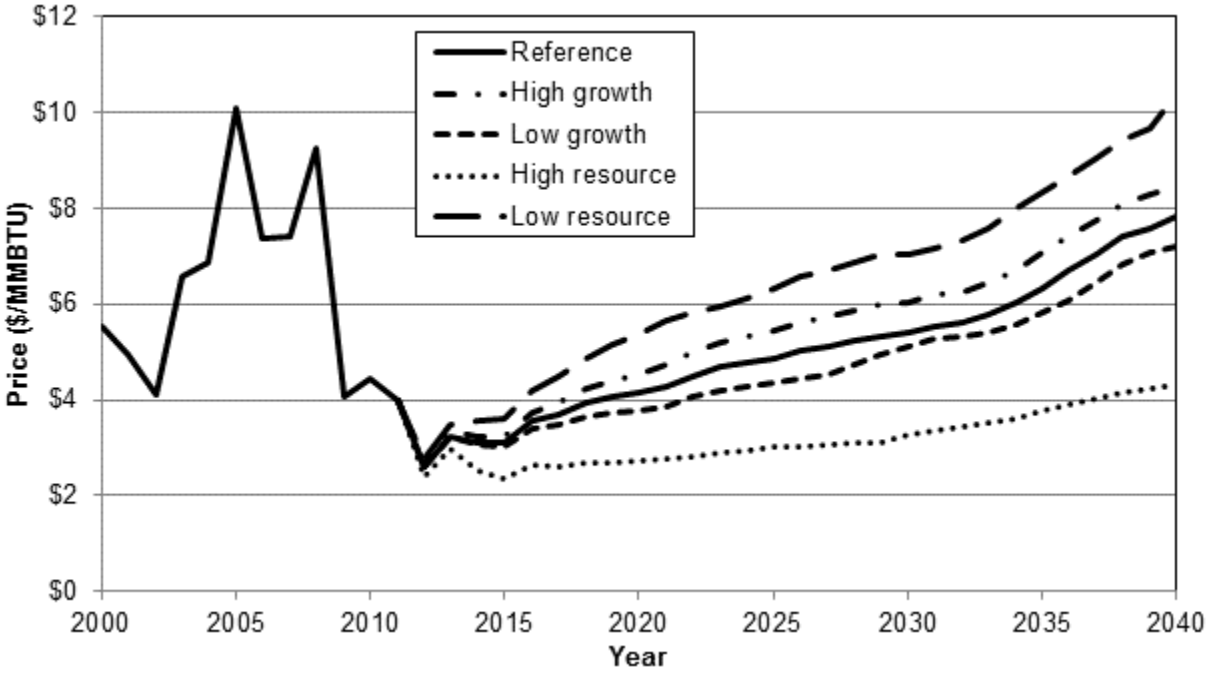

Figure 15. The natural gas spot and futures prices (NYMEX).

Based on the CRVFO field-wide RFD, the cost of finding and development natural gas and oil is about $125 per foot for drilling and $100 per foot for completion.

Two of the major cost items in the direct field operating cost are produced water disposal and gas processing. The estimated direct field operating cost in the RPPA would be similar to the CRVFO area and is estimated to be $0.33 per MCF (before taxes).

Gathering, Processing, Compression, and Transmission Costs

The RPPA has similar costs to the CRVFO field-wide RFD; therefore, these costs were pulled directly from CRVFO RFD. An average of $0.90 per MCF is typical based on in-field processing and compression. Upfront costs could increase on the plateau in the RPPA. The plateau‘s infrastructure is limited and has only supported hunters and range activities in the past. Pipelines exist on the western edge (fee surface) of the plateau, but the federal surface on the plateau would require pipelines for development to occur.

Field Production Equipment and Field Operation Practices

The field production equipment and operation practices are the same between the RPPA and the CRVFO field-wide RFD; therefore, the below discussion of practices were pulled directly from the CRVFO field-wide RFD.

For a multi-well pad, construction and reclamation costs are estimated at $100,000. The size and configuration of the well pad may cause this estimation to vary. The cost to equip a single well to produce to a sales line averages $70,000. This includes three-phase separation equipment (natural gas, condensate, and water), metering hookup, liquid storage tanks, and labor.

The natural gas from each well is individually measured after passing through the separation equipment on the well pad and then transported by pipeline to a processing plant. Associated condensate is collected and gauged in storage tanks, then trucked to an offsite sales collection facility. A portion of the gas is used at the facility to operate fired vessels, control systems, pumps, compressors, gas-lift systems, etc. Sometimes, the gas may be flared or vented.

Gas Transportation Pipelines

After gas is individually treated, separated and measured, it travels through a 4-inch to 8-inch diameter steel line (line pressures range: 100 psi to 1,000 psi) from the well pad to field compression facilities and then to a buried cross-country trunk pipeline. Trunk pipelines in the area have diameters between 12 and 36 inches and can cost as much as $2,000,000 per mile for a 36-inch line. The trunk pipelines carry wet, unprocessed gas-to-gas treatment facilities. After processing, the dry gas is transported to local markets or out of the Piceance Basin in one of several 24-inch lines

Gas Compression Facilities

Typically, two types of gas compression facilities are used in the area. Gas-driven compression can either be a permanent or temporary installation, whereas electric-driven compression is normally a permanent installation. A major variance is the lack of emissions with the electric driven compressors. The limitations of electric-driven compressors are power supply requirements and installation costs. These costs are typically 30% higher than gas-driven compressors.

Electrical Power Lines, Generators, and Roads

The need for electrical power on a well pad is minimal in the area, as power is typically supplied by natural gas generators. The majority of the field compressors are natural gas driven; however; as stated above, electric-driven compressors have recently been introduced.

Roads used for oil and gas operations require an average 35-foot-wide right-of-way. Below the rim, the RPPA has extensive oil and gas roads and infrastructure in place; however, above the rim, there is only a small amount of oil and gas development on the fee surface of the RPPA. The federal surface on the plateau in the RPPA has roads used for grazing and hunting. The average road width is around 15-feet. The road on the federal surface above the rim would require upgrades before drilling can occur. The amount of roads needed would depend on the well spacing, the amount of use of multi-well pads, terrain, environmental constraints, land ownership patterns, and existing road infrastructure. The topography of the area has an impact on the length of road needed and the cost. Hilly terrain would need a road to fit the terrain and cut-and fill construction to meet slope requirements.

The CRVFO requires that oil and gas operators use existing roads and two-tracks where possible to minimize surface disturbance. Flat blading is allowed and crowned, and ditched roads are not always required for wildcat wells (except on National Forest lands) to encourage minimal disturbance to the surface estate. The reasoning is that if the well is a dry hole, reclamation is more efficient and cost effective. If a wildcat well proves to be productive, the road must be upgraded to an all-weather road and meet more stringent construction standards.

Conflicts with Other Mineral Development

Saleable minerals such as sand and gravel are plentiful in northwest Colorado and are widely scattered throughout the CRVFO. These small mining operations can easily be avoided by oil and gas operators and, as a result, conflicts do not exist. Conflicts between oil and gas and coal typically do not occur but, if they were to occur, they would be governed by a No Surface Occupancy (NSO) stipulation (Stip. Code: CO-01) listed in the Record of Decision (1991) for the Oil and Gas Development and Leasing EIS.

Future conflicts between oil shale development and gas development on the Roan Plateau could arise. The existing leases on the plateau in the RPPA, which are currently under suspension, contain stipulations that limit drilling opportunities. According to these stipulations, only 1% of the top of the plateau can be in a disturbed condition due to un-reclaimed oil and gas activities. Therefore, current restrictions will not allow for both the extraction of natural gas and oil shale from the surface. However, if new technologies allow oil shale to be economically developed using underground mining or in-situ techniques versus extraction from the surface, this may allow oil shale extraction to be performed in conjunction with gas development.

Oil and Gas Occurrence Potential

Review of RFD Prepared for Areas Adjacent to the Study Area

Management plans and/or RFDs for BLM's White River Field Office, Grand Junction Field Office, and the Colorado River Valley Field Office were reviewed. This review provided information helpful in looking at adjacent oil and gas exploration and development that may affect the RPPA RFD. In addition, basin-wide studies performed by the National Petroleum Council and the USGS, and the Energy Policy and Conservation Act (EPCA) study were reviewed to enhance the quality of the RPPA RFD. CRVFO staff members also review RMPs from surrounding field offices and look for consistencies,

inconsistencies, and new approaches or ideas to mitigate impacts from oil and gas exploration and development activities. This should facilitate consistency by BLM in managing oil and gas resources across field office boundaries.

Resources, Plays, and Oil and Gas Assessments

The DOE prepared two reports that discussed reserves, development potential and geology for the Naval Oil Shale Reserves (NOSR) 1 and 3. The first is entitled, "Naval Oil Shale Reserves 1 and 3 Oil and Gas Reserves Evaluation" and the second is entitled, "Naval Oil Shale Reserve No. 3 Commercial Development Study". Both were prepared in July 1998. Geologic studies were also conducted in 1988 and 1990as part of the Department of Energy's Multi Well Experiment (MWX), which characterized the Mesaverde low permeability reservoirs and developed technology for their production. In addition, Ron Gunnufson, BLM Colorado State Office Geologist, prepared a report on the geologic potential of the area on October 14, 1999 and Brian Macke (Director of the Colorado Oil and Gas Conservation Commission) prepared a related report on August 26, 2005. The USGS prepared an oil and gas assessment report in 2003 for the Piceance Basin. The following discussion incorporates information from those reports, except where otherwise noted. For greater discussion on AUs, see the Description of Geology section.

Williams Fork Formation

The principal drilling objective in the RPPA is the gas-bearing fluvial sand section present in the Williams Fork Formation of the Mesaverde Group. This includes the Cameo Member found directly above the prominent Rollins Sandstone at the base of the Williams Fork. The Williams Fork is approximately 3,600 feet thick (Rulison Field), of which the lower 2,400 feet is gas saturated in the Rulison Field, and lower 1,500 feet in the Grand Valley Field. In the lower plateau, depth to the base of the Williams Fork (Rollins Sandstone) is about 7,000-8,000 feet. On the upper plateau, depths are about 3,000 feet greater.

The fluvial section in the Williams Fork Formation consists almost totally of lenticular channel sandstones and fine-grained flood plain deposits, which were deposited on a coastal plain behind the retreating Late Cretaceous coastline. (Lorenz) best described this section as consisting of meander belt river-channel sandstones inter-bedded with muddy flood plain, levee and swamp deposits. Lorenz stated that the average meander-belt width for the fluvial section of the Williams Fork Formation is 1,500 feet but within that meander-belt width are numerous point bar deposits, with each sandstone body generally not exceeding 700-800 feet in width. The point bar sand bodies are stacked vertically throughout the thickness of the formation. Studies show that the point-bar reservoirs are layered, do not communicate vertically, are naturally isolated from each other, have an asymmetric drainage pattern based on natural fracture distribution, and that drainage from a well is limited to the aerial extent of the point bar sand bodies. This explains why wells that penetrate the fluvial section encounter 10 to 25 + different, individual sandstone reservoirs that are tight and lenticular with very limited extent. These discontinuous and compartmentalized sand bodies have a very limited aerial extent, which requires that wells be drilled closer together in order to adequately recover the gas and associated hydrocarbons and prevent resource waste.

The lenticular nature of the fluvial sandstone reservoirs forms the major trapping mechanism at Rulison, Parachute and Grand Valley Fields with regional extension fractures enhancing this production. The source rocks for the fluvial section are the Cameo Coals and associated carbonaceous shales.

Production rates from the sands are highly variable and are a function of depth, porosity and permeability, continuity of individual sands, degree of natural fracturing, number of sands penetrated and other geologic factors, which vary from well to well. The Williams Fork gas wells produce some associated

condensate but little water. Initial well production for Williams Fork wells averages 1,360 MCF/day. During an April 2001, spacing hearing before the Colorado Oil and Gas Conservation Commission, Williams estimated Mesaverde reserves to be 1.25 -1.86 BCF/Well.

Geologically, there is little risk in extending the existing Grand Valley, Parachute and Rulison Fields into NOSR-1. It is expected that the Williams Fork gas saturated zone will probably underlie most of the plateau. Very few dry holes have been drilled in the Grand Valley, Parachute and Rulison Fields due to the nature of the play. Risks are minimized because the wells are drilled into a pre-dominantly gas saturated section encompassing an enormous area. Gas sand reservoirs may lack continuity and may not be correlative between closely spaced wells, but each well will penetrate numerous productive reservoirs, unique to that well. There are smaller risks related to the geologic and engineering heterogeneities (such as permeability, porosity, faults, fracture systems, structural irregularities, etc.) that are unique to each well, which is evidenced by the large range in production rates.

Wasatch Formation

The DOE report considered the Wasatch reserves as second only to Mesaverde potential. The Wasatch Formation is Eocene to Paleocene in age and consists of multiple, lenticular sandstone lenses interbedded with bentonitic varicolored shales and siltstones. The sands of the Wasatch were deposited as channels cut into the shales and siltstones. The sands that usually contain high clay content are considered "tight" with low permeability.

It is expected that most of the Wasatch production in the RPPA to originate from the G Sand of the Molina Member. Production has been established in the G Sand in the Rulison, Parachute and Grand Valley Fields. Due to the heterogeneous make-up of this formation, trapping mechanisms are normally stratigraphic in nature. Economic gas production rates and recoveries are highly dependent on natural and induced fracture systems within the reservoirs. Below the rim, the Wasatch Formation is found from the surface down to a depth of about 3500 feet. Most production from this formation has been derived from depths between 2,000-3,000 feet. Wasatch reserves are estimated to be about 0.7 BCF/Well and initial well production averages 270 MCF/day.

One factor affecting potential Wasatch development could be the relatively deep drilling depths required to reach the "G Sand" and the other reservoirs of the Wasatch on top of the plateau since the top is about 3,000 feet higher than the majority of the producing wells situated to the south. In December of 1990, Barrett Resources Corporation completed a Wasatch G Sand well only 1179 feet from the southern boundary of NOSR-1. The Allen Point #1-8-95 was completed between the depths of 5887-5933 feet and had an initial well production of 230 MCF/day with no oil and no water. The ground surface elevation of this well was 8,516 feet. If the Wasatch G Sand approaches a depth of nearly 6,000 feet near the southern boundary of NOSR-1 (and structurally the regional dip underlying much of this area is to the northeast) then depths to the G Sand could be in excess of 7,000 feet. Traditionally, in many areas of northwestern Colorado, the Wasatch has been developed at depths between 2,000-3,000 feet with typical initial well productions of 200-300 MCF/day.

Coalbed Natural Gas

The Cameo Coal Zone is the basal member of the Williams Fork Formation, and the coalbeds represent a potential reservoir component within the Mesaverde Group. This section reflects a paludal (swamp) depositional environment landward of the prograding Rollins paleoshoreline. In the Grand Valley Field, the Cameo coal zone is about 470 feet thick and contains 50 to 70 feet of net coal with the thicker coals occurring near the base of the zone. The zone thickens regionally from the Grand Valley Field to the Parachute Field.

While CBNG exists in the Cameo coals, they lack the well-developed natural fracture permeability associated with prolific water and gas flows exhibited in some areas of the northern San Juan Basin and on the Divide Creek anticline in the eastern Piceance Basin. Well test data from the Parachute Field indicate that in situ coal permeability ranges from 0.02 to 0.2 mD. In the Grand Valley Field, the absence of well-developed cleat systems and the lack of abundant open fractures are probably related to the depth of rock overlying the coals and to the lack of faulting in the area. With the exception of any structurally impacted areas on top of the plateau, coalbeds could be subjected to even less fracturing, with greater thicknesses of overburden, resulting in less developed cleat and fracture systems, which would equate to less gas production.

The CBNG potential was also evaluated in several studies that concluded that permeability in coals is significantly reduced with depth. At a depth around 7,000, the permeability would be so low that coalbed methane could not flow in economic quantities. The USGS geologic assessment of oil and gas (2003) delineated a coalbed natural gas area in the Grand Valley and Parachute fields to a depth of 7,000 based on Barrett Resources completing 51 wells in the coalbeds to near that depth between 1989 and 1992. However, USGS noted that most of the wells were dual coalbed and sandstone completions, and that the coalbeds were contributing only small amounts of gas to the overall production. The DOE's Coalbed Methane Primer (2004) noted that due to the depth of Piceance Basin coals, permeability is reduced, thereby hindering extraction.

It should be noted that the Cameo coals in the White River Dome area in the northeastern part of the Piceance Basin are productive at deeper depths. CBNG production has occurred down to a depth of 8,140' (Olson). The coals have low permeability, but higher than the sandstones. Coal permeability is derived from the cleats and natural fractures. Although there are current problems associated with commercial development of CBNG within the RPPA, the actual potential is unknown.

Iles Formation

The Iles Formation underlies the Williams Fork Formation and comprises the lowest part of the Mesaverde Group. The Rollins, Cozzette, and Corcoran Sandstone Members reflect distributary channel, and beach (shoreline and offshore bar sands) depositional environments. Significant gas production from the Cozzette and Corcoran Sandstones occurs in other fields to the south and west, but is minimal within the RPPA. Therefore, the actual potential of this resource is unknown.

Mancos Shale, Dakota Sandstone

The DOE report states that hydrocarbons could exist in the Upper Cretaceous Mancos Shale in fractured reservoirs, in the Lower Cretaceous Dakota Sandstone and Cedar Mountain-Burro Canyon Formations, Jurassic Morrison Formation and in Paleozoic strata. With the possible exception of the Mancos Shale, all of the above formations would probably occur at depths in excess of 15,000 feet, which significantly reduces their importance as viable objectives in this area. In addition the Cedar Mountain-Burro Canyon Formations are actually stratigraphic lateral equivalents, and the Cedar Mountain component present in portions of northwestern Colorado may actually be absent in the NOSR-1 area.

Rationale for selecting values of occurrence potential and certainty

The rationale for selecting values of occurrence potential and certainty is discussed below. The classification was modified from the BLM Handbook H-1624-1, dated May 7, 1990, and derived from a variety of sources; such as the EPCA inventory resource density polygons, reserve estimates from PI Dwight's Digital Well Data and Production Data, USGS TPS and AU maps, and USGS geologic maps.

- High – Demonstrate existence of source rock, thermal maturation, reservoir strata possessing suitable permeability and porosity, and traps. Demonstrated existence is defined by physical evidence or documentation in the literature. The high potential occurs in areas inside total petroleum systems and geologic basins with extensive Cretaceous and Tertiary sediments such as the Piceance Basin within the CRVFO boundary.

- Medium – Geophysical or geological indications that the following may be present: source rock, thermal maturation, reservoir strata possessing suitable permeability and porosity, and traps. Geologic indication is defined by geological inference based on direct and/or indirect evidence. Occurs in the Eagle Basin, which is known to be marginal for the economic occurrence for oil and gas, areas of thick sediment that contain some lower Mesozoic sediments along with Paleozoic sediments, and areas where existing well data show some evidence of hydrocarbons.

- Low – Specific indications that one or more of the following may not be present: source rock, thermal maturation, or reservoir strata possessing permeability and porosity, and traps. Occurs in areas outside USGS petroleum system and productive basin margins, where little or no hydrocarbon resources are indicated by existing well data. Also in areas where the basin sediments are less than 5,000 feet thick and consist mostly of Jurassic and older rocks as evidenced by existing well data.

- No Known Potential – Demonstrate absence of source rock, thermal maturation, reservoir rock, and traps. Demonstrated absence is defined by physical evidence or documentation in the literature. Occurs in areas outside the EPCA resource boundaries and USGS TPS and productive basin margins. Also in areas of Cambrian and Precambrian igneous and metamorphic rocks, not overlying favorable sedimentary environments. These areas may be unconformably overlain by thin younger sediments.

Note: Inclusion of an area in a USGS oil and gas play defined in the 2002 national assessment should be considered in determining potential for oil and gas occurrence. However, because the USGS assesses speculative plays, play definition alone should not be the only criterion for determining occurrence potential.

Oil and Gas Development Potential

The high potential area for natural gas includes all acres in the RPPA. Operators expressed a high degree of interest in the federal minerals in 2007 and 2008. At today's natural gas prices, interest has waned; however, natural gas prices will likely return to a higher rate in the future, which would increase the pace of development in the area.

RFD Scenarios for Plan Revisions

Three BLM field offices and one national forest share similar geology and oil and gas potential with the RPPA, since all four are located within the southern Piceance Basin. The White River Field Office (WRFO) manages the federal minerals north of the RPPA and finalized an RFD in 2007. The WRFO RFD estimates 17,800 wells to be drilled in the next 20 years. The Grand Junction Field Office (GJFO) finalized a RFD in June 2012. The GJFO estimates 8,403 wells to be drilled in the next 20 years. The CRVFO office wide RFD estimates 14,792 wells to be drilled in the next 20 years. These numbers include both fee and federal wells. The White River National Forest, which is a large part of the surface area within the CRVFO, the GJFO, and the WRFO, is working closely with both the CRVFO and the

GJFO to revise their estimated oil and gas activity. There should be no conflict of estimates for future development potential between the BLM and USFS offices.

Values of Development Potential

The future development for the RPPA is based on past development seen in the RPPA and surrounding areas. The main criteria for future development are the area's geology, current technology, and estimated future natural gas prices. The area's geology has already been established as high potential throughout the RPPA and the current technology was discussed previously in the section on Past and Present Oil and Gas Development Activity. The critical aspect for operator's to drill a well is therefore the natural gas prices. Combining Table 2 and Figure 15, the price of natural gas and the number of wells spud is graphed per year in Figure 16.

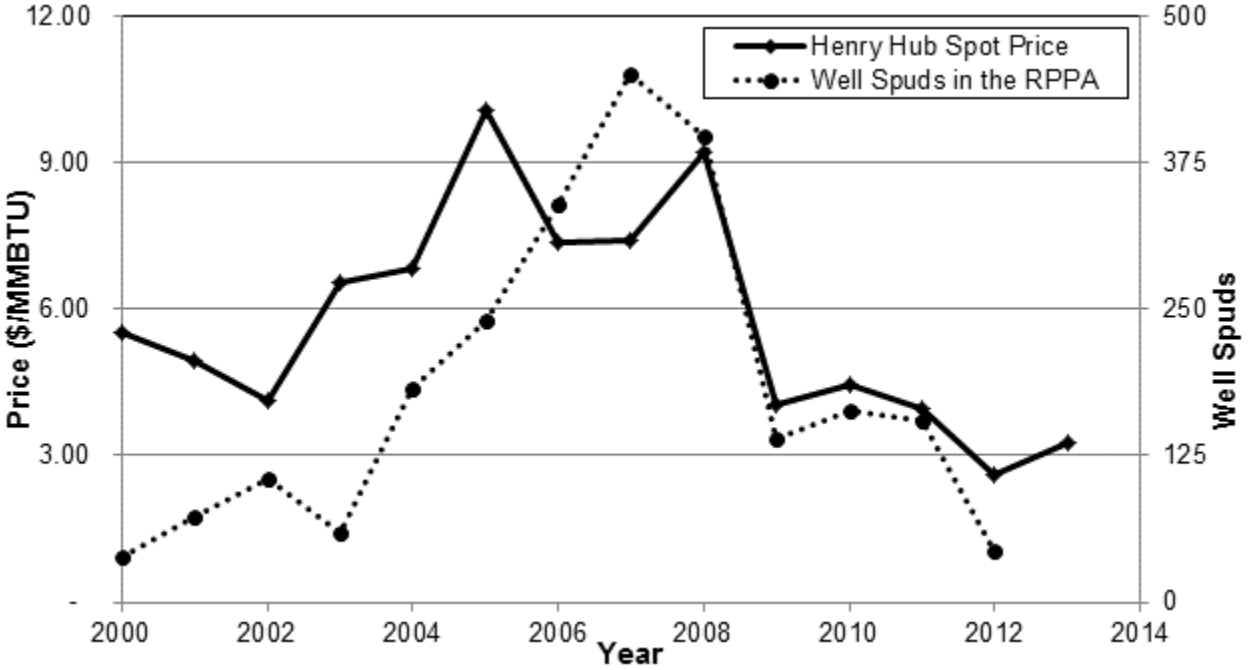

Figure 16. A comparison of the number of RPPA well spuds and the price of natural gas.

The number of spudded wells per year trends with the price of natural gas. Initially the wells lag behind the change in price, which might be due to the lack of infrastructure needed to produce all the wells. Based on this relationship, a trend line can be created to model future development based on the predicted price of natural gas. Since the cost to drill a well is higher when above the rim, the price of natural gas and the number of wells spud were modelled for two geographic areas: below the rim in the RPPA and above 8,000' in and around the RPPA. A scatter plot of the price versus the wells spud below the rim in the RPPA is created between 2006 and 2012 in Figure 17 with a trend line.

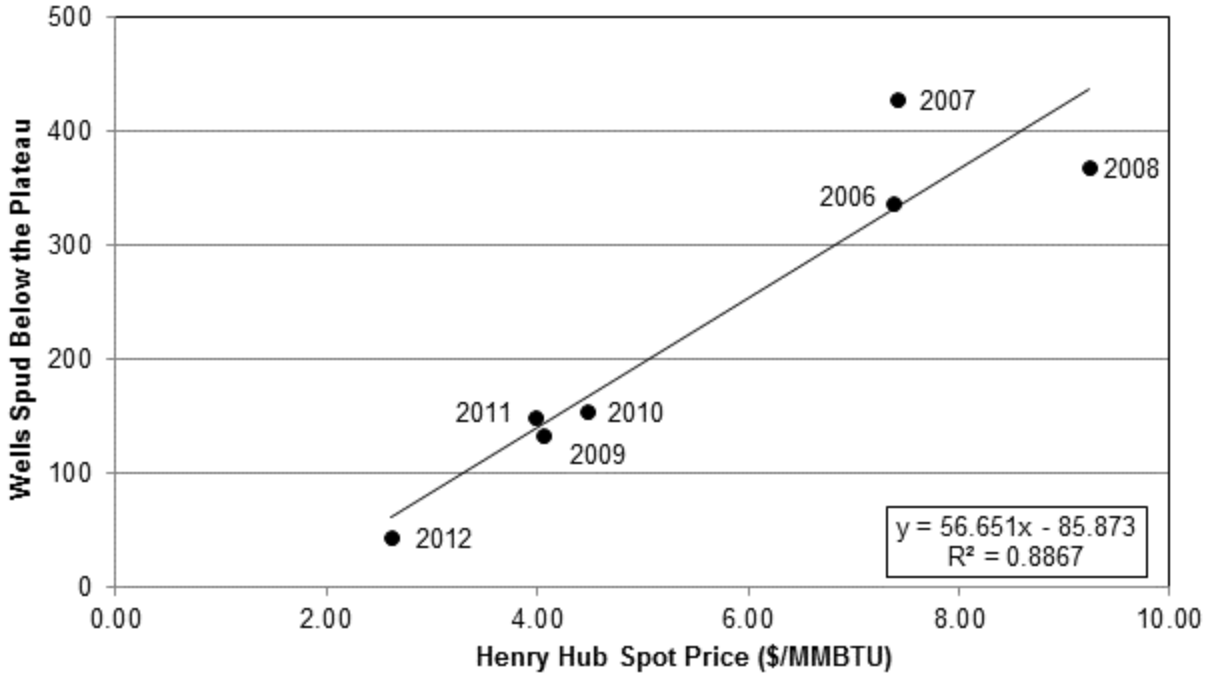

Figure 17. Number of well spuds below the plateau versus the price of natural gas.

The trend line in Figure 17 represents a historical relationship between the price of natural gas and the number of wells spud in the RPPA and below the rim each year. Using the trend line and the predicted natural gas prices in Figure 15 from NYMEX, the potential number of wells to be drilled below the plateau in the RPPA is determined. The average reference price between 2016 and 2035 is $4.89/MMBTU which is approximately 190 wells/year based on the trend line from Figure 17.

Little past development has occurred atop the plateau in the RPPA. Only 82 wells have been spud on top of the plateau, which is an insufficient data set to determine an accurate relationship between past and future development. Wells drilled into adjacent lands with similar elevation, topography, and geology were included to analyze the future potential development atop the plateau in the RPPA. The top of the plateau, which is between 7,500 and 9,300 feet above sea level, has greater drilling depths then below the rim, considering the lowest point in the RPPA below the rim is 5,100 feet above sea level at the confluence of Parachute Creek with the Colorado River. Refer to Figure 21 on page 42 for the topography in the RPPA. For this reason, the criteria used to pull the well data included: wells above 8,000' in elevation and wells east of Township 5 South Range 98 West and Township 5 South Range 97 West. West of the barrier, the geology begins differing from the RPPA. The area described above is shown in Figure 26 on page 47.

Using ArcMap and COGCC well data, 1,189 wells were determined to have similar characteristics as future wells atop the plateau in the RPPA. The majority of the wells were located in the Book Cliffs area between Debeque and Parachute. A graph was then generated to determine the relationship for wells drilled in areas similar to the plateau in the RPPA as seen in Figure 18. Years before 2008 were not modelled since there was significant lag between a change in price and development until 2008.

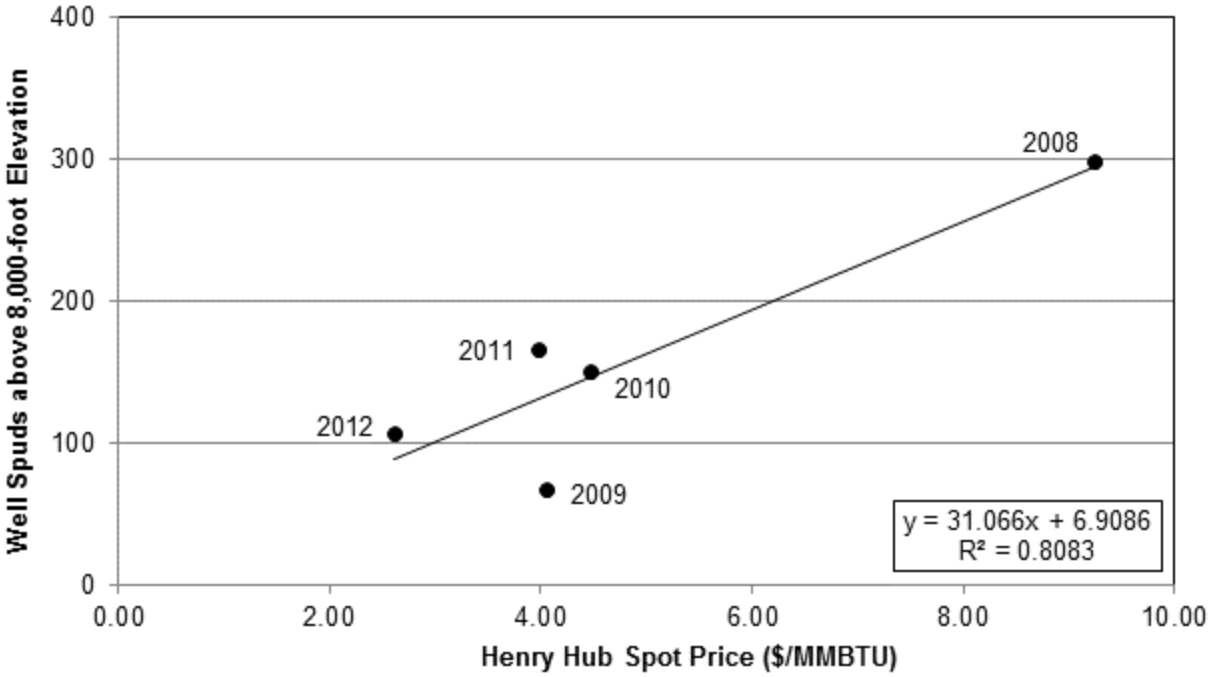

Figure 18. Number of well spuds above the 8,000-foot elevation versus the price of natural gas.

Since the 8,000-foot elevation area includes lands outside the RPPA, a ratio was used to determine the potential development on the plateau. The 8,000-foot area includes 135,327 acres; however, 33,000 of the acres are leased but under suspension and no development could occur. The plateau in the RPPA has 54,525 acres. Therefore, the equation based on the trend line was divided by 102,327 acres and then multiplied by 54,525 acres to create an equation able to approximate future development on the plateau in the RPPA. The new equation is $y = 16.55x+3.68$ where y equals the potential wells to be drilled atop the plateau in the RPPA and x equals the Henry Hub Spot Price. The average reference price between 2016 and 2035 is $4.89/MMBTU which is approximately 85 wells/year based on the new equation.

Using the two relationships, the potential number of well spuds is determined for the RPPA based on the price of natural gas. Figure 19 was created to show the different development possibilities in the RPPA based on the price of natural gas predicted in Figure 15. Years 2014 through 2016 estimate a lower number of wells on the plateau in the RPPA. Since the federal leases are still under suspension, development would only occur on the fee estate and federal minerals leased prior to 2008. This is approximately 72,260 acres.

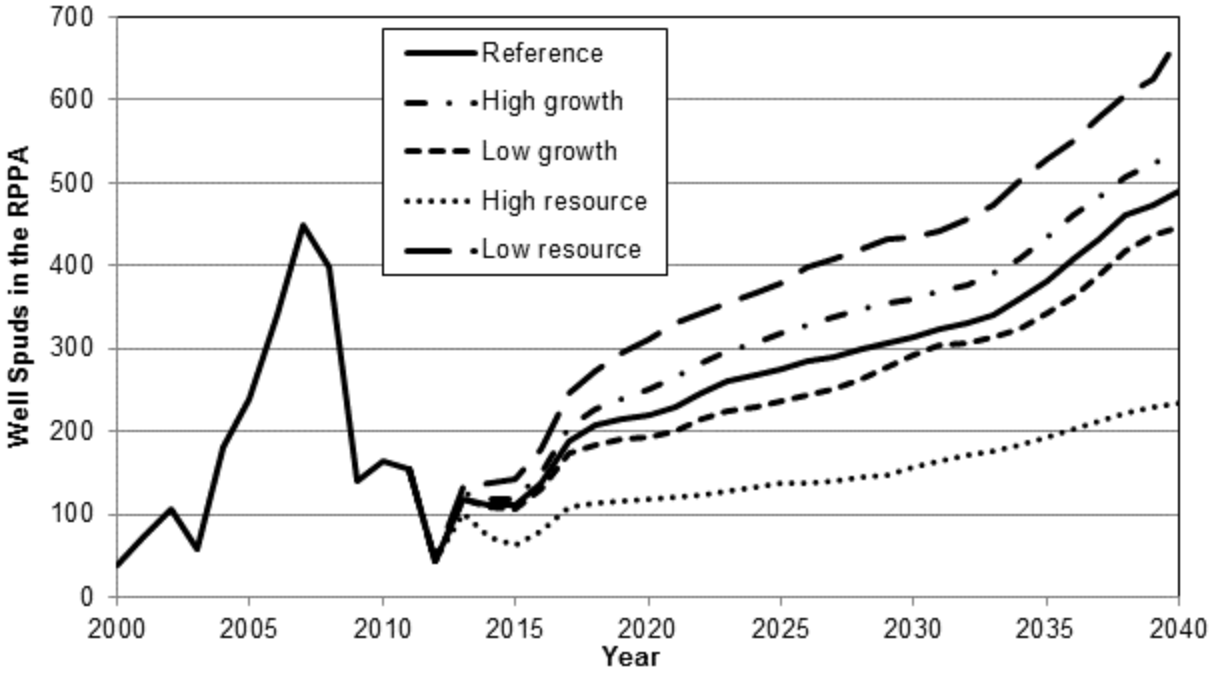

Figure 19. Potential future wells based on the NYMEX price of natural gas.

The reference natural gas price predictions were used to determine future development in the RPPA. Between 2016 and 2035, the equations estimated 3,820 wells below the plateau and 1,650 wells on the plateau in the RPPA. Based on the existing mineral acreage and existing wells, the potential wells were split between the federal and fee minerals in the RPPA. Table 3 breaks down the well numbers over the next 20 years for the RPPA.

Table 3. Well spuds potential within the RPPA between 2016 and 2035.

Location	Potential Well Spuds ('16-'35)	Mineral Ownership	Mineral Estate Acres	Current Wells	Undeveloped Acreage	Acreage Ratio	Potential Future Wells
Above the Rim	1650	Federal	34,990	0	34,990	65%	1,070
		Fee	19,640	82	18,820	35%	580
Below the Rim	3820	Federal	38,740	890	29,840	64%	2,450
		Fee	33,630	1,689	16,740	36%	1,370
Total Federal	-	Federal	73,730	890	64,830	-	3,520
Total	5470	-	127,000	2,661	100,390	-	5,470

Based on the undeveloped acreage, 3,520 potential wells could be drilled into the federal mineral estate between 2016 and 2035: 1,070 wells into the federal minerals above the rim and 2,450 wells into the federal minerals below the rim.

Reserves

Estimated ultimate recovery (EUR) is the total volume of gas that can reasonably be extracted from a well or a reserve. This RFD evaluates the possible reserves to be recovered in the 20-year planning horizon from the two proven formations: the Mesaverde and the Wasatch formations.

Based on Figure 11, a typical well drilled into the Mesaverde Formation in the RPPA could produce approximately 1.35 BCF over its life. The EUR for the existing 2,600 producing Mesaverde wells is approximately 3.5 TCF. The EUR for the 5,470 potential future wells is 7.4 TCF. Therefore, the total EUR for this RFD of 10.9 TCF for existing wells and potential wells for Mesaverde production is approximately 63% of the 17.1 TCF of the EUR within Mesaverde Formation inside the RPPA boundary.

Based on Figure 14, wells drilled into the Wasatch Formation could produce 0.74 BCF over the well's life. Due to the increased production from Mesaverde wells, none of the wells in the next 20 years are expected to be Wasatch wells. The EUR for the existing 90 Wasatch wells is 65 BCF. This is approximately 11% of the 0.6 TCF estimated to exist within the Wasatch Formation inside the RPPA. Refer to Table 4 for the total EUR in each area of the RPPA and the potential recovered by the current and future wells.

Table 4. Summary of EUR for current and potential future wells.

Formation	Location	Mineral Ownership	Mineral Estate Acres	Reserve EUR (BCF)	Current Wells	Potential Future Wells	EUR for Current and Future Wells (BCF)	Percent Depleted
Wasatch	Above the Rim	Federal	34,990	160	0	0	0	0%
		Fee	19,640	90	5	0	5	6%
	Below the Rim	Federal	38,740	180	30	0	20	11%
		Fee	33,630	155	55	0	40	26%
	Wasatch Total		127,000	585	90	0	65	11%
Mesaverde	Above the Rim	Federal	34,990	4,725	0	1,070	1,445	31%
		Fee	19,640	2,650	77	580	885	33%
	Below the Rim	Federal	38,740	5,230	860	2,450	4,470	85%
		Fee	33,630	4,540	1,634	1,370	4,055	89%
	Mesaverde Total		127,000	17,145	2,571	5,470	10,855	63%
Total Federal			73,730	10,295	890	3,520	5,935	58%
Total			127,000	17,730	2,661	5,470	10,920	62%

Wells drilled into the Mancos Formation were not included in the estimate of future production. Currently the Mancos Formation is still in the exploratory stage of its development in the RPPA and the potential Mancos reserves cannot be accurately determined. For purposes of predicting the EUR for the RPPA in Table 4, all of the potential 5,470 wells were considered Mesaverde wells. This will probably not be the case. Likely, a percentage of the potential 5,470 well number would be wells drilled into the Mancos Formation. However, there is not enough data on the Mancos/Niobrara shale wells to determine reasonable estimates on the amount of development that might occur in the RPPA. In addition, appropriate well spacing is undetermined, which is a critical aspect in determining the development required to extract the resource. The BLM anticipates increased Mancos/Niobrara exploration but cannot reasonably estimate potential future development, in contrast to Mesaverde development for which there

are clear trends. The RFD assumes that the increased development in the Mancos formation would be offset by decreased development in the Mesaverde formation.

The mineral reserves underlying the RPPA contain an estimated 17.7 TCF of gas within the Wasatch and Mesaverde Formation. Combining the EUR in the Wasatch and Mesaverde formation, the current wells and potential wells that could be drilled in the next 20 years could drain around 62% of the EUR for the RPPA.

Leased Acreage

Based on the acreage and predicted gas prices, the 3,520 potential wells could be drilled on 73,730 acres of federal minerals in the next 20 years. On the 70,190-leased BLM acres, 890 wells have already been drilled into federal minerals. The combined well number of potential and pre-existing wells, 4,410 wells, could potentially drain 5.9 TCF. The EUR for the leased-federal minerals in the RPPA is 10.3 TCF. Combining the potential wells in the next 20 years and current wells, the RFD estimates 58% of the total wells needed to drain the leased acreage could be drilled. This is based on the expectation that development would occur on 10-acre spacing in the Mesaverde Formation and 160-acre spacing in the Wasatch Formation. More wells might be needed to drain Mancos Formations.

RFD Baseline Scenario Assumptions and Discussion

The baseline for projecting an accurate RFD for the life of the Resource Management Plan (RMP) is based on all potentially productive areas being open for leasing under the standard lease terms and conditions, except those areas designated as closed to leasing by law, regulation, or executive order. None of the federal minerals is currently closed to leasing, but 31 leases in the Roan Plateau Planning Area (RPPA) are suspended due to ongoing litigation. The RFD analyzed the federal minerals without regard to leased or unleased federal minerals and assumed all federal minerals within the RPPA were open to leasing. A summary of the current and future development is shown in Table 5.

Table 5. Summary of well spud potential.

Mineral Ownership & Location	Mineral Estate Acres	Leased Acres	Suspended Acres	Current Wells (9-2013)	Potential Future Wells	Percent of New Activity
Federal above the Rim	34,990	34,380	33,000	0	1,070	19.6%
Fee above the Rim	19,640	-	-	82	580	10.6%
Federal below the Rim	38,740	35,920	21,630	890	2,450	44.8%
Fee below the Rim	33,630	-	-	1,689	1,370	25.0%
Total Federal	73,730	70,190	54,630	890	3,520	64.4%
Total	127,000	-	-	2,661	5,470	100.0%

Oil and gas development is dependent on the operator's ability to profit from the development; therefore, the potential well numbers are tied to predictions in natural gas prices from NYMEX and the EIA. The reference predictions for the Henry Hub Spot Price were selected as the rationale price prediction to model future development in the RPPA. Other RFDs have based development on current rig activity or industry estimates. Rig activity and industry estimates are based on current gas prices; therefore, the gas price is the key independent variable for oil and gas development in the RPPA. Large changes from the predicted Henry Hub Spot natural gas price can increase or decrease the potential development. In

addition, a change in drilling and completion technology may lower the cost of oil and gas development. This would allow operators to economically drill at lower natural gas prices and could increase the potential well numbers in the RFD. At this time, the well numbers for the next 20 years are the best estimate of development.

Surface Disturbance Due to Oil and Gas Activity on All Lands

It is estimated that 5,470 fee and Federal wells could be drilled over the next twenty years. This is an average of approximately 274 wells per year over the planned life of the RMPA. This is only an average, and it is more likely that an uneven distribution of wells could be drilled each year, depending on market forces, lands available for leasing, and political constraints. All wells are predicted to be gas wells (both coalbed natural gas and conventional natural gas), and many would have associated natural gas fluids (condensate) and, in some cases, produced water. However, over time and with an increase in exploring marginal USGS plays, some primary oil wells may also be developed. Tables 6 through 12 present estimates of current and future surface disturbance associated with well pads, access roads (including collocated pipelines, and central facilities. Data presented includes gross disturbance (including both temporary and long-term), reclamation (including both interim and final), and net disturbance (gross disturbance minus reclamation). Interim reclamation is conducted following completion of a wellpad and reduces the disturbed footprint to the amount needed for ongoing production and periodic workover operations. Final reclamation occurs after a pad no longer has producing wells.

Assumptions used in preparing Table 6 through Table 12 are based on BLM experience from historical exploration and development in the CRVFO and from Industry input and are as follows:

- Existing pads are assumed to average 5 wells per pad of gross disturbance.
- Plugged & Abandoned numbers are assumed to be one well per 3 acre pad.
- Plugged and abandoned reclamation assumes 75% reclaimed (pad and road), but final abandonment notice (FAN) not approved.
- Existing multi-well pads and future wells pad averaging 20 wells per pad are assumed to be 5 acres in size.
- Existing roads average .40 miles per pad for existing well pads. This number was derived by using a ratio of existing roads to existing well pads. Road acres per well pad are approximated from the following calculation. .40 x 5,280 feet x 75 feet (road width) ÷ 43,560 square feet per acre ≈ 3.6 acres of road per pad.
- It is assumed that the .40 average will apply to future road and well pad development. Therefore, approximately 117 miles out of 146 miles of existing BLM unimproved roads (not associated with oil and gas development) would be upgraded /improved in order to support future development. However, after interim reclamation (IR) the roads would be reduced by 67% (see below), which would ultimately result in no net gain.
- Central facilities are assumed to average 10 acres per facility. It is assumed that the number of central facilities would double over the life of the RPPA SEIS Revision. Since 36% of the projected wells are Federal, it is assumed that 36% of the central facilities would service Federal wells. The central facilities are expected to be developed on private land.
- Gross disturbance well numbers include wells of all status including producing, temporary abandoned, abandoned, service, and drilling.
- Treatment facility surface disturbance is included in the well pad figures.
- Pipelines, gathering lines, and power lines that are approved as a lease or unit action are included in this RFD surface disturbance acreage and are largely included in the access road corridor. Pipelines that require right-of-way approvals are realty actions not oil and gas operations; as a result are not included in this RFD.

- As a result of drilling multiple wells per pad, future well pads and access roads are assumed to not be affected if a well is plugged and abandoned or drilled and abandoned. Hence, future dry hole reclamation acreage is not considered.
- Interim reclamation assumes that 2.5 acres of the original 6 acres is reclaimed (42% reclamation factor) and that the access road right of way is reclaimed down to 25 feet from 75 feet (67% reclamation factor).
- Final abandonment assumes 100% reclamation and FAN approved. Abandoned Fee wells are assumed to be final abandoned

Table 6. Existing surface disturbance for federal wells.

Component	Gross Disturbance	Reclaimed to Date				Net Disturbance (Gross Disturbance - Reclaimed to Date)
		Plugged and Abandoned	Final Abandoned	Interim Reclamation	Total Reclamation	
No. Wells	882[1]	8	0	882	-	
No. Pads	186[2]	-	-	178[7]	-	
Acres of Disturbance						
Well Pads	1,092[3]	18[5]	0	445[8]	463	629
Access Roads	670[4]	19[6]	0	429[9]	449	221
Central Facilities	0	0	0	0	0	0
Total	1,762	37	0	874	912	850

Table 7. Existing surface disturbance for non-federal wells.

Component	Gross Disturbance	Reclaimed to Date				Net Disturbance (Gross Disturbance - Reclaimed to Date)
		Plugged and Abandoned	Final Abandoned	Interim Reclamation	Total Reclamation	
No. Wells	1,740[10]	39	0	1,740	-	
No. Pads	389[11]	39	-	350	-	
Acres of Disturbance						
Well Pads	2,217	88	0	875	963	1,254
Access Roads	1,400	94	0	844	938	462
Central Facilities	30[12]	0	0	0	0	30
Total	3,617	182	0	1,719	1,901	1,746

Table 8. Existing surface disturbance for all wells.

Component	Gross Disturbance	Reclaimed to Date				Net Disturbance (Gross Disturbance -
		Plugged and Abandoned	Final Abandoned	Interim Reclamation	Total Reclamation	

No. Wells	2,622	47	0	2,622	-	**Reclaimed to Date)**
No. Pads	575	47	-	524	-	
			Acres of Disturbance			
Well Pads	3,309	106	0	1,311	1,417	1,892
Access Roads	2,070	113	0	1,265	1,348	692
Central Facilities	30	0	0	0	0	30
Total	5,379	219	0	2,576	2,765	2,614

Table 9. Estimated future surface disturbance from BLM wells.

Component	Count	Acres per site	Gross Disturbance	Interim Reclamation	Net Disturbance (Gross-Interim)
Well Pads	176[13]	5	880[14]	440[16]	440
Access Roads	176	4	634[15]	425[17]	209
Central Facilities	0	0	0	0	0
Total	352	9	1,514	865	649

Table 10. Estimated future surface disturbance for all wells.

Component	Count	Acres per site	Gross Disturbance	Interim Reclamation	Net Disturbance (Gross-Interim)
Well Pads	274	5	1,368	684	684
Access Roads	274	4	985	660	325
Central Facilities	3	10	30	0	30
Total	550	19	2,382	1,343	1,039

Table 11. Combined existing and future net surface disturbance from BLM wells.

Component	Existing Net Disturbance	Future Net Disturbance	Total
Well Pads	629	440	1,069
Access Roads	221	209	430
Central Facilities	0	0	0
Total	850	649	1,499

Table 12. Combined existing and future net surface disturbance from all wells.

Component	Existing Net Disturbance	Future Net Disturbance	Total
Well Pads	1,883	684	2,567
Access Roads	683	325	1,008
Central Facilities	30	30	60
Total	2,596	1,039	3,635

[1] wells - P&A wells
[2] existing active pads + single P&A pads
[3] ((existing active pads - single P&A pads) x 6 acres/pad) + (single P&A pads x 3 acres/pad)
[4] (existing active pads + single 3 acre pads) x 3.6 acres of road/pad
[5] (single P&A pads x 3 acres/pad) x .75 reclamation factor
[6] (single P&A roads x 3.6 acres/road) x .67 reclamation factor
[7] existing active pads - single P&A pads
[8] existing active pads x 2.5 acres/pad
[9] (existing active pad roads x 3.6 acres/road) x .67 reclamation factor
[10] wells - P&A wells
[11] existing active pads + single P&A pads
[12] 3 existing central facilities x 10 acres/facility
[13] future wells ÷ 20 wells/pad
[14] future well pads x 5acres/pad
[15] future well pad roads x 3.6 acres/road
[16] existing active pads x 2.5 acres/pad
[17] (existing active pad roads x 3.6 acres/road) x .67 reclamation factor

Produced Water Disposal

Currently, the BLM surface lands do not have permitted surface discharge, only contained produced water disposal in approved pits or tanks or approved trucking of produced water to approved disposal facilities. Both the BLM and the State of Colorado have jurisdiction over surface discharge (retention ponds, skimmer pits and equipment, tanks, and any additional surface disturbance) and approves surface discharge permits. Operations from the point of origin to the point of discharge are under the jurisdiction of the BLM. Operations from the point of discharge downstream are under the jurisdiction of the State of Colorado. The State of Colorado approves the underground injection of water into the disposal wells. Water quality has to meet their minimum standards for fresh water (<3,500 mg/L TDS) before it is allowed to be surfaced discharged. Water quality within the CRVFO ranges in quality from potable to well over 25,000 mg/L of total dissolve solids (TDS). In the Rulison field, produced water from the Williams Fork Formation is around 3,000 mg/L TDS; in the Parachute field it is around 4,200 mg/L TDS; and in the Grand Valley field it is around 21,400 mg/L TDS. Typically the deeper the formation and the closer to the basin center, the poorer the quality of water. Formations in these areas usually contain connate water, marine in origin and very briny (>10,000 mg/L TDS). If the water is lacustrine or fluvial in origin, it is somewhat fresh (1,500 to 10,000 mg/L TDS). Shallow formations, formations near the basin margin recharge zones, and formations with conduits for fresh water recharge (i.e., faults) can contain very fresh to potable meteoric water (<1,500 mg/L TDS). Nearly 10 million barrels of water have

been produced within the CRVFO. Much of the future produced water may come from fee CBM wells. Fortunately most of the gas wells in the CRVFO do not produce a lot of water. Other methods of water disposal used within the CRVFO are reinjection, disposal into evaporation pits, and trucking to approved disposal facilities.

References

Annual Energy Outlook 2013. 2 May 2013. 26 September 2013. <http://www.eia.gov/forecasts/aeo/MT_naturalgas.cfm#marginal>.

COGCC Library: Production and Prices. September 2013. 23 September 2013. <http://cogcc.state.co.us/>.

Cumella, Stephen P. and Douglas B. Ostby. "Geology of the Basin-Centered Gas Accumulation, Piceance Basin, Colorado." Peterson, Kristine M., Terrilyn M. Olson and Donna S. Anderson. *Piceance Basin 2003 Guidebook*. Denver: Rocky Mountain Association of Geologists, 2003. 171-192.

Dickinson,, W. W. and B. E. Law. "Conceptual model for origin of abnormally pressured gas accumlations in low-pereability reservoirs." *American Association of Petroleum Geologists Bulletin v. 69* (1985): 1295-1350.

"DOI-BLM-CO-N040-2011-0110-EA." *60 Wells from the WF H15 596 Pad*. BLM Colorado River Valley Field Office, 11 November 2011.

IHS Enerdeq. 28 August 2013. 23 September 2013. <http://www.ihs.com/products/oil-gas-information/data-access/enerdeq/index.aspx>.

Johnson, R. C. and D. D. Rice. "Coalbed gas plays of the Piceance Basin." Gautier, D. L., et al. *National Assesment of Unitied States Oil and Gas Resources - Results, Methodology , and Supporting Data: USGS Digital Data Series DDS-30, Release 2*. USGS, 1995. CD-ROM.

Kirschbaum, M. A. and R. D. Hettinger. "Stratigraphy of the Upper Cretaceous Mancos Shale (upper part) and Mesaverde Group in the southern part of the Uinta and Piceance Basins, Utah and Colorado." *Geologic Investigations Series I-2764*. U.S. Geological Survey, 2002.

Lorenz, J. C. "Reservoir sedimentology of rocks of the Mesaverde Group, multiwall experiment site and east-central Piceance Basin, northwest Colorado." Law, B. E. and C. W. Spencer. *Geology of tight gas reservoirs in the Pinedale Anticline area, Wyoming, and at the multiwall experiment site, Colorado: U.S. Geological Survey Bulletin 1886:K1-K24.* USGS, 1989.

Olson, Terrilyn M. "White River Dome Field: Gas Production from Deep Coals and Sandstones of the Cretaceous Williams Fork Formation." Peterson, Kristine M., Terrilyn M. Olson and Donna S. Anderson. *Piceance Basin 2003 Guidebook*. Denver: Rocky Mountain Association of Geologists, 2003. 155-170.

Patterson, P. E., K. Kronmueller and T.D. Davies. "Sequence Stratigraphy of the Mesaverde Group and Ohio Creek Conglomerate, Northern Piceance Basin, Colorado." Peterson, Kristine M., Terrilyn M. Olson and Donna S. Anderson. *Piceance Basin 2003 Guidebook*. Denver: Rocky Mountain Association of Geologists, 2003. 115-139.

Proctor, Cathy. "Niobrara gas well on Western Slope comes in big." 22 January 2013. *Denver Business Journal*. 24 January 2014. <http://www.bizjournals.com/denver/news/2013/01/22/niobrara-gas-well-on-western-slope.html?page=all>.

Stright Jr., D. H. and J. I. Gordon. "Decline Curve Analysis in Fractured Low Permeability Gas Wells in the Piceance Basin." *SPE/DOE Low Permeability Gas Reservoirs Symposium*. Denver: Society of Petroleum Engineers, 1983. 1-11.

Webb, Dennis. "Encana extends capacity of directional drilling." *The Daily Sentinel* 25 September 2011: 1-4. 21 January 2014. <http://www.gjsentinel.com/news/articles/encana_extends_capacity_of_dir>.

Appendix A: RPPA Maps

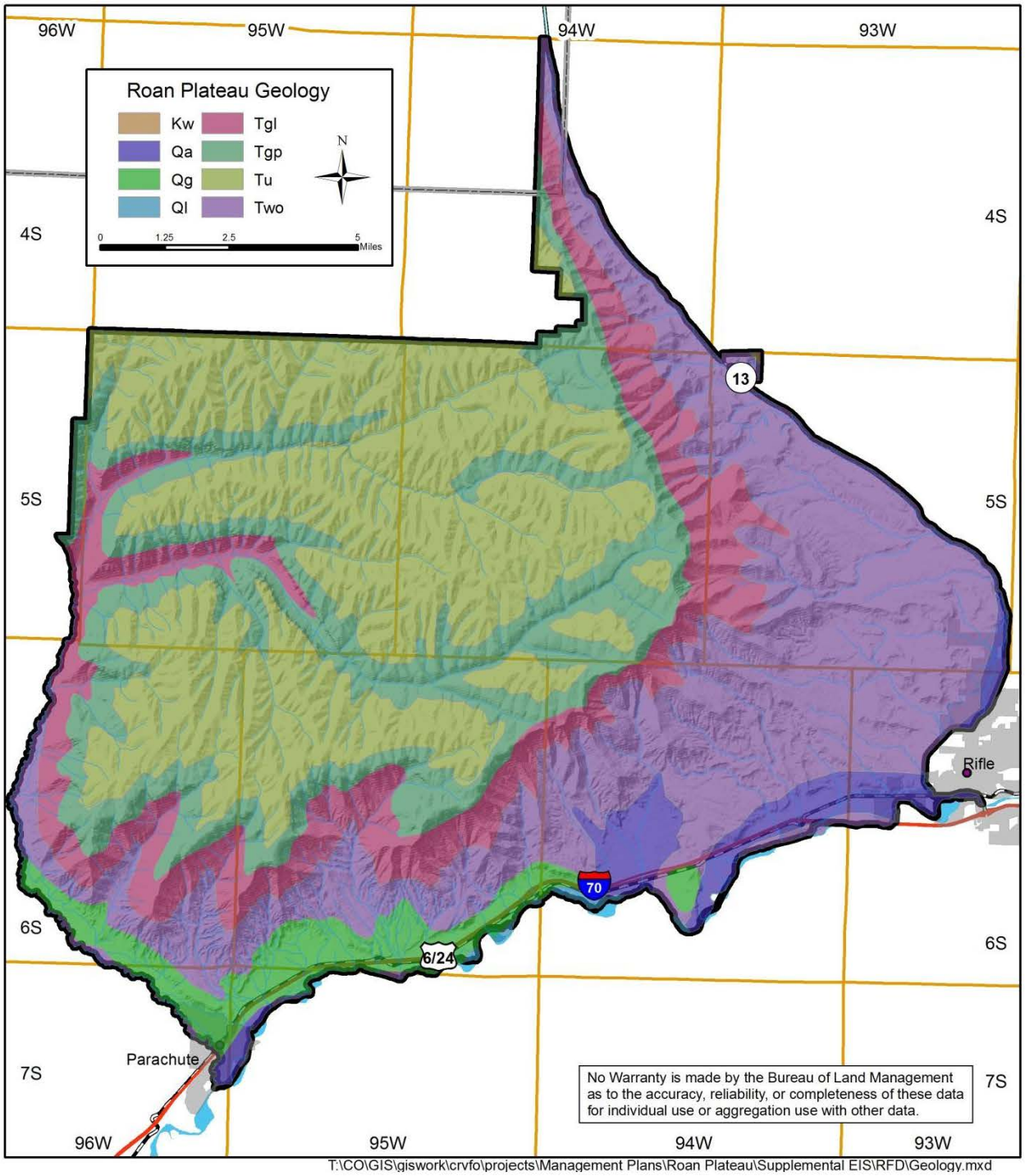

Figure 20. The geology in the RPPA.

Kw is the Williams Fork Member of the Mesaverde Formation, Tgi is the Jackrabbit Ridge member of the Green River Formation , Qa is Quaternary Alluvium Deposits, Tgp is the Parachute Creek member of the Green River Formation, Qg is Quaternary Gravel Deposits, Tu is the Uintah Formation, Ql is Quaternary Loess, and Two is the Shire member of the Wasatch Formation..

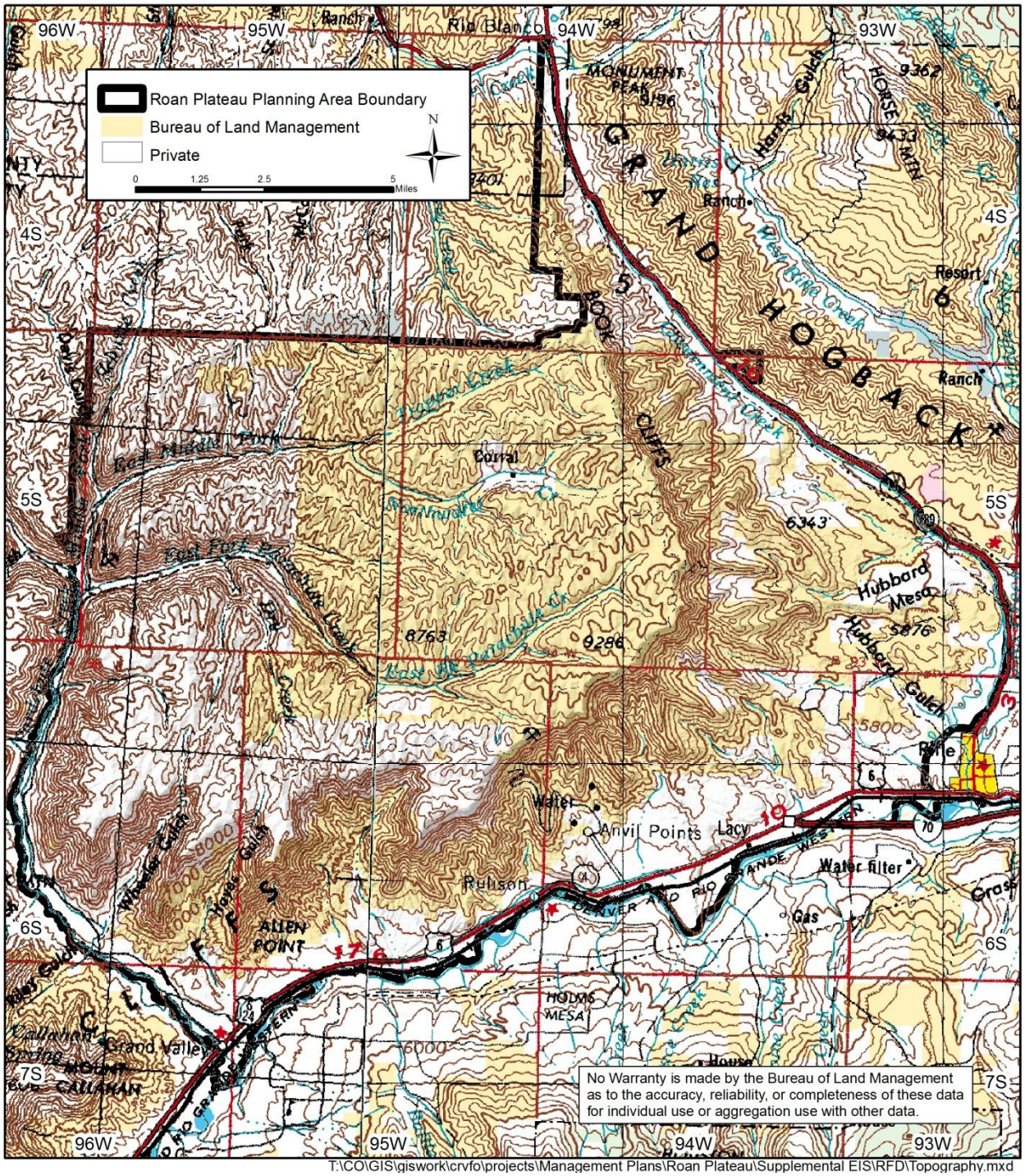

Figure 21. Topography in the RPPA.

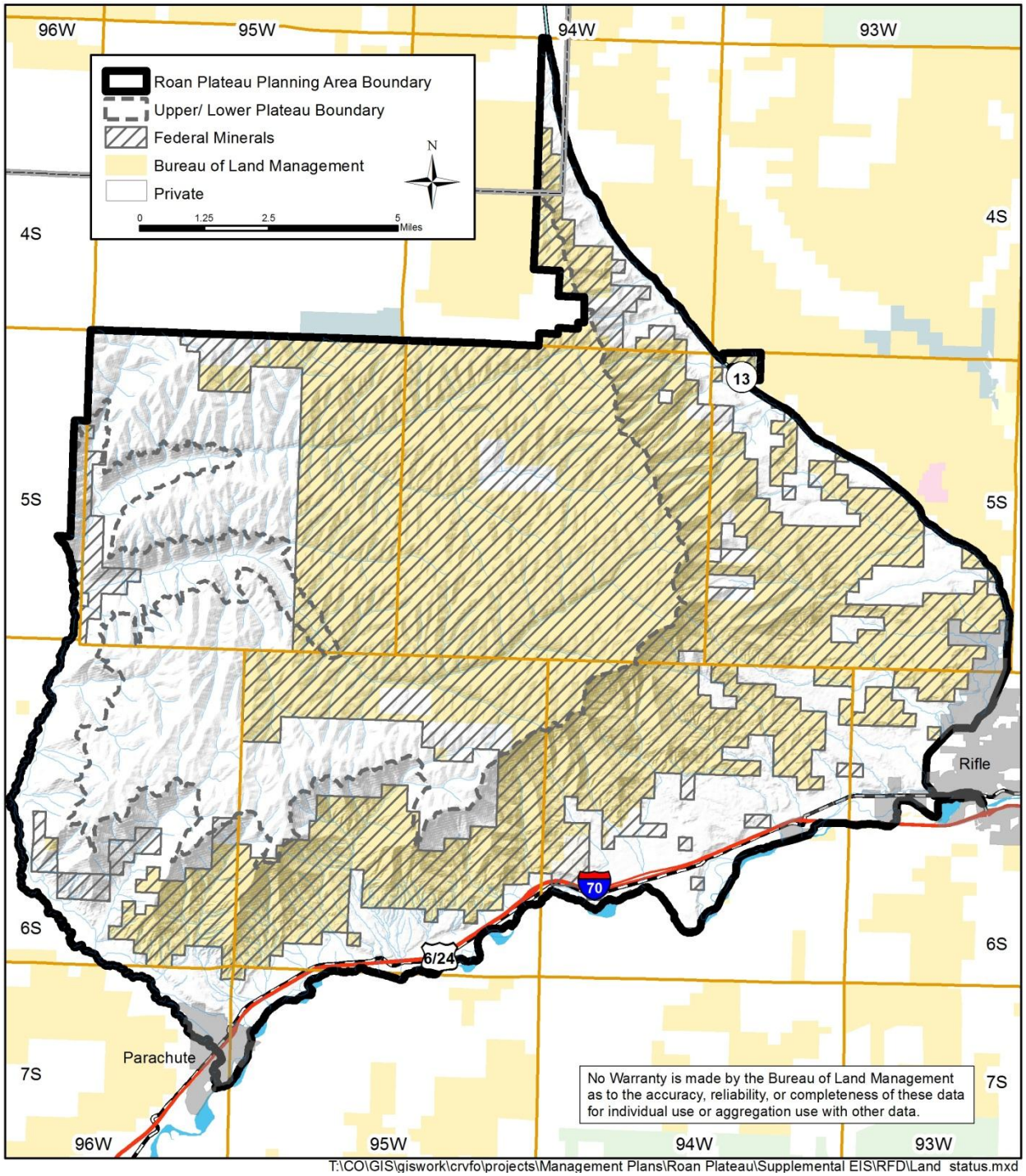

Figure 22. Federal minerals in the RPPA.

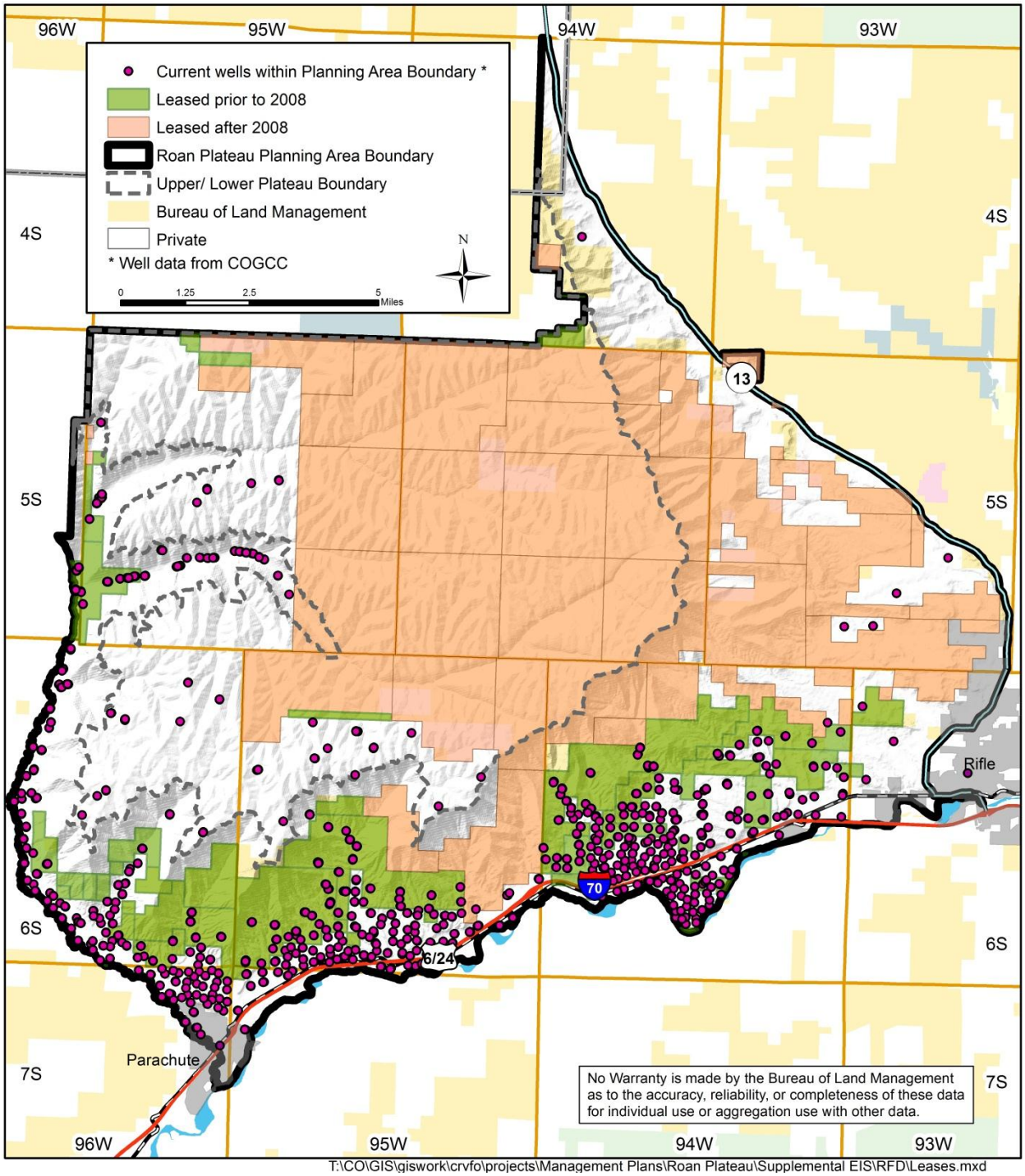

Figure 23. Leases and current well locations in the RPPA

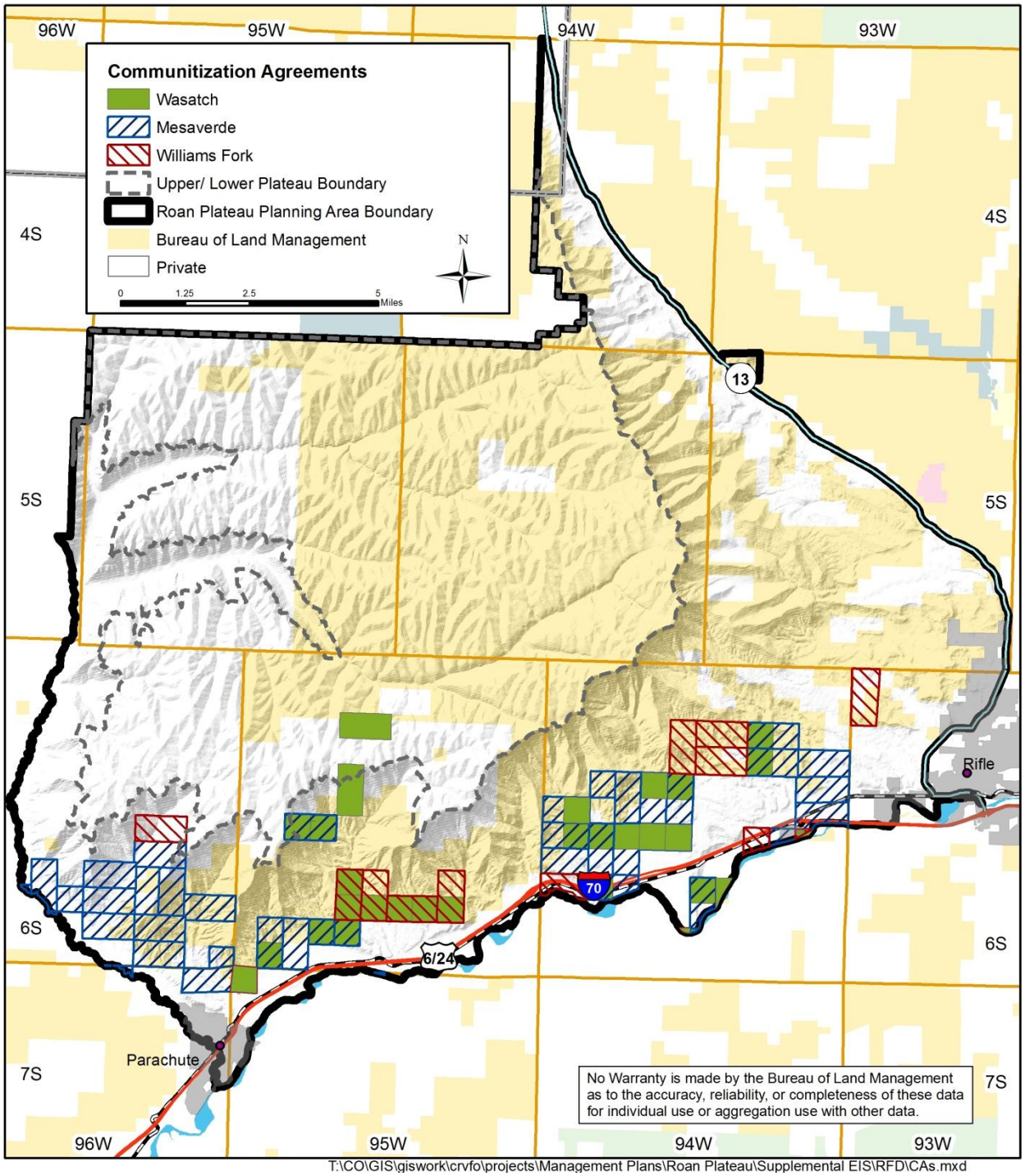

Figure 24. Current Communitization Agreements in the RPPA.

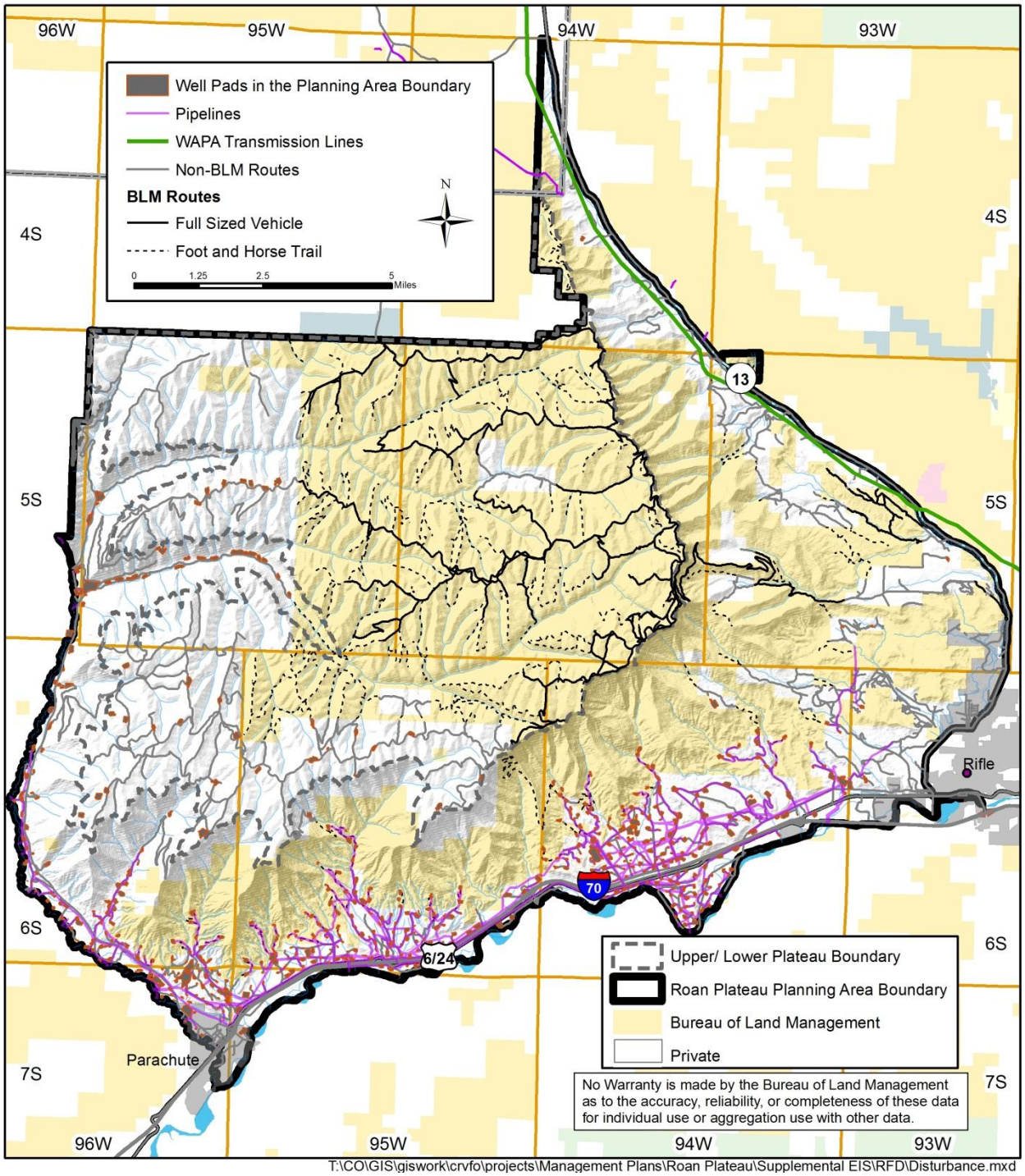

Figure 25. Current surface disturbance in the RPPA.

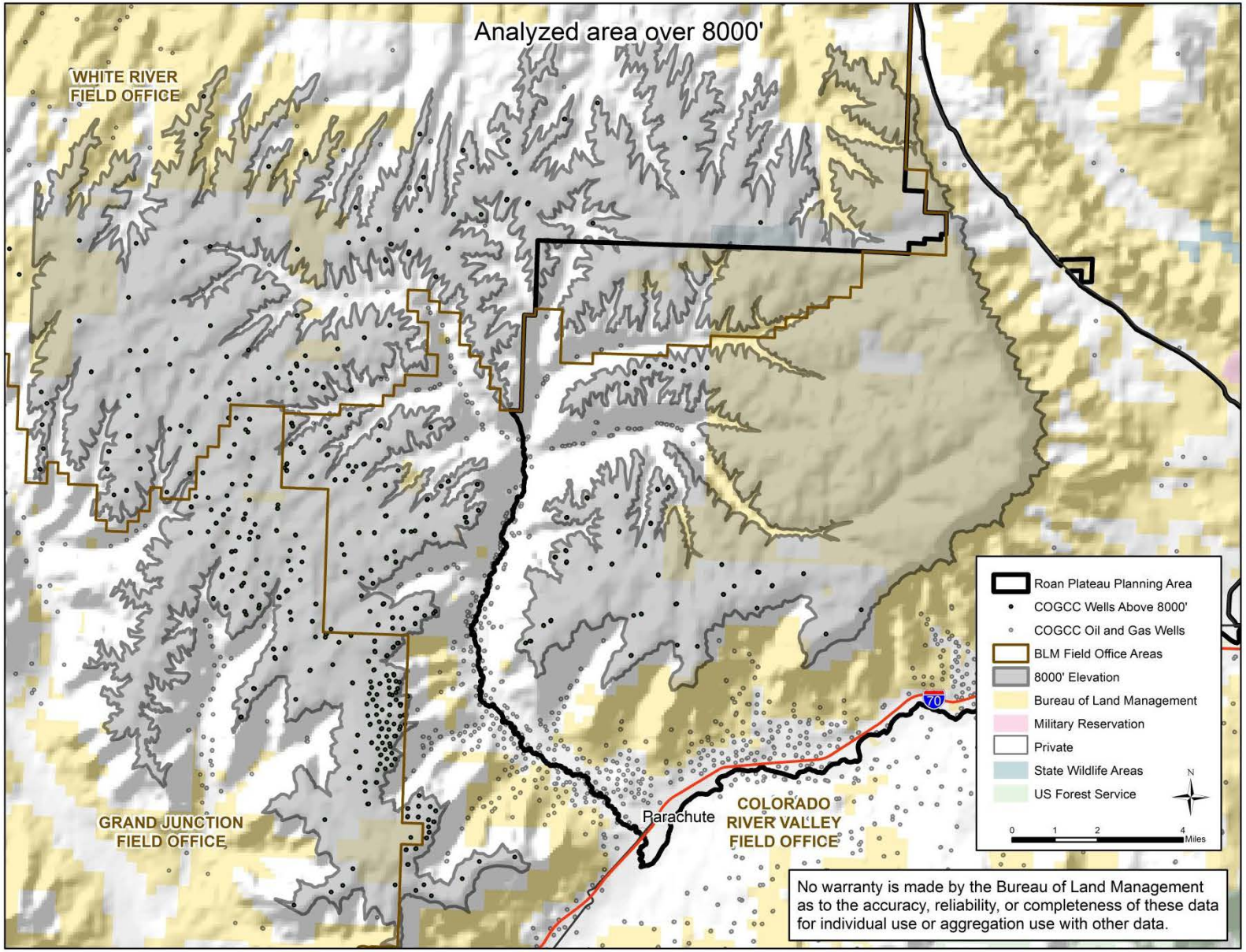

Figure 26. Wells pulled with similar activity as future development on the plateau in the RPPA.

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Appendix H

Best Management Practices (BMPs)

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Appendix H

BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are innovative, dynamic, and economically feasible mitigation practices that are applied on a site-by-site basis to reduce, prevent, or avoid adverse environmental or social impacts of development activities (BLM 2004). A number of BLM BMPs for oil and gas development are incorporated into the general oil and gas development requirements in the Proposed Plan. These include minimizing the number of pads by utilizing multiple well designs and directional drilling, minimizing road footprints, utilizing centralized support facilities such as tank batteries, collocating utilities and pipelines in common corridors and aligning them along roadways, and implementing interim reclamation practices. The BMPs identified in this Appendix represent the kinds of activities which may be required; actual BMPs required during the permitting process to mitigate impacts may vary. BMPs and specific methodologies associated with them are expected to change over time to reflect the results of monitoring and ongoing adaptive management efforts. Additional practices may be required, practices may be withdrawn, or practices may be modified during activity, implementation, or project level planning; this may be done without future land use plan (RMP) decisions or amendments, but would likely be analyzed as part of the NEPA analysis associated with the permitting process. Monitoring and adaptive management practices will be used to refine and clarify needed practices consistent with the goals and objectives of this plan.

The following or similar BMPs will be applied to all long-term ground-disturbing activities, as appropriate to each site and activity. This list is not all inclusive, but is presented to aid the reader in understanding BMPs.

Physical Site Protection/Water Quality Controls

- Employ dust suppression to minimize impacts to air, water, vegetation, and wildlife.
- Install silt fences to protect riparian areas, wetlands, and open water.
- Use closed compressor buildings or mufflers to minimize noise.
- Install catalytic converters to minimize emissions.

Air Quality Protection

- Implement the Comprehensive Air Resource Protection Protocol (CARPP); as part of the CARPP, and in addition to the CARPP, the following may be applicable as needed:
    - Apply best available control technology to minimize air pollutant emissions in order to comply with applicable local, state and federal laws, statutes, regulations, standards and implementation plans.
    - Adaptively manage air quality through baseline assessment, continuous monitoring, re-evaluation, and adjustment as necessary.
    - Cooperate in an interagency process to conduct regional air quality modeling and develop a comprehensive strategy to protect regional air quality.
    - Utilize regional air modeling and project-specific modeling to develop air resource protection strategies.
    - Consider the following factors to identify pollutants of concerns and the appropriate level of air analysis, monitoring and reporting for a proposed activity: magnitude of potential air emissions; duration of proposed activity and phases; proximity to Class I areas, Sensitive Class II areas, population centers, or other sensitive receptors; proximity to non-attainment or maintenance area; meteorological and geographic conditions; existing air quality data; intensity of existing and projected regional development; and issues identified during scoping.

- As an operator, conduct one year of pre-construction baseline air quality monitoring within or adjacent to a proposed development area during the year immediately preceding the proposed project submittal. This includes siting, installing, operating, and maintaining the required air quality monitors.
- As an operator, conduct air quality monitoring for the life of the development project.
- Publicly disclose air monitoring data.
- As an operator, conduct project-specific air quality modeling for the pollutant(s) of concern in the absence of sufficient data to ensure compliance with laws and regulations or to determine the effectiveness of mitigation options.
- Manage the timing, pace, place, density, and intensity of leasing and development to meet air quality goals.
- As an operator, provide an emissions inventory as part of an application for a permit to drill.
- As an operator, obtain an air permit from the Air Pollution Control Division for the site as a whole or cover individual equipment under one of Colorado's general permits for oil and gas operations.
- If a project may cause a significant adverse air quality impact or exceed an air quality standard, develop an emissions reduction plan.
- Respond to monitored exceedances of the National Ambient Air Quality Standards (NAAQS) by: reviewing the metadata for quality assurance and quality control (QA/QC) and meteorological data for exceptional atmospheric events; and, if validated, conducting a screening analysis to determine the likely cause, source, and origin. Consult with appropriate agencies, mitigate the exceedance(s) and enforce compliance with the NAAQS.
- Prepare and publish an annual air quality summary report.
- Post and enforce reduced speed limits to decrease fugitive dust from vehicular traffic on unpaved roads.
- Reduce unnecessary vehicle idling to reduce combustion emissions, ozone formation, visibility impacts, and fuel consumption.
- Surface or stabilize roads and disturbed areas where soils are susceptible to wind erosion.
- Restrict surface-disturbing activities to periods when wind speeds are less than 25 miles per hour.
- Keep soil moist while loading into trucks.
- Keep soil loads below the freeboard of trucks.
- Minimize drop heights when loaders dump soil into trucks.
- Tighten gate seals on trucks.
- Cover truck loads before traveling on public roads.
- Cover construction materials and stockpiled soils if sources of fugitive dust.
- Train workers to handle construction materials and debris to reduce fugitive emissions.
- Centralize or consolidate gas processing facilities, liquids gathering systems (condensate and produced water), and water and/or fracturing liquids delivery systems to reduce volatile organic compound (VOC) and greenhouse gas (GHG) emissions from individual dehydration/separator units and to reduce vehicle emissions.
- Utilize dust suppression techniques on unpaved surfaces to prevent fugitive dust from vehicular traffic, equipment operations, and wind. Dust suppression techniques may include watering, applying BLM-pre-approved chemical suppressants, and adding gravel, particularly during the construction and well development phases.
- Initially apply at least six inches of compacted gravel to upgraded roads.
- Reduce trucking and service traffic through car pools, innovative work schedules, and centralized collection facilities in order to minimize fugitive dust and tailpipe emissions.
- Improve engine technology (Tier 2 or better) for diesel drill rig engines, as well as all mobile and non-road diesel engines, to reduce nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide (CO) and VOC emissions.

- With regard to drill rig, hydraulic fracturing, and completion-related engines, comply with EPA Non-Road Tier II Emissions Standards in order to achieve compliance with short-term nitrogen dioxide (NO_2) air quality standards.
- Instead of diesel engines, utilize natural-gas-fueled engines to reduce NO_x emissions and reduce the formation of visibility-impairing compounds and ozone.
- Utilize ultra-low-sulfur diesel (e.g., in engines, compressors, construction equipment) to reduce emissions of PM and sulfates.
- Utilize closed-loop drilling systems to reduce VOC and methane emissions.
- Implement directional and horizontal drilling to reduce construction-related emissions and surface disturbance, thereby minimizing the road network, as well as dust and emissions from truck traffic and construction activities.
- Utilize "green completions" when feasible.
- Utilize "green workovers" to reduce VOC and methane emissions.
- Utilize enclosed tanks instead of open top tanks or pits to reduce VOC and GHG emissions.
- Confine fracturing fluids and condensates to lined pits or tanks.
- Utilize and maintain proper hatches, seals, and valves to minimize VOC emissions.
- Replace wet compressor seals with dry seals or use mechanical seals to reduce gas venting and decrease power requirements. Utilize a degassing recovery system for centrifugal compressors with wet seals.
- Utilize electricity or renewable power sources (e.g., solar panels) for wellhead compressors, pumps, and monitoring equipment to reduce truck trips, engine emissions, methane emissions from gas pneumatic pumps, and local fossil fuel combustion emissions.
- Utilize compressed air or nitrogen instead of natural gas for engine starting to reduce methane and VOCs emissions.
- Frequently replace rod packing to reduce emissions.
- Ideally, utilize flareless technology to reduce VOC and methane emissions; if not feasible, flaring the natural gas is preferable to venting.
- Improve capture and control of flashing emissions from all storage tanks and separation vessels with vapor recovery and/or thermal combustion units.
- Replace intermittent or continuously burning flare pilots with electrical sparking flare ignition devices.
- Reduce miscellaneous fugitive VOC emissions by: installing plunger lift systems with smart automated control systems to reduce methane emissions from well blowdowns; installing and maintaining low VOC-emitting seals, valves, and hatches on production equipment; initiating an equipment leak detection and repair program (e.g., including FLIR infrared cameras, grab samples, organic vapor detection devices, and/or visual inspection); installing or converting gas-operated pneumatic devices to electric, solar, or instrument (or compressed) air-driven devices/controllers; utilizing "low" or "no-bleed" gas-operated pneumatic devices/controllers; utilizing a closed-loop system or thermal combustion for gas-operated pneumatic pump emissions; installing or converting gas-operated pneumatic pumps to electric, solar, or instrument (or compressed) air-driven pumps; and installing vapor recovery units on truck loading/unloading operations at tanks.
- Optimize glycol circulation and install a flash tank separator to capture and recycle methane, thereby reducing VOCs and methane emissions.
- Install selective catalytic reduction systems to convert NO_x into nitrogen and water vapor.
- Improve capture and control of dehydration equipment emissions with condensers, vapor recovery, and/or thermal combustion to reduce VOC, HAP, and GHG emissions.
- Utilize zero-emissions dehydrators or desiccants dehydrators to reduce VOC, HAP, and GHG emissions.
- Improve capture and control of produced water, crude oil, and condensate tank emissions to reduce VOC and GHG emissions.

- Utilize inert gases and pigs to purge pipelines rather than vent natural gas to the atmosphere.
- Install a dedicated vapor recovery system to recover gas from pipeline pigging operations.
- Where underground cast iron or unprotected steel distribution pipelines cannot be replaced with plastic pipe (e.g., bridge crossings), utilize flexible plastic insert liners.
- Replace burst plates with secondary relief valves to reduce emissions of methane, VOCs and HAPs.
- Install excess flow valves to minimize emissions.
- Utilize pressurized storage/transport of condensate to avoid venting methane, VOCs, and hazardous air pollutants (HAPs) to the atmosphere.
- During condensate loading, flare or recover the low-pressure gas in the natural gas liquids storage tank to avoid methane emissions.
- Utilize telemetry and automation of wellhead equipment to remotely control and monitor production thereby reducing vehicle traffic and associated emissions.
- Adhere to manufacturers' equipment operation and maintenance requirements.
- Track and record the utilization of hazardous chemicals.
- Regularly inspect and maintain wells and facilities, including pressure safety valves, excess flow valves, compressor stations, flowlines, gas processing plants and booster stations.
- Prior to reclamation, either adequately treat potentially hazardous materials to remain onsite or dispose of them at an approved disposal area.
- Reclaim disturbed areas as soon as possible.

Noise Management

- Apply best available control technology to minimize noise in order to comply with applicable local and state laws, statutes, regulations, standards and implementation plans.
- Implement and enforce the Colorado Oil and Gas Conservation Commission's (COGCC's) day and nighttime noise level standards.
- Manage the timing, pace, place, density, and intensity of leasing and development to manage noise.
- Centralize or consolidate well pads, facilities, and systems to reduce the amount of disturbance and overall area impacted by elevated noise levels.
- Design and locate disturbance activities to minimize noise impacts to wildlife, livestock and the public.
- Design wells, drill pads, compressors, roads, and facilities with auditory buffers or screens (topography, vegetation, distance).
- Design road networks and manage road use (through car pools, innovative work schedules, and centralized collection facilities) to minimize traffic and reduce noise.
- Prohibit the utilization of horns, bells, or other-noise-making devices other than for safety measures.
- Post and enforce "no jake brake zones."
- Reduce unnecessary vehicle idling to reduce noise.
- Monitor noise levels of drilling, cementing, and completion activities.
- Between a noise source and a receptor, construct engineered sound barriers (tightly-spaced wooden fences, concrete fences, earthen berms, walls, sheds).
- Utilize electric-powered equipment rather than diesel-powered equipment to reduce noise.
- Utilize drilling rigs with noise dampening equipment.
- Utilize pneumatic pumps that produce little or no noise.
- Utilize "green completions" when feasible to reduce noise levels.
- Utilize telemetry and automation of wellhead equipment to remotely control and monitor production thereby reducing vehicle traffic and associated noise.
- Install suitable mufflers on all internal combustion engines and certain compressor components.

- Decrease continuous noise levels by installing multi-cylinder pumps and hospital-grade mufflers, carefully selecting the placement of exhaust systems, enclosing engines, and installing additional muffler exhaust suppression.
- Install suitable mufflers or otherwise control exhaust noise from pump jacks and compressors in order to not exceed 49 dB at 30 feet from the source.
- Implement compressor and pump-jack noise abatement (hospital-grade mufflers, design retrofits on older equipment, equipment location, high-grade mufflers on exhausts, electric power rather than diesel, progressive cavity pumps or other quiet-running artificial lift equipment instead of conventional pump jacks, enclosures with insulation).
- Adhere to manufacturers' equipment operation and maintenance requirements to minimize noise.
- Install monitoring devices where compressors are built within ¼ mile of sensitive receptors.
- Apply buffers and abide by timing restrictions to reduce noise impacts on bald eagles, owls, raptors, sage grouse, and songbirds.
- Limit noise to less than 10 dB above ambient levels (typically 20 to 24 dB) from two hours before until two hours after sunrise at the perimeters of a sage grouse lek during the active lek season.
- Utilize noise shields when drilling during the lek, nesting, brood-rearing, and wintering seasons.

Soil Management

- Protect soils and native vegetation by minimizing their disturbance.
- Consider site-specific soil and vegetative characteristics and reclamation potential in a project design and layout. To reduce soil disturbance, consider mowing or brush beating of vegetation for parts of the well location or access road where excavation is not necessary.
- Consider topography and landforms when proposing surface disturbance. Deep vertical cuts, long or steep fill slopes and side cuts across steep slopes will be avoided. Cluster surface disturbance (rights-of-way will be shared, structures and facilities will be grouped, etc.).
- Avoid disturbance in areas with erodible soils, steep slopes, fragile soil (areas with erodible soils and slopes greater than 30 percent), saline soil, rugged terrain, sparse vegetation, previous mass wasting and unstable geologic conditions prone to mass wasting. If unavoidable, create and get approval of a specific development plan (covering erosion control, GIS modeling, and engineered survey and design) to minimize erosion and maintain productivity.
- Avoid disturbance in areas with cut slope challenges, surface or subsurface water issues, inadequate fill material, or reclamation limitations (e.g., little to no topsoil, saline soils).
- Design and construct each oil and gas pad in the shape of a tear-drop to maximize interim reclamation and minimize bare soils. Cluster infrastructure appropriately on the pad to facilitate the smallest disturbance footprint.
- Post and enforce reduced speed limits to decrease erosion on unpaved roads. Restrict surface-disturbing activities to periods when wind speeds are less than 25 miles per hour.
- Drive only on established routes.
- Stabilize slopes with retaining structures (loose rock, gabions, reinforced concrete, piles, crib walls, soil nails, mechanically stabilized soil walls with facings of geotextile/welded wire/timber/concrete blocks, etc.), buttresses, brush layering and drainage.
- Where applicable, cover entrances to construction locations with gravel to prevent sediment and weed seeds from being tracked in and out.
- Follow the "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (commonly referred to as "The Gold Book") when conducting surface-disturbing activities associated with the development of fluid minerals.
- Following the initial clearing of large trees and salvaging of certain vegetation, etc., include all growth medium present at a site in topsoil stripping, as indicated by color or texture. The stripping and storage depth may be specified during the onsite inspection. Salvage, segregate, and store all

stripped topsoil/growth medium in a stable manner that extends biological viability and mitigates erosion. Replace topsoil and all growth medium prior to seedbed preparation.

- Segregate and store topsoil separate from subsurface materials. Segregate thin or rocky topsoil from other topsoil.
- Stockpile, shred, and salvage with topsoil the cleared vegetation smaller than four inches in diameter. Scatter cleared vegetation larger than four inches in diameter over disturbed areas. Excessive vegetation larger than four inches in diameter may be removed from public land or shredded in place to be salvaged with topsoil. A wood cutting permit may be purchased from the BLM to remove material.
- Avoid surface disturbance near drainages and saline soils; however, if surface disturbance in sensitive areas is unavoidable, the disturbance will be minimized to the greatest extent practicable.
- Strip and salvage topsoil to a minimum depth of six inches at disturbance sites. An exception to this practice will be in disturbance areas infested with noxious weeds or other undesirable plants species, where deep burial of the infested topsoil may be preferable.
- To ensure successful vegetative growth, salvage topsoil during construction and re-spread to the greatest degree practical on cut slopes, fill slopes, and borrow ditches prior to seeding. Consider applying weed-free mulch or other erosion control measures to increase surface roughness and decrease erosion. Only utilize mulch when its potential benefits exceed its inherent risk of introducing undesirable plant species.
- Conduct stripping in stages to avoid topsoil compaction, beginning with a leading edge and moving in one consistent direction for subsequent loads.
- Prohibit the placement of soil and other material within floodplains.
- Prohibit the stripping or segregating of topsoil when saturated or frozen below the stripping depth unless a Winter Construction Plan is submitted and approved by the BLM Authorized Officer, thereby authorizing a Notice to Proceed with construction activities in frozen soils.
- Stockpile topsoil where no vehicle traffic will cross topsoil mounds. Protect stockpiles from wind and water erosion through the use of suitable weed-free mulch, weed-free seeding with native species appropriate to the site's native plant community, and other measures as necessary. Only utilize mulch when its potential benefits exceed its inherent risk of introducing undesirable plant species.
- Ensure stockpiles have appropriate heights and slopes to prevent wind and water erosion.
- As topographically appropriate (not on steep slopes or on minimally sized pads), windrow topsoil around the perimeter of the surface disturbance area to create a berm (no higher than five feet) that extends the viability of the topsoil, as well as limits and redirects storm water runoff. Windrow, segregate, and store topsoil along disturbed surfaces or linear features for later spreading across the disturbed corridor during final reclamation. Promptly seed topsoil berms with native species appropriate to the site's native plant community to maintain soil microbial activity, reduce erosion, and minimize weed establishment.
- Compact fills to minimize subsidence or slope failure. If excess material is present after fill areas are at grade, stockpile the excess material at approved locations.
- Prohibit the placement of drill rigs, tanks, heater-treaters, and other production equipment on uncompacted fill material.
- Locate mud tanks, generators, mud storage, and fuel tanks in areas with a slight slope or utilize a suitable alternative, such as ditching, to provide surface drainage from the work area to the pit.
- Prohibit the utilization of snow or frozen soil in fill areas, dikes, or berms.
- With the exception of active work areas, stabilize (as approved by the BLM) disturbed soils that remain exposed, unprotected, or un-reclaimed for longer than one month. Soil stabilization may include seeding with native seed or application of a covering, such as mulch, matting or hydromulch. Utilize certified weed-free mulch, and apply it only to sites where its potential benefit outweighs its inherent risk of introducing undesirable plant species.

- Utilize erosion reduction techniques, such as silt fencing, diversion terraces, rip-rap, matting, biodegradable mulch/hydromulch/netting/soil stabilizers, sediment traps, and water bars.
- Implement mitigation measures for sedimentation, erosion, slippage, settlement, and subsidence on moderate to steep slopes that are disturbed.
- Design roads with gradients of eight percent or less (except for pitch grades no longer than 300 feet) to minimize erosion. Obtain approval for roads with gradients greater than eight percent but not exceeding 16 percent.
- Build and maintain all routes to BLM Manual Section 9113 standards for road shape and drainage features, BLM Manual Section 9112 standards for bridges and major culverts, or BLM Manual Section 9115 standards for primitive roads. For drainage crossings, size culverts for the 25-year storm event or greater without development of a static head at the pipe inlet. Install culverts of at least 24 inches in diameter and in the bottom and middle of the natural channel. Site-specific conditions may warrant the BLM to require designs for larger events (e.g., 75-to-100-year storm events). (Due to the flashy nature of area drainages and anticipated culvert maintenance, design drainage crossings for the 100-year storm event per the U.S. Army Corps of Engineers [USACE].) On perennial and intermittent streams, design culverts to allow for passage of aquatic biota.
- In areas where all-weather access is necessary, construct and maintain routes per BLM Manual Section 9113 standards. Apply gravel or other appropriate surfacing material to reduce environmental resource damage and provide safe all-weather access on “soft” road sections, steep grades, erosive soils, and clay soils.
- Initially apply at least six inches of compacted gravel to upgraded roads.
- Utilize and consider upgrading existing roads when feasible to minimize disturbance. Consider following topographic contours when designing and constructing new roads to minimize soil erosion.
- Utilize specialized low-surface-impact equipment (wide- or balloon-tired vehicles, all-terrain vehicles) or helicopters for activities in off-road areas to protect fragile soils or other resource values.
- Confine or route drainage (with ditches, berms or waterbars above cut slopes) from disturbed areas in order to minimize erosion, particularly within 100 feet of a waterway. Route runoff, including that from roads, through a sediment-trapping mechanism (native vegetation, anchored weed-free bales, catchments, sediment fences) prior to discharging into a waterway.
- Extend culvert outlets at least one foot beyond the toe of any slope. Utilize culvert outlet erosion control techniques (e.g., properly sized rip-rap) to slow water velocity and prevent soil erosion.
- Regularly inspect and maintain roads (compaction, dust abatement, etc.) and road drainage features (ditches, drainage dips, ditch turnouts, culverts, inslopes, etc.).
- Halt construction activities when saturated soil conditions exist on access roads or on location, or when road rutting becomes deeper than six inches, until soil material dries out or is frozen sufficiently for construction to proceed without undue damage and erosion to soils, roads and locations.
- Prohibit the placement of fill on a frozen foundation.
- Utilize closed-loop drilling systems or line reserve pits with impermeable liners (synthetic, bentonite, clay) to prevent soil contamination.
- Locate and construct reserve pits in cut material and outside of natural watercourses, avoiding areas with shallow groundwater or with porous soils over fractured bedrock aquifers. Install a leak detection system or utilize self-contained mud systems with drilling fluids, mud, and cuttings disposed at approved disposal areas.
- Return shot-hole cuttings to the hole, or submit an alternative plan to the BLM for approval.
- After cessation of drilling and completion operations, remove and properly dispose of any visible or measurable oil in the reserve pit.

- Design and construct secondary containment to hold 110% of the largest single tank capacity and to be impervious to oil, glycol, produced water or other toxic fluid for 72 hours. To prevent seepage of a spill, construct earthen berms with fine material and compact them.
- Design and construct secondary containment with a sturdy corrugated metal wall, heavy impervious poly liner, and gravel surface. Install small plastic hoppers at all loadout connections to catch drips and small leaks.
- On tanks with a capacity of ten barrels or greater, label or post signage with the name of the Operator; Operator's emergency contact telephone number; tank capacity; tank contents; and National Fire Protection Association (NFPA) label. For each container with a capacity of less than ten barrels, label its contents and ensure the appropriate NFPA label is also visible.
- Only utilize topsoil for reclamation, and not for fill or for pipe bedding/padding during backfilling.
- Prohibit the placement of topsoil when in a frozen or muddy condition, when the subgrade is excessively wet (i.e., equipment creates ruts greater than six inches), or when the condition may otherwise be detrimental to proper grading or proposed sodding or seeding.
- Utilize best available science and technology to protect natural resources from undue degradation during interim and final reclamation.
- Maintain healthy, biologically active topsoil through timely reclamation (temporary, interim, final), and by adequately segregating and stockpiling topsoil (designed to maximize surface area to minimize microbial impacts). Stockpiles remaining less than two years facilitate microbial survival and native seed viability.
- Reclaim disturbed areas as soon as possible. Promptly reapply topsoil, prepare a seedbed (to retain moisture and foster vegetative growth), apply weed-free native seed of species appropriate for the site's native plant community, and utilize weed-free mulch for erosion control and soil moisture retention at lower elevation sites. Utilize straw mulch only in areas where potential benefits outweigh the potential risks of introducing undesirable plant species.
- Regularly monitor and adaptively manage soil stabilization measures and revegetation.
- Test soil samples to determine reclamation potential.
- During reclamation, amend the topsoil as necessary to foster native vegetative growth, thereby providing soil stability.
- Store chemicals and hazardous materials in a manner that does not allow contact with soil or exposure to weather. Properly label all containers. Keep containers closed when not being utilized; provide secondary containment.
- Utilize bioremediation techniques (e.g., landspreading, in-situ biotreatment, landfarming, compostion) to treat contaminated soil. Optimize soil conditions (pH, nutrients, moisture, aeration) for microorganisms.
- With regard to contaminated soil, either treat or remove to an appropriate disposal site.

Water Resource Management

- Avoid the alteration of natural hydrologic function and condition in source areas for springs, seeps, wetlands, or other water bodies by relocating surface-disturbing activities.
- Avoid soil compaction or surface-disturbing activities in recharge areas that could impair the natural function of springs or seeps.
- Document the baseline characteristics of a stream channel or wetland/riparian area prior to disturbance.
- Direct overflow from water developments to a natural drainage in a manner that does not facilitate erosion or modify riparian habitats.
- Time construction activities at perennial, intermittent, and ephemeral drainage crossings (e.g., buried pipelines, culverts) to avoid high-flow conditions. When construction disturbs a flowing stream, utilize either a piped stream diversion or a cofferdam and pump to divert flow around the disturbed area.

- Due to the flashy nature of area drainages and anticipated culvert maintenance, design drainage crossings for the 100-year event per USACE.
- Bore/bury pipelines installed beneath stream crossings a minimum depth of four feet below the channel substrate to avoid exposure by channel scour and degradation. Following burial, return the channel grade and substrate composition to pre-construction conditions. Apply the minimum width for rights-of-way where pipelines cross streams or riparian areas.
- Prohibit the permanent impairment of floodplain function as a result of surface-disturbing activities.
- Maintain appropriate vegetative/riparian buffers (at least 325 to 500 feet) around water features to slow runoff, trap sediments and protect water quality.
- Manage and manipulate invasive stands of brush and weeds on forest, range, and pasture land by mechanical, chemical, or biological means or by prescribed burning to improve watershed function and condition.
- Limit consumptive water use from Federal point source water rights on public lands that are not sustainable and/or would jeopardize discharge to streams, springs, seeps, wetlands, or downstream senior water rights.
- Utilize/establish off-stream watering facilities when possible (e.g., stock tanks, stock ponds, nose pumps). Where feasible, place grazing stock tanks and other watering facilities at least 400 meters (¼ mile) from riparian zones.
- Exclude livestock and vehicles from spring sources and riparian areas where on-site evaluation and/or monitoring data indicate degrading conditions or potential to degrade spring or riparian function.
- Implement range improvements in conformance with BLM Manual H 1740-2 and subsequent updates.
- Provide livestock with feed, salt, molasses and other supplements on uplands at least 400 meters (¼ mile) from riparian and wetland areas and on gently sloping land to encourage cattle to graze the uplands and move out of riparian areas. Locate supplementation sites at least 800 meters (½ mile) apart. (Supplemental feeding of livestock on public land is not authorized by regulation, unless approved by the authorized officer.)
- Limit surface disturbance near drainage features and minimize surface disturbance on steep slopes, fragile soils, saline soils, and Mancos-shale-derived soils.
- Consider topography and landforms when proposing surface disturbance. Deep vertical cuts, long or steep fill slopes and side cuts across steep slopes will be avoided. Cluster surface disturbance (rights-of-way will be shared, structures and facilities will be grouped, etc.).
- Follow the “Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development” (commonly referred to as “The Gold Book”) when conducting surface-disturbing activities associated with the development of fluid minerals.
- Build and maintain all routes to BLM Manual Section 9113 standards for road shape and drainage features, BLM Manual Section 9112 standards for bridges and major culverts, or BLM Manual Section 9115 standards for primitive roads. For drainage crossings, size culverts for the 25-year storm event or greater without development of a static head at the pipe inlet. Install culverts of at least 24 inches in diameter and in the bottom and middle of the natural channel. Site-specific conditions may warrant the BLM to require designs for larger events (e.g., 75-to-100-year storm events). (Due to the flashy nature of area drainages and anticipated culvert maintenance, design drainage crossings for the 100-year storm event per the U.S. Army Corps of Engineers [USACE].) On perennial and intermittent streams, design culverts to allow for passage of aquatic biota.
- When designing protective/mitigative measures, consider the changes that may occur in the watershed hydrology and sedimentation over the design life of the measure. Moreover, design and construct roads that are self-maintaining and consider using road surfacing, such as gravel, when year-long access may be necessary.
- Initially apply at least six inches of compacted gravel to upgraded roads.

- Avoid cutting the toe of cut slopes when grading roads or pulling ditches.
- Grade road surfaces only as often as necessary to maintain a stable running surface and to retain the original surface drainage.
- Design and construct surface pipelines at drainage crossings at an adequate height above possible flood levels. Bore/bury pipeline crossings below the surface deep enough to remain undisturbed by scour and fill processes typically associated with peak flows. Complete a hydraulic analysis during the pipeline design phase to avoid repeated maintenance of such a crossing and eliminate costly repairs and potential environmental degradation associated with pipeline breaks at stream crossings. Utilize horizontal directional boring techniques below perennial water bodies and/or wetland complexes when environmental circumstances allow.
- X-ray pipeline welds within 100 feet of a perennial stream to prevent leakage into the stream. Where pipelines cross streams that support Federal or State-listed threatened or endangered species or BLM-listed sensitive species, utilize additional safeguards (such as double-walled pipe, and remotely-actuated block or check valves) on both sides of the stream.
- Prior to surface disturbance at a pad, access road, or facility, have an approved surface drainage plan with minimal clearing and grading, protection of waterways, phased activities to limit soil exposure, immediate stabilization of exposed soils, protection of steep slopes and cuts, installation of perimeter control to filter sediments, advanced sediment settling controls, contractor certification and training, site waste control, and inspection and maintenance of adaptive BMPs (e.g., run-on/run-off controls, such as surface pocking or re-vegetation, ditches or berms, and basins). Install pre-construction drainage BMPs as appropriate.
- Minimize crossing streams and wetlands/riparian areas with vehicles, heavy machinery and facilities.
- When activity in streams, wetlands, or riparian areas is unavoidable, first employ best available technology, such as eco-matting, to reduce impacts. Then restore modified or damaged areas as close as practicable to natural conditions to protect banks and wetlands, as well as to re-establish native riparian vegetation.
- Subject to BLM approval, professionally engineer (design, construct, and maintain) stream crossings affecting perennial streams or streams supporting riparian habitat.
- Avoid the placement of roads or facilities immediately adjacent and/or parallel to streams. If unavoidable, design and construct crossings perpendicular to streams in straight sections of stable reaches to handle (at a minimum) the 25-year flood and allow aquatic organism passage, and have the route immediately exit the riparian buffer zone.
- Maintain to the greatest extent practicable natural flow rates and chemical and physical properties of surface and groundwater during work within stream channels, floodplains, and/or riparian areas.
- Utilize low-water crossings where an access road crosses a small drainage or intermittent stream not requiring a culvert. Dip the road to the original streambed elevation of the drainage, and prevent blockage or restriction of the existing channel. Stockpile material moved from the banks of the crossing nearby for later use in reclamation. Gravel, riprap, or concrete bottoms may be required.
- Conduct activities in wetlands and watercourses during low-flow or no-flow conditions (e.g., prior to spring runoff or during late summer/early fall) and in a manner consistent with BMPs for biological resources. Note that high flows occur during late summer/ early fall as a result of high-intensity convective thunderstorm events.
- Armor low-water stream crossings, place properly sized culverts, and span streams as appropriate to protect riparian areas.
- Place energy dissipaters (e.g., rock piles and logs) where necessary at the downstream end of ditch relief culverts to reduce erosion and sedimentation.
- Regularly inspect and maintain drainage features. Keep road inlet and outlet ditches, catchments, and culverts free of obstructions, clean dips and cross-drains, repair ditches, and mark the location of culvert inlets, particularly before and during spring runoff. Minimize routine machine-cleaning of

ditches during wet weather. Leave disturbed areas in a condition that provides drainage with no additional maintenance.

- Remove and reclaim temporary stream crossings immediately after utilization. Install cross-ditches at the ends of routes or rights-of-way to mitigate erosion/sedimentation from disturbed areas.
- Locate residue piles (e.g., sawdust, field chipping residue, disposal ponds) away from drainages where runoff may wash residue into water bodies or wetlands.
- Within 200 feet of a water body, prohibit activities using chemical processes (except for vegetation management) or pollutants. This includes equipment maintenance and the use of staging equipment for refueling. Prohibit the placement of staging areas for refueling, maintenance equipment, materials, operating supplies, and well borings in wetland/riparian areas.
- Confine or route drainage (with ditches, berms or waterbars above cut slopes) from disturbed areas in order to minimize erosion, particularly within 100 feet of a waterway. Route runoff, including that from roads, through a sediment-trapping mechanism (native vegetation, anchored weed-free bales, catchments, sediment fences) prior to discharging into a waterway.
- Avoid water courses when locating pipelines and flowlines; utilize road corridors wherever possible to minimize surface disturbance and provide better leak detection and access for installation and repair activities.
- Prohibit the pipeline construction from blocking, damming, or changing the natural course of a drainage.
- Test pipelines and flowlines for leak before backfilling trenches. Compact pipeline trenches during backfilling. Regrade cut-and-fill slopes to conform to adjacent terrain, and reclaim them.
- Avoid placing well pads near 100-year floodplains.
- Reduce the potential of water resource contamination where the environmental risk of a drilling fluid spill is heightened. Areas of heightened environmental risk include a ¼-mile buffer around the following: mapped alluvial, colluvial, and glacial deposits; springs and perennial water sources; Source Water Protection Areas, and Municipal Watersheds. In these areas, conduct the following:
    - utilize closed-loop drilling systems;
    - utilize gas-blocker additives during the cementing process;
    - store flowback and stimulation fluids in tanks on the well pad with secondary containment;
    - install secondary containment beneath and around crude oil, condensate and produced water storage tanks;
    - collect baseline water quality data from downstream fresh water sources prior to drilling or the storage of potentially harmful substances (Parameters to be analyzed will be determined on a site-specific basis. A list of parameters will be submitted to and approved by the BLM prior to sampling.);
    - identify potentially impacted Public Water Systems within 15 miles downstream;
    - develop and submit to the BLM an emergency spill and response program, which requires approval prior to surface-disturbing activities.
- Locate and construct reserve pits in cut material and outside of natural watercourses, avoiding areas with shallow groundwater or with porous soils over fractured bedrock aquifers. Install a leak detection system or utilize self-contained mud systems with drilling fluids, mud, and cuttings disposed at approved disposal areas.
- When constructing dikes for pits or impoundments with fill embankment, excavate a keyway or core trench to a minimum depth of two to three feet below the original ground level. Then construct the core of with compacted, water-impervious material.
- Locate mud tanks, generators, mud storage, and fuel tanks in areas with a slight slope or utilize a suitable alternative, such as ditching, to provide surface drainage from the work area to the pit.
- Within portions of municipal watersheds and source water protection areas available for fluid minerals development, develop and implement a watershed protection plan that includes characterization and monitoring of baseline hydrologic/hydrogeologic conditions (such as, but not

limited to, water quality, water quantity, groundwater flow patterns, connectivity between geologic formations, and communication between surface and ground water). Collaborate with all watershed stakeholders regarding the development and implementation of the watershed protection plan.

- When conducting oil and gas drilling operations within municipal watersheds, source water protection areas, or locally important fresh water aquifers, utilize methods and materials to prevent the degradation of underlying groundwater. This may include practices such as surface and intermediate casing through potential fresh water zones, gas blocker additives in cement, green fracturing fluids, and closed-loop drilling. Document the utilization of "green" fracturing fluids in the form of Material Safety Data Sheets (MSDSs) to be reviewed by the operator for compliance prior to use. Keep the MSDSs on-site at all times such chemicals are present.
- Utilize anti-backflow devices when drafting fresh water from streams, springs, reservoirs and wells.
- Prohibit the utilization of hazardous substances in drilling, testing, or completion operations, as well as in the reserve or cuttings pit. Confine fluids to pits or tanks. Pits that may contain liquids will be lined to protect groundwater. Liners will be maintained in good condition, with no tears or holes, until they are removed when the reserve pit is closed.
- Substitute less toxic, yet equally effective products, for conventional drilling products.
- Design and construct pits to eliminate drainage into them. Maintain fluid levels at least two feet below the lowest point of containment.
- Subject to BLM approval, dispose of produced water by subsurface injection, pits, surface discharge into channels or impoundments or other methods, including beneficial use, in accordance with the requirements of Onshore Order No. 7, Disposal of Produced Water, and other Federal and State regulations.
- At pits, water impoundments, and surface discharges that present a potential hazards to humans, livestock, wildlife and other resources, install appropriate mitigation, such as fencing, netting, caging, or covers.
- Prohibit shot-hole seismic testing near aquatic habitats.
- Dispose of spoil material from clearing, grubbing, and channel excavation in a manner that will not interfere with the function of the channel and in accordance with all local, state, and federal laws and regulations. Prohibit the casting of fill material over hilltops and into drainages.
- Locate stockpiles outside of active floodplains.
- Prohibit concentrated flows of surface water (natural drainage ways, graded swales, downspouts) on the face of cut or fill slopes.
- Provide subsurface drainage where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet conditions.
- With regard to the discharge of surface and ground water to surface drainages, comply with the Federal Water Pollution Control Act (as amended through P.L. 107–303, November 27, 2002), obtain a pre-approval by the BLM, and meet the following criteria:
    - discharge operations will not negatively impact downstream beneficial uses;
    - discharge soil/water interactions will not facilitate the mobilization of water quality contaminants (e.g., salt, selenium [typically associated with Mancos-shale-derived soils], sediment, metals) above natural rates in surface and/or ground water;
    - discharge will be limited to well-defined major channels (away from major erosional features), to reduce the potential of discharged water dissolving and transporting salts from the stream channel and to reduce the concentration of salts in alluvium;
    - discharge will be limited to a volume no greater than the naturally occurring mean annual peak flow (which is roughly equivalent to a two-year, 24-hour storm peak) conveyed by the natural channel under anticipated conditions;
    - discharge points will be located in stable channels or reservoirs away from any downstream head-cuts or other major erosional features as determined by the BLM (The outfall design

may include discharge aprons and downstream stabilization of channel side slopes to prevent erosion and provide energy dissipation.);
  - subject to BLM approval, establish and monitor water-quality thresholds for both surface and ground water during discharge operations and cease operations if thresholds are exceeded;
  - monitor surface- and ground-water quantity and quality during discharge operations and for at least two years following the cessation of discharge operations (The monitoring locations will be subject to BLM approval.).
- Prohibit the utilization of subsurface explosives and vibrosis buggies within 0.25 miles of all spring sources and perennial streams.

Riparian and Wetland Habitats Management

- Minimize surface disturbance in areas prone to flooding and near wetland edges, lowland bottoms, drainages, open water, wetlands, riparian areas, and sensitive habitats.
- Establish staging, refueling, and storage areas outside of areas prone to flooding, wetland edges, lowland bottoms, drainages, open water, wetlands, riparian areas, and sensitive habitats.
- Mitigate activities that degrade wetlands or riparian areas.
- Avoid the alteration of natural hydrologic function and condition in source areas for springs, seeps, wetlands, or other water bodies by relocating surface-disturbing activities.
- Conduct activities in wetlands and watercourses during low-flow or no-flow conditions (e.g., prior to spring runoff or during late summer/early fall) and in a manner consistent with BMPs for biological resources. Note that high flows occur during late summer/ early fall as a result of high-intensity convective thunderstorm events. Particularly in cold-water systems, maintain a minimum flow.
- Avoid soil compaction or surface-disturbing activities in recharge areas that could impair the natural function of springs or seeps.
- Manage vegetation in riparian areas to provide wildlife habitat, adequate shade, sediment control, bank stability, and recruitment of wood into stream channels.
- Restrict disturbance of riparian habitat within ½ mile of owl and bald eagle habitat.
- Phase the size and timing of vegetation removal treatments within riparian areas to reduce soil and water temperatures, maintain bank and soil stability, and retain adequate wildlife habitat for cover and nesting.
- Phase the size and timing of vegetation removal treatments on uplands immediately adjacent to riparian areas, and buffer treatment boundaries away from riparian areas to reduce sedimentation and erosion in riparian zones. Allow for at least one year between vegetation removal treatments in uplands and in riparian/wetland areas.
- Utilize the techniques and methods for vegetation treatments identified in the Record of Decision for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States.
- Maintain appropriate vegetative/riparian buffers (at least 325 to 500 feet) around water features to slow runoff, trap sediments and protect water quality.
- Document the baseline characteristics of a stream channel or wetland/riparian area prior to disturbance.
- Prohibit disturbance in areas adjacent to streams containing Colorado River cutthroat trout.
- Avoid riparian areas and wetlands when designing and constructing roads and trails (off-highway vehicle, horse, bicycle, hiking). If unavoidable, the roads and trails will be designed and constructed in accordance with “Managing Degraded Off-Highway Vehicle Trails in Wet, Unstable, and Sensitive Environments”.
- Direct overflow from water developments to a natural drainage in a manner that does not facilitate erosion or modify riparian habitats.

- Utilize low-stress methods of stockmanship (e.g., herding, movements between pastures) to encourage cattle grazing away from riparian areas. Turn cattle out away from riparian areas when entering new pastures or allotments. Also guide cattle to appropriate bedding areas.
- Utilize/establish off-stream watering facilities when possible (e.g., stock tanks, stock ponds, nose pumps). Where feasible, place grazing stock tanks and other watering facilities at least 400 meters (¼ mile) from riparian zones.
- Cull individually identified cattle from the herd that congregate or preferentially graze a riparian area for extended periods of time.
- Avoid late summer or early fall grazing in areas with declining willow populations. If grazing during these time periods must occur, allow for at least one full year between grazing rotations.
- Utilize riparian pastures as appropriate to manage grazing activities in riparian areas by varying the timing, duration, and frequency of riparian pasture grazing. Actively move cattle to and from riparian pastures or pastures containing riparian habitat. Do not allow cattle to drift between pastures.
- Exclude livestock and vehicles from spring sources and riparian areas where on-site evaluation and/or monitoring data indicate degrading conditions or potential to degrade spring or riparian function.
- Prohibit the placement of fences on the immediate edge of riparian areas. Place fences away from riparian/wetland areas to decrease impacts of trailing along fences.
- Provide livestock with feed, salt, molasses and other supplements on uplands at least 400 meters (¼ mile) from riparian and wetland areas and on gently sloping land to encourage cattle to graze the uplands and move out of riparian areas. Locate supplementation sites at least 800 meters (½ mile) apart. (Supplemental feeding of livestock on public land is not authorized by regulation, unless approved by the authorized officer.)
- Minimize crossing streams and wetlands/riparian areas with vehicles, heavy machinery and facilities.
- Install bridges and culverts in accordance with BLM Manual Section 9112.
- Due to the flashy nature of area drainages and anticipated culvert maintenance, design drainage crossings for the 100-year event per the USACE.
- Bore/bury pipeline crossings below the surface deep enough to remain undisturbed by scour and fill processes typically associated with peak flows. Apply the minimum width for rights-of-way where pipelines cross streams or riparian areas.
- When activity in streams, wetlands, or riparian areas is unavoidable, first employ best available technology, such as eco-matting, to reduce impacts. Then restore modified or damaged areas as close as practicable to natural conditions to protect banks and wetlands, as well as to re-establish native riparian vegetation.
- Subject to BLM approval, professionally engineer (design, construct, and maintain) stream crossings affecting perennial streams or streams supporting riparian habitat.
- Avoid the placement of roads or facilities immediately adjacent and/or parallel to streams. If unavoidable, design and construct crossings perpendicular to streams in straight sections of stable reaches to handle (at a minimum) the 25-year flood and allow aquatic organism passage, and have the route immediately exit the riparian buffer zone.
- Avoid stripping riparian canopy or stream bank vegetation. Crush or shear streamside woody vegetation rather than completely removing it.
- Segregate hydric topsoil from spoil.
- Maintain to the greatest extent practicable natural flow rates and chemical and physical properties of surface and groundwater during work within stream channels, floodplains, and/or riparian areas.
- Armor low-water stream crossings, place properly sized culverts, and span streams as appropriate to protect riparian areas.

- Within 200 feet of a water body, prohibit activities using chemical processes (except for vegetation management) or pollutants. This includes equipment maintenance and the use of staging equipment for refueling. Prohibit the placement of staging areas for refueling, maintenance equipment, materials, operating supplies, and well borings in wetland/riparian areas.
- On stream banks (lotic areas), maintain a minimum six-inch stubble height for the key specie(s) of the riparian area by the end of October or the winter grazing rotation. If the riparian system stability is dependent upon key riparian grasses and forbs, maintain an adequate stubble height to dissipate energy from spring runoff.
- In wet meadows (lentic areas), maintain a minimum four-inch stubble height for the key specie(s) of the riparian area by the end of October.
- Avoid placing well pads near 100-year floodplains.
- Prohibit shot-hole seismic testing near aquatic habitats.
- Locate residue piles (e.g., sawdust, field chipping residue, disposal ponds) away from drainages where runoff may wash residue into water bodies or wetlands.
- Relocate existing roads away from riparian areas as feasible during the requested permitting or authorization of routes. Reclaim abandoned portions of relocated roads back to natural conditions. Recontour routes to natural slopes as feasible, rip compacted soils (except for in close proximity to desirable trees), and seed disturbed areas.
- Regularly monitor seeps and springs near disturbance areas.
- Regularly monitor erosion, degradation and riparian health.

Reclamation

The objectives of temporary or interim reclamation are to restore vegetative cover and a portion of the landform sufficient to maintain healthy, biologically active topsoil; control erosion; and minimize loss of habitat, forage, and visual resources.

The long-term objective of final reclamation is to return the land to a condition approximating that which existed prior to disturbance. This includes restoration of the landform and natural vegetative community, hydrologic systems, visual resources, and wildlife habitats. To ensure that the long-term objective will be reached through human and natural processes, standards will be enforced to meet objectives for site stability, visual quality, hydrological function, and vegetative productivity.

- Maintain healthy, biologically active topsoil through timely reclamation (temporary, interim, final), and by adequately segregating and stockpiling topsoil (designed to maximize surface area to minimize microbial impacts). Stockpiles remaining less than two years facilitate microbial survival and native seed viability.
- As topographically appropriate (not on steep slopes or on minimally sized pads), windrow topsoil around the perimeter of the surface disturbance area to create a berm (no higher than five feet) that extends the viability of the topsoil, as well as limits and redirects storm water runoff. Topsoil will also be windrowed, segregated, and stored along disturbed surfaces or linear features for later spreading across the disturbed corridor during final reclamation. Topsoil berms will be promptly seeded with native species to maintain soil microbial activity, reduce erosion, and minimize weed establishment.
- Implement dust abatement measures during reclamation.
- Reclaim disturbed areas as soon as possible. Promptly reapply topsoil, prepare a seedbed (to retain moisture and foster vegetative growth), apply native weed-free seed of species appropriate for the site's native plant community, and utilize weed-free mulch for erosion control and soil moisture retention at lower elevation sites. Utilize straw mulch only in areas where potential benefits outweigh the potential risks of introducing undesirable plant species.

- Identify, delineate, and segregate all salvaged topsoil and subsoil based on a site-specific soil evaluation, including depth, chemical and physical characteristics. Identify stockpiles with appropriate signage.
- Seed soils to be stored more than one growing season with native weed-free seed of species appropriate for the site's native plant community.
- Protect salvaged soil from erosion, degradation and contamination.
- Prior to reclamation, either adequately treat potentially hazardous materials to remain onsite or dispose of them at an approved disposal area.
- Only utilize topsoil for reclamation, and not for fill or for pipe bedding/padding during backfilling.
- Recontour cut-and-fill slopes to the approximate original contour or consistent with the adjacent topography to maintain the approximate drainage pattern, profile, and dimension of nearby stable naturally functioning drainages.
- Thin and feather existing vegetation in areas where dense vegetation has been removed, and salvage/redistribute cleared trees, debris, and rock over recontoured cut-and-fill slopes or along linear features to: help mitigate the contrast of recontoured slopes; emulate the color, texture, and form of the natural landscape; and foster microclimates that encourage vegetative growth. Material should be placed so that it appears to be naturally deposited.
- Reduce compaction (e.g., ripping) prior to redistributing topsoil.
- Prohibit the placement of topsoil when in a frozen or muddy condition, when the subgrade is excessively wet (i.e., equipment creates ruts greater than six inches), or when the condition may otherwise be detrimental to proper grading or proposed sodding or seeding.
- Test soil samples to determine reclamation potential.
- During reclamation, amend the topsoil as necessary to foster vegetative growth, thereby providing soil stability.
- Redistribute soil materials in a manner that resembles the predisturbance soil profile.
- Prepare a seedbed to provide suitable surface and subsurface physical, chemical and biological properties to support the long-term establishment and viability of the desired plant community.
- Apply BLM-approved native weed-free seed of species appropriate for the site's native plant community.
- Protect the seed and seedling establishment by managing weeds, restricting livestock and wildlife activities through grazing management or fencing/cattleguards/gates, and restricting human activities.
- Minimize erosion and sedimentation on or adjacent to the reclaimed area by: minimizing surface disturbance; minimizing the duration of bare soils; surface roughening for moisture retention; applying mulch; revegetating; constructing/installing water bars/dips, mats/blankets, check dams, sediment basins, silt fences, etc.; and/or phasing reclamation.
- Regularly monitor reclamation success utilizing standard quantitative vegetation sampling protocols, with an adequate sample size to accurately assess plant cover by species across the site.
- Remove temporary BMPs once site stabilization and reclamation efforts have been deemed successful by the BLM.
- Prepare a reclamation plan and weed management plan prior to ground-disturbing activities. Realize that seeding or planting native plants may need to be repeated until deemed successful.
- Develop vegetation objectives that include desired plant composition, canopy and ground cover prior to conducting vegetation treatments or revegetation efforts.
- Utilize the techniques and methods for vegetation treatments identified in the Record of Decision for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007).
- Close and rehabilitate roads quickly when they are no longer needed.
- Build roads to the appropriate standard, no higher than necessary for use and safety, and utilize primitive or two-track roads rather than constructing new roads where feasible.

- Pipelines (and electrical power lines when possible) shall be placed within road corridors to minimize disturbance.
- Minimize disturbance to soil and native vegetation as much as possible.
- Stockpile topsoil for use in final reclamation. Topsoil shall be stored separately from other fill materials.
- When timely natural regeneration of the native plant community is not likely to occur, carefully select species that will not compete with or exclude native botanical resources for revegetation efforts. Bare sites shall be seeded as soon as appropriate to prevent establishment of undesirable plant species.
- Utilize appropriate sagebrush species/subspecies and important understory plants relative to site potential in seedings.
- Ensure that seed used for revegetation as well as straw and hay bales used for erosion control are certified free of noxious weeds.
- Monitor the long-term success of revegetation efforts (according to the Reclamation Plan or Vegetation Objectives of the vegetation treatment plan) to ensure successful establishment of desired species and detect any noxious weed infestations. If revegetation is unsuccessful, continue efforts to establish desired species in disturbed sites.
- In Salt Desert Shrub communities with biological soil crusts, require reclamation that includes, but is not limited to: broadcasting bacterial inoculants, planting native grass, forbs, and shrub seedlings, and installing exclosure fences.
- Road and pipeline reclamation, including seedbed prep and seeding of temporarily disturbed areas will be completed within 30 days following completion of construction.
- In areas that have low reclamation potential or are especially challenging to restore, reclamation plans will be required prior to APD approval. The plan shall contain the following components: detailed reclamation plats, which include contours and indicate irregular rather than smooth contours as appropriate for visual and ecological benefit; timeline for drilling completion, interim reclamation earthwork, and seeding; soil test results and/or a soil profile description; amendments to be used; soil treatment techniques such as roughening, pocking, and terracing; erosion control techniques such as hydromulch, blankets/matting, and wattles; and visual mitigations if in a sensitive VRM area.
- Reclamation, including seeding, of temporarily disturbed areas along roads and pipelines, and of topsoil piles and berms, shall be completed within 30 days following completion of construction. Any such area on which construction is completed prior to December 1 shall be seeded during the remainder of the early winter season instead of during the following spring, unless BLM approves otherwise based on weather. If road or pipeline construction occurs discontinuously (e.g., new segments installed as new pads are built) or continuously but with a total duration greater than 30 days, reclamation, including seeding, shall be phased such that no portion of the temporarily disturbed area remains in an unreclaimed condition for longer than 30 days. BLM may authorize deviation from this requirement based on the season and the amount of work remaining on the entirety of the road or pipeline when the 30-day period has expired.
- All topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. In areas of thin soil, a minimum of the upper 6 inches of surficial material shall be stripped. The BLM may specify a stripping depth during the onsite visit or based on subsequent information regarding soil thickness and suitability.
- If requested by the project lead NRS for a specific pad or group of pads, the operator shall contact the NRS by telephone or email approximately 72 hours before reclamation and reseeding begin. This will allow the NRS to schedule a pre-reclamation field visit if needed to ensure that all parties are in agreement and provide time for adjustments to the plan before work is initiated.
- For cut-and-fill slopes, initial seedbed preparation shall consist of backfilling and recontouring to achieve the configuration specified in the reclamation plan. For compacted areas, initial seedbed

preparation shall include ripping to a minimum depth of 18 inches, with a maximum furrow spacing of 2 feet. Where practicable, ripping shall be conducted in two passes at perpendicular directions. Following final contouring, the backfilled or ripped surfaces shall be covered evenly with topsoil.

- Final seedbed preparation shall consist of scarifying (raking or harrowing) the spread topsoil prior to seeding. If more than one season has elapsed between final seedbed preparation and seeding, and if the area is to be broadcast-seeded or hydroseeded, this step shall be repeated no more than 1 day prior to seeding to break up any crust that has formed.
- Interim reclamation includes recontouring and revegetating the entire portion of the disturbed area except that part of the well pad needed for production activities.
- It will be completed within six months following completion of the last well planned for the pad or after a year has passed with no new wells drilled on the pad. All areas unnecessary to production activities will be revegetated, including the area within the remaining rig anchors. In special cases, an exception to this will be requested.
- Before interim reclamation is scheduled, the operator will meet with BLM to inspect the disturbed area, review the existing reclamation plan, and agree upon any revisions to it.
- All parts of the area unnecessary for long-term operations will be reshaped to blend with natural topography, covered evenly with topsoil and a seedbed prepared.
- For cut-and-fill slopes, initial reclamation will typically consist of moving fill material back into cuts, back-filling and reshaping to achieve the configuration specified in the reclamation plan. Compacted areas will be well ripped in two passes at perpendicular directions. In fragile or loose soils, compaction techniques such as tread-walking may be necessary to prevent high erosion hazard. Topographic contours will be reshaped to blend with natural topography. These may include berms and swales to manage water drainage, support revegetation, mitigate visual impacts and maximize natural appearances.
- Seedbed Preparation. Good seedbed preparation is key to soil stabilization, moisture infiltration, and improving the chances for revegetation success.
- Following contouring, backfilled or ripped surfaces will be covered evenly with topsoil.
- Within 24 hours of broadcast seeding, the spread topsoil will be roughened by a method such as pitting, raking or harrowing before seeding, to break up any crust that has formed and ensure good seed-to-soil contact.
- To control erosion and enhance vegetative establishment on slopes steeper than 3:1, or to create a more natural looking landscape in areas of visual sensitivity, or if directed by the BLM, the operator shall implement measures following seedbed preparation (when broadcast-seeding or hydroseeding is to be used) to create small depressions to enhance capture of moisture and establishment of seeded species. Depressions shall be no deeper than 1 to 2 inches and shall not result in piles or mounds of displaced soil. Excavated depressions shall not be used unless approved by the BLM for the purpose of erosion control on slopes. Where excavated depressions are approved by the BLM, the excavated soil shall be placed only on the downslope side of the depression.
- Requests to use soil amendments, including fertilizer and soil conditioners, will be submitted to the BLM for approval. Submittal will include basic information on the amendment and the purpose of its use.
- If directed by the BLM, the operator shall conduct soil testing prior to reseeding to identify if and what type of soil amendments may be required to enhance revegetation success. At a minimum, the soil tests shall include texture, pH, organic matter, sodium adsorption ratio (SAR), cation exchange capacity (CEC), alkalinity/salinity, and basic nutrients (nitrogen, phosphorus, potassium [NPK]). Depending on the outcome of the soil testing, the BLM may require the operator to submit a plan for soil amendment. Any requests to use soil amendments not directed by the BLM shall be submitted to the CRVFO for approval.

- Seed Mixes. Seed mixes will typically consist of native, early-succession species, or species with the ability to establish quickly in disturbed soil areas. Non-native species shall not be used, except under rare circumstances and with prior written approval from the BLM.
- Seed mix composition will be calculated based on the number of Pure Live Seed per pound rather than percentage by weight. Seeding rate in pounds per acre will be based on the total number of Pure Live Seeds per square foot.
- Weed free seed will be used. It will contain no prohibited or restricted noxious weed seeds and no more than 0.5 percent by weight of any other weed seeds. Seed may contain up to 2.0 percent of "other crop" seed by weight, including the seed of other agronomic crops and native plants; however, a lower percentage of other crop seed is recommended. To maintain quality, purity, germination, and yield, only tested, certified seed for the current year, with a minimum germination rate of 80 percent and a minimum purity of 90 percent will be used unless otherwise approved by BLM in advance of purchase. Seed shall be viability-tested in accordance with State law(s) and within nine months before purchase.
- Seed mixes for temporary use must contain only native species, except under rare circumstance and with prior written approval from the BLM.
- For private surfaces, the operator shall use a BLM-approved native seed mix unless specified otherwise by the private landowner.
- Seed tags or other official documentation of the seed mix will be supplied to the BLM for approval at least 14 days before the date of proposed seeding. Seed that does not meet the above criteria will not be applied to public lands. A Sundry Notice describing the completed work, the weed-free certification, and the seed tag(s) will be submitted BLM within 30 days after seeding.
- Seeding Procedures:
- Seeding will be conducted no more than 24 hours following completion of final seedbed preparation (see Seedbed Prep).
- Where practical, seed will be planted by drill-seeding to a depth of 0.25 to 0.5 inch along the contour of the site. Drill seeding will be followed by culti-paction to enhance seed-to-soil contact and prevent losses of both. Where drill-seeding is impracticable, seed may be installed by broadcast-seeding at twice the drill-seeding rate, followed by raking or harrowing to provide 0.25 to 0.5 inch of soil cover. An exception to these seeding requirements shall be made for seeding of sagebrush. Sagebrush seeding shall occur prior to winter snowfall, or on top of snow. Sagebrush may be sown either by broadcast seeding, or, if not on snowpack, by placing the seed in the fluffy seed box of a seed drill, with the drop tube left open to allow seed to fall out on the ground surface.
- Hydro-seeding and hydro-mulching may be used in temporary seeding or in areas where drill-seeding or broadcast-seeding/ raking are impracticable. Hydro-seeding and hydro-mulching must be conducted in two separate applications to ensure adequate seed-to-soil contact.
- If interim revegetation is unsuccessful, reseedings will be repeated annually until satisfactory vegetative cover has been achieved. Requirements for reseeding of temporary areas will be considered on a case-by-case basis. Seeding will be considered successful when the site is protected from erosion and revegetated with a vigorous, self-sustaining, and diverse cover of native (or otherwise approved) plant species. BLM shall not require reseeding during periods that have proven less than optimal.
- Mulch shall be applied within 24 hours following completion of seeding in project areas within pinyon-juniper, sagebrush shrubland, and/or salt desert shrub habitat types. Mulch may consist of either hydromulch or of certified weed-free straw or certified weed-free native grass hay crimped into the soil. Mulch shall not be used within mountain shrub or spruce-fir forest habitat types, unless requested or approved by the BLM.
- Hydro-mulching may be used in areas of interim reclamation where crimping is impractical, in areas of interim reclamation that were hydroseeded, and in areas of temporary seeding regardless of seeding method.

- Mulch will not be applied in areas where erosion potential necessitates use of a biodegradable erosion-control blanket (straw matting).
- Cut and fill slopes will be protected against erosion by contour grading, microbasins or other measures approved by the BLM. Well anchored BMPs such as biodegradable matting, weed-free bales or wattles may also be used on cut-and-fill slopes and along drainages to protect against soil movement.
- The reclaimed pad will be protected from disturbance by a fence to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. Seeded species will be considered firmly established when perennial grass and forb species are at least 80% cover of that of the surrounding or reference area.
- Monitoring. Because weed and reclamation management activities are components of a long-term process, monitoring and reporting are integral to and long-term commitment to land health.
- The operator shall conduct annual monitoring surveys of all sites categorized as "operator reclamation in progress" and shall submit an annual monitoring report of these sites, including a description of the monitoring methods used, to the BLM by December 31 of each year. The monitoring program shall use the four Reclamation Categories defined in Appendix I of the 1998 DSEIS to assess progress toward reclamation objectives. The annual report shall document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report shall identify appropriate corrective actions. Upon review and approval of the report by the BLM, the operator shall be responsible for implementing the corrective actions or other measures specified by the BLM
- Monitoring shall be performed using a standard quantitative vegetation sampling protocol, with a sampling pattern and sufficient to represent the vegetative diversity across the site. Sampling shall include percent canopy cover by plant species, as well as percent bare ground.
- All sites considered as "operator reclamation in progress" will be routinely monitored for reclamation success. Reports will be submitted to the BLM by December 1 of each year. Annual reports will include whether accomplishment of objectives appears likely and of not, what corrective actions are proposed.
- All sites will be routinely monitored for the presence of noxious weeds or other undesirable plant species as set forth in the joint BLM/US Forest Service Noxious and Invasive Weed Management Plan for Oil and Gas Operators. Pesticide Use Proposals will be approved by the BLM before application of herbicides. Annual weed monitoring reports shall be submitted to the BLM by December 1. They will include weed species found (listed by common names), total acres infested with weeds, total acres treated, treatment methods, and total pounds of active ingredient of pesticides applied. All Noxious Weed Inventory and Pesticide Application records for that year will be included with the report. Weed reports shall include BLM Pesticide Application Records (PARs) for all weed treatments, as well as GPS data with data fields for all weed treatments sufficient to meet the requirements of the BLM NISIMS database.
- To the extent practical, existing vegetation shall be preserved when clearing and grading for pads, roads, and pipelines. Cleared trees and rocks may be salvaged for redistribution over reshaped cut-and-fill slopes or along linear features.
- Above-ground facilities will be painted a non-reflective natural color selected to minimize contrast with adjacent vegetation or rock outcrops. Colors may be specified by the BLM on a project-by-project basis.
- Adaptive management techniques may be applied before or after construction to mitigate straight-line visual contrast effects of pad margins, cut and fill slopes, pipeline alignments or other cleared vegetation. This could include additional tree removal along contrasting edges, to create irregularly shaped openings or more natural-looking mosaic patterns, or treating surfaces to mitigate visual contrasts in color or surface texture.

- Trees and vegetation will be left along the edge of surface disturbance whenever feasible to provide screening.
- To help mitigate the contrast of recontoured slopes, reclamation will include measures to feather cleared lines of vegetation and to save and redistribute cleared trees, debris, and rock over recontoured cut and fill slopes.
- To reduce the view of project facilities from visibility corridors and private residences, facilities will not be placed in visually exposed locations (such as ridgelines and hilltops).
- Project facilities will be clustered and placed away from cut slopes and fill slopes to allow the maximum recontouring of cut and fill slopes.
- All long-term above ground structures will be painted in a non-reflective finish to blend with the environment. Colors will be selected (from the BLM "Standard Environmental Colors") in the field at the proposed project location, considering viewer's likely observation points and the time of year with the greatest number of viewers. Selected colors will be one to shades darker than those naturally occurring in the background landscape.
- Projects should be located to take advantage of existing vertical features, such as landforms or existing stands of vegetation to provide visually screening.
- Projects should not be located in visually exposed locations, such as ridgelines and hilltops.
- Projects should be located in areas that will minimize the amount of cut-and-fill needed to meet natural grade.
- Linear disturbances (roads and pipelines) should follow the natural contours of the landscape as much as possible.
- Project design should take into consideration any existing vegetation surrounding the project that can be used for visual screening. Care should be taken to preserve the integrity of the vegetation and the vegetation should remain standing and undamaged when the cut-and-fill slopes are recontoured.
- Thinning and feathering of existing vegetation may also be used in areas where clearing within dense vegetation is required. Thinning and feathering will reduce the hard line between new construction and existing vegetation and will emulate the forms of natural clearings.
- Project facilities should be placed to maximize recontouring of the cut-and-fill slopes and interim reclamation. Facilities should be oriented in the direction that is least visually obtrusive and should be clustered to reduce the overall impact and the area that will need to be visually mitigated. Facilities should be located away from the cut-and-fill slopes and, if possible, near a road to maximize the total surface area that can be reclaimed.
- Cut-and-fill slopes should be recontoured to the approximate original contour or consistent with the adjacent topography so that the reclaimed landscape features blend into the natural surroundings.
- Berms may be utilized to provide visual screening, but should be used only when it makes sense when viewing the surrounding natural environment and should blend with the adjacent topography.
- Cleared vegetation and rocks salvaged during construction should be salvaged and redistributed over reshaped cut-and-fill slopes or along linear features to emulate the color and texture closer to that of the natural landscape and to help create microclimates to encourage vegetation growth. The material should be placed so that it appears to be naturally deposited.

Site Stabilization, Reclamation and Monitoring

- During interim reclamation contour land forming will be used to create a visual barrier to the permanent structures location on the site.
- Re-topsoil and revegetate access road cut & fill slopes, backslopes and road shoulders, and borrow ditches. Also, revegetating the travel surface of surfaced roads and turnarounds, where practical. With low traffic roads, this will result in a hardpan, two-track road that is stable and requires less maintenance.

- Reclamation plans would contain specifics such as elevation, pre-disturbance plant community species and habitat type, soil type, soil testing, topsoil management, seed mix and/or container stock species, mulch, site preparation, soil amendments including fertilizer, mycorrhizal and/or bacterial inoculum, organic material and/or carbon amendments, etc.
- Require that all mulch used in reclamation activities be certified weed free.

Special Status Species – General

- The CRVFO will consult agency species management plans and other conservation plans as appropriate to guide management and devise mitigation measures when needed. Examples of these plans include, but are not limited, to the Colorado Wildlife Action Plan, Colorado Sagebrush: A Conservation Assessment and Strategy, National, range-wide, statewide and local working group conservation plans for Gunnison and greater sage grouse, Sharing the land with pinyon-juniper birds, Birds in a sagebrush sea: managing sagebrush habitats for bird communities, North American Landbird Conservation Plan, North American Waterbird conservation Plan, National and Colorado Partners in flight Bird Conservation Plans, Colorado Gunnison's and White-tailed Prairie Dog Conservation Strategy and Recovery plans for federally listed species, and Colorado Rare Plant Conservation Initiative's Recommended Best Management Practices for Plants of Concern.
- Lessees will be notified when a lease parcel contains potential habitat for threatened, endangered, proposed, candidate or BLM sensitive plants, fish and wildlife.
- Limit flaring operations when well pads are within 100 m of occupied special status species habitat.
- Surveys for raptor nests, sensitive plant and animal species and cultural resources will be conducted prior to construction activities following BLM survey standards. Survey results will be submitted to the BLM for analysis and recommendations before project approval.

Special Status Species – Plants

- Prior to approving any ground-disturbing activities, suitable habitat for special status plants will be identified based on existing plant location records, soil or geological mapping, USFWS Section 7 range maps, aerial photos, and/or site inventories. In areas identified as suitable habitat, surveys for special status species will be performed prior to conducting any ground disturbance. Surveys will take place when the plants can be positively identified, usually during the appropriate flowering periods. Surveys will be performed by qualified field botanists/biologists who will provide documentation of their qualifications, experience and knowledge of the species prior to starting work. Surveys will be performed in compliance with the latest CRVFO survey protocols.
- For surface-disturbing activities with the potential to affect special status species, surveys in core habitat for T&E species will generally extend at least 200 meters (656 feet) beyond the edge of disturbance and at least 100 meters (328 feet) beyond the edge of disturbance outside of core habitat. For linear features such as roads and pipelines, surveys will extend at least 100 meters (328 feet) beyond the edge of the proposed ground disturbance along each side of the right of way. If special status plants are found within the survey area, the contractor will endeavor to determine the complete areal extent of the occurrence and the approximate number of individuals within the occurrence.
- For Colorado hookless cactus and other federally listed, proposed or candidate plant species, surface-disturbing activities will be avoided within 200 meters of current or historically occupied plant habitat wherever possible and where geography and other resource concerns allow. (Historically occupied habitat is habitat where plants were known to occur within the past 15-20 years and a viable seedbank may remain). Fragmentation of existing populations and identified areas of suitable habitat will be avoided wherever possible.
- For BLM sensitive species surface-disturbing activities will be avoided within 100 meters of occupied plant habitat wherever possible and where geography and other resource concerns allow.

Fragmentation of existing populations and identified areas of suitable habitat will be avoided wherever possible.

- Where surface-disturbing activities are allowed within 100 meters of occupied habitat for special status plant species, unauthorized disturbance of plant habitat will be avoided by on-site guidance from a biologist, and by fencing the perimeter of the disturbed area, or such other method as agreed to by the Fish and Wildlife Service. In such instances, a monitoring plan approved by the Service will be implemented for the duration of the project to assess impacts to the plant population or seed bank. If detrimental effects are detected through monitoring, corrective action will be taken through adaptive management.
- Surface disturbance closer than 20 meters to a listed plant will be considered an adverse effect. Mitigating measures within this narrow buffer are very important and helpful to individual plants, but it is unlikely that all adverse effects can be fully mitigated within this distance. Some adverse effects due to dust, dust suppression, loss of pollinator habitat, and toxic spills will likely remain. There are two possible exceptions to this rule of thumb: 1) The new disturbance is no closer to a listed plant than preexisting disturbance and no new or increased impacts to the listed plant are expected; or 2) the listed plant is screened from the proposed disturbance (e.g., tall, thick vegetation or a berm acts as a screen or effective barrier to fugitive dust and other potential impacts).
- Transplantation of potentially affected plants will not be used as a rationale to defend a “not likely to adversely affect” or a “no effect” determination for listed plant species.
- Protect pollinator species for endangered or threatened species by incorporating the standard operating procedures found in the Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007).
- Prepare a reclamation plan and weed management plan prior to ground-disturbing activities. Reclamation seeding within special status plant habitat should consist of native species only. If possible, seeds will be from locally collected genotypes. Realize that seeding or planting native plants may need to be repeated until deemed successful by the Authorized Officer.
- Rigorously monitor and control all infestations of noxious weeds and other non-native invasive plant species in and adjacent to occupied habitat for special status plants.
- Control noxious weeds using integrated techniques. Limit chemical control in areas with special plant species to avoid damage to non-target species. Mechanical or chemical control in and near special status plant habitat shall only be implemented by personnel familiar with the rare plants.
- Broadcast spraying of herbicides, either by ground or aerial methods, shall comply with the Conservation Measures from the Biological Assessment for the Vegetation EIS. The conservation measures are specific to the herbicide to be used, the desired mode of application, and the conditions of the site. Manual spot treatment of undesirable vegetation can occur within the listed buffer zones if it is determined by local biologists that this method of herbicide application would not pose risks to listed or proposed plant species in the vicinity. Additional precautions during spot treatment of vegetation within these buffers shall be employed to avoid pesticide drift in those cases.
- Prevent plumes of dust and particulate matter from impacting special status plants. While new roads should not be built within 200 meters of special status plants, preexisting roads with an expected increase in traffic should be graveled (or paved) in these areas. The operator is encouraged to apply water for dust abatement to such areas during the flowering period. Magnesium chloride or other additives should not be used in special status plant habitat.
- The use of deicers and dust suppressants, other than water, within 100 meters of roadside occurrences of special status plant species will require prior approval from the BLM.
- Prohibit collection of rare plants or plant parts, except as permitted by the BLM Authorized Officer for scientific research.

- When not needed for other resource uses, close and reclaim roads that are directly or indirectly impacting special status plant species to minimize disturbance, habitat fragmentation, and loss of pollinator habitat.
- Surface disturbances (including wildfire and prescribed fires) within lower-elevation salt desert shrub and pinyon-juniper woodland habitat should review the need for cheatgrass control and/or restoration seeding. Seeding should emphasize locally-adapted native species (or locally collected ecotypes, when available) that will not outcompete the special status plants.
- Protection of T & E plant occurrences from use of non-native seed with a 1 km restriction buffer around TES plant occurrences where native seed is required
- Limit flaring operations when well pads are within 100m of occupied special status plant habitat.
- Surface disturbances (including wildfire and prescribed fires) within potential habitat for listed or proposed plant species (i.e. salt desert shrub and Wyoming big sagebrush habitat west of Rifle) should review the need for cheatgrass control and/or seeding. Seeding should emphasize locally-adapted native species (or locally collected ecotypes, when available) that will not outcompete the special status plants.
- Prior to approving any ground-disturbing activities, suitable habitat for special status plants will be identified based on existing plant location records, soil or geological mapping, aerial photos, and/or site inventories. In areas identified as suitable habitat, surveys for special status species will be performed prior to conducting any ground disturbance. Surveys will take place when the plants can be positively identified, usually during the appropriate flowering periods. Surveys will be performed by qualified field botanists/biologists who will provide documentation of their qualifications, experience and knowledge of the species prior to starting work.
- For Colorado hookless cactus and other federally listed, proposed or candidate plant species, surface-disturbing activities will be avoided within 200 meters of occupied plant habitat1 wherever possible and where geography and other resource concerns allow. Fragmentation of existing populations and identified areas of suitable habitat will be avoided wherever possible.
- Where development is allowed within 100 meters of occupied habitat for listed, proposed, candidate or BLM sensitive species, unauthorized disturbance of plant habitat will be avoided by on-site guidance from a biologist, and by fencing the perimeter of the disturbed area, or such other method as agreed to by the Fish and Wildlife Service. In such instances, a monitoring plan approved by the Service will be implemented for the duration of the project to assess impacts to the plant population or seed bank. If detrimental effects are detected through monitoring, corrective action will be taken through adaptive management.
- Surface disturbance closer than 20 meters to a listed plant will be considered an adverse effect. Mitigating measures within this narrow buffer are very important and helpful to individual plants, but we do not expect that all adverse effects can be fully mitigated within this distance. Some adverse effects due to dust, dust suppression, loss of pollinator habitat, and toxic spills will likely remain. There are two possible exceptions to this rule of thumb: 1) The new disturbance is no closer to a listed plant than preexisting disturbance and no new or increased impacts to the listed plant are expected; or 2) the listed plant is screened from the proposed disturbance (e.g., tall, thick vegetation or a berm acts as a screen or effective barrier to fugitive dust and other potential impacts).
- Transplantation of potentially affected plants will not be used as a rationale to defend a “not likely to adversely affect” or a “no effect” determination for listed plant species.
- Protect pollinator species for endangered or threatened species by incorporating the standard operating procedures found in the Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM 2007).
- When not needed for other resource uses, close and reclaim roads that are directly or indirectly impacting special status plant species to minimize disturbance, habitat fragmentation, and loss of pollinator habitat.

- All weed management actions will comply with the Conservation Measures from the Biological Assessment for the Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (June 2007).
- Within mapped occupied and suitable habitat for Colorado hookless cactus, DeBeque phacelia or Parachute penstemon, wildland fire management actions will be conducted in the following manner:
    - Minimize surface disturbance by using retardant, water, engines/wet lines, etc in known habitat rather than dozers or hand crews.
    - Unless firefighter safety is jeopardized, construct fire line outside the perimeter of known cactus populations.
    - Avoid cross-country use of motorized vehicles and mechanical equipment within known populations of federally listed or proposed plants.

Visual Resource Management

- Limit surface disturbance to the minimum area necessary
- Use natural features such as trees, rock formations, or terrain, to conceal disturbed areas. Constructed berms that blend with the terrain may be useful for concealment.
- Minimize contrast of the structure or activity with the surrounding terrain by using the visual resource management principles of form, line, color, and texture.
- Paint structures a color that blends with the surrounding vegetation.
- Remove unnecessary equipment, structures, and debris from the site that are not necessary for daily operation.
- All new surface-disturbing projects or activities, regardless of size or potential impact, will incorporate visual design considerations during project design as a reasonable attempt to meet the Visual Resource Management (VRM) class objectives for the area and minimize the visual impacts of the proposal. Visual design considerations will be incorporated by:
    a. Using the VRM contrast rating process (required for proposed projects in highly sensitive areas, high impact projects, or for other projects where it appears to be the most effective design or assessment tool), or by
    b. Providing a brief narrative visual assessment for all other projects that require an environmental assessment or environmental impact statement.
    c. Measures to mitigate potential visual impacts could include the use of natural materials, screening, painting, project design, location, or restoration (See Appendix H; BLM Handbook H-8431-1, Visual Resource Contrast Rating; or online at http://www.blm.gov/nstc/VRM/8431.html, for information about the contrast rating process).

- All new roads will be designed and constructed to a safe and appropriate standard, “no higher than necessary” to accommodate intended vehicular use. Roads will follow the contour of the land where practical. Existing oil and gas roads that are in eroded condition or contribute to other resource concerns will be brought to BLM standards within a reasonable period of time.
- Impacts to dark night skies will be prevented or reduced through the application of specific mitigation measures identified in activity level planning and NEPA level review. These measures may include directing all light downward, using shielded lights, using only the minimum illumination necessary, using lamp types such as sodium lamps (less prone to atmospheric scattering), using circuit timers, and using motion sensors.
- Any facilities authorized will use the best technology available to minimize light emissions
- Any new permits/authorizations, including renewals, will be stipulated to use the best technology available to minimize light emissions as compatible with public health and safety.
- Restrict visual intrusion in VRM Class I and II areas and within 0.25-mile of historic trails.
- Screening facilities from view and avoiding placement of production facilities on steep slopes, hilltops, and ridgelines.

- Paint all facilities a color that best allows the facility to blend with the background (Operator-committed BMP).
- Gravel of road color shall be similar to adjacent dominant soil colors.
- Reduce impacts on visual resource management class II and class III areas.
- Bury distribution powerlines and flow lines in or adjacent to access roads.
- Repeat form, line, color, and texture elements to blend facilities with the surrounding landscape
- All aboveground facilities including power boxes, building doors, roofs, and any visible equipment will be painted a color selected from the latest national color charts that best allows the facility to blend into the background.
- Perform final reclamation recontouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography.
- To the extent opportunities are practicable, extreme visual contrast created by past management practices or human activities will be minimized. Examples include right-of-way amendments, mineral material sites, abandoned mines, and areas impacted by unauthorized off-road driving.
- Reclaim unused well pads within one year.
- Final reclamation of all oil and gas disturbance will involve re-contouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography and revegetating all disturbed areas
- The use of submersible pumps will be strongly encouraged, especially in VRM Class I, II or III areas or any area visible by the visiting public.
- The use of partial or completely below-grade wellheads will be strongly encouraged in high visibility areas as well as VRM Class I, II or III areas.
- The placement of production facilities on hilltops and ridgelines will be prohibited where they are highly visible.

Livestock Management

- Implement management tools such as fencing, stock ponds, and salt licks to manage livestock distribution as needed, and discourage grazing in unwanted areas such as riparian vegetation and sensitive wildlife habitat.
- Adjust livestock grazing in heavily used areas to allow native vegetation a period of recovery.
- Restoring temporarily disturbed areas, using native species, planting woody species, or use a biodegradable erosion-control fabric to enhance germination and seedling establishment
- Drill-seed at a rate of Pure Live Seeds per square foot as needed to establish healthy vegetation (rate may be double for broadcast-seeding or hydroseeding) and be preceded by adequate site preparation, including decompaction of soil and control of annual or biennial weeds
- Fence revegetated areas to exclude livestock for at least two full growing seasons
- Use culverts or hardened crossings for use of roads that cross streams
- Use erosion control devices around culverts as needed to reduce erosion and gulley formation.
- Construct fences and gates to ensure that livestock do not enter areas being protected for another resource that would be diminished by grazing or trampling
- Construct alternative water sources to disperse livestock use and reduce dependence on natural streams and riparian corridors

Noxious and Invasive Weed Management

- Rehabilitation disturbed sites as quickly as possible following interim or final rehabilitation guidelines as appropriate.
- Allow on supplementary livestock feed and revegetation mulches that are certified weed free.
- Clean vehicles regularly using water or air spray to reduce the chance of transporting weed seed from affected areas to non-affected areas.

- All weed management actions will comply with the Conservation Measures from the Biological Assessment for the Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (June 2007).

Pre-Project Planning

- Environmental analyses for projects, vegetation treatments, and maintenance programs should assess weed risks, analyze high-risk sites for potential weed establishment and spread, and identify prevention practices.
- Determine site-specific restoration and monitoring needs and objectives at the onset of project planning.
- Inventory all proposed projects for weeds prior to ground-disturbing activities. If weeds are found, they should be treated (if the timing is appropriate) or removed (if seeds are present) to limit weed seed production and dispersal.
- Wash vehicles and other equipment to reduce the spread of noxious weeds from weed-contaminated areas to non-contaminated areas. Portable wash stations would be ideal in areas of heavy oilfield traffic and in areas where noxious weeds are an issue.
- Locate and use weed-free project staging areas. Avoid or minimize travel through weed infested areas, or restrict travel to periods when spread of disseminules is least likely.
- Identify sites where equipment can be cleaned. Remove mud, dirt, and plant parts from project equipment before moving it into a project area. Seeds and plant parts should be collected and incinerated when possible.
- If certified weed-free gravel pits become available in the county, the use of certified weed-free gravel will be required wherever gravel is applied to public lands (e.g., roads).
- Maintain stockpiled, non-infested material in a weed-free condition. Topsoil stockpiles should be promptly revegetated with native species to maintain soil microbial health and reduce the potential for weeds.
- Use native seed mixes appropriate to the ecological site and those species that are demonstrated to be best at inhibiting weed establishment, except when other resource values dictate a less-competitive mix.
- A certified seed laboratory shall test each seed lot according to the Association of Official Seed Analysts standards (which include an all-state noxious weed list) and provide documentation of the seed inspection test. The seed shall contain no prohibited or restricted noxious weed seeds and shall contain no more than 0.5 percent by weight of other weed seeds. Seed may contain up to 2.0 percent of “other crop” seed by weight, including the seed of other agronomic crops and native plants; however, a lower percentage of other crop seed is recommended.

Project Implementation

- Minimize soil disturbance. To the extent practicable, native vegetation should be retained in and around project activity areas, and soil disturbance kept to a minimum.
- If a disturbed area must be left bare for a considerable length of time, cover the area with weed barrier until revegetation is possible.
- Clean all equipment before leaving the project site when operating in weed infested areas.
- Inspect, remove, and properly dispose of weed seed and plant parts found on clothing and equipment. Proper disposal means bagging and incinerating seeds and plant parts or washing equipment in an approved containment area.
- Require pressure-washing or an equivalent seed removal process on all vehicles and equipment prior to entry of all ground-disturbing project areas, and upon exit of project areas infested with noxious weeds.
- Revegetate disturbed soil where appropriate to optimize plant establishment for that specific site. Define revegetation objectives for each site. Revegetation may include topsoil replacement, planting,

seeding, fertilization, and certified weed-free mulching as necessary. Native materials should be used except under rare circumstances and with prior written approval from the BLM.

- Monitor sites where seed, hay, straw, or mulch has been applied. Eradicate weeds before they form seed. In contracted projects, contract specifications could require that the contractor control weeds for a specified length of time.
- Inspect and document all ground-disturbing activities in noxious weed infested areas for at least three growing seasons following completion of the project. For ongoing projects, continue to monitor until reasonably certain that no weeds are present. Plan for follow-up treatments based on inspection results.

Roads and Utilities - Pre-Project Planning

- Communicate with contractors, local weed districts or weed management areas about projects and best management practices for prevention.
- Remove mud, dirt, and plant parts from project equipment before moving it into a project area. Seeds and plant parts shall be collected and incinerated when practical, or washed off in an approved containment area.
- Avoid acquiring water for road dust abatement where access to water is through weed-infested sites.
- Treat weeds on travel rights-of-ways before seed formation so construction equipment doesn't spread weed seed.
- Schedule and coordinate blading or pulling of noxious weed-infested roadsides or ditches in consultation with the local weed specialist. When it is necessary to blade weed-infested roadsides or ditches, schedule the activity when disseminules are least likely to be viable.

Roads and Utilities - Project Implementation

- Retain shade to suppress weeds by minimizing the removal of trees and other roadside vegetation during construction, reconstruction, and maintenance; particularly on south aspects.
- Do not blade or pull roadsides and ditches infested with noxious weeds unless doing so is required for public safety or protection of the roadway. If the ditch must be pulled, ensure weeds remain onsite. Blade from least infested to most infested areas.

Roads and Utilities - Post-Project

- Clean all equipment (power or high-pressure cleaning) of all mud, dirt, and plant parts before leaving the project site if operating in areas infested with weeds. Seeds and plant parts shall be collected and incinerated when possible.
- When seeding has been specified for construction and maintenance activities, seed all disturbed soil (except travel route) soon after work is completed.
- Use a certified weed-free seed mix suitable for local environmental conditions that includes fast, early growing native species to provide quick revegetation. Consider applying weed-free mulch with seeding in salt desert shrub, sagebrush, and pinyon-juniper woodland habitat types.
- Periodically inspect roads and rights-of-way for noxious weeds. Train staff to recognize weeds and report locations to the local weed specialist. Follow-up with treatment when needed.
- When reclaiming roads, treat weeds before roads are made impassable. Inspect and follow up based on initial inspection and documentation.
- To avoid weed infestations, create and maintain healthy plant communities whenever possible, including utility rights-of-ways, roadsides, scenic overlooks, trailheads, and campgrounds.

Recreational Activities

- Inspect and clean mechanized trail vehicles of weeds and weed seeds.
- Wash boots and socks before hiking into a new area. Inspect and clean packs, equipment, and bike tires.

- Avoid picking unidentified "wildflowers" and discarding them along trails or roadways.
- Maintain trailheads, campgrounds, visitor centers, boat launches, picnic areas, roads leading to trailheads, and other areas of concentrated public use in a weed-free condition. Consider high-use recreation areas as high priority sites for weed eradication.
- Sign trailheads and access points to educate visitors on noxious and invasive weeds and the consequences of their activities.
- In areas susceptible to weed invasion, limit vehicles to designated, maintained travel routes. Inspect and document travel corridors for weeds and treat as necessary.
- Encourage use of pelletized feed for backcountry horsemen and hunters. Pelletized feed is unlikely to contain weed seed.

Outfitting / Recreation Pack and Saddle Stock Use

- Allow only certified weed-free hay/feed on BLM lands.
- Inspect, brush, and clean animals (especially hooves and legs) before entering public land. Inspect and clean tack and equipment.
- Regularly inspect trailheads and other staging areas for backcountry travel. Bedding in trailers and hay fed to pack and saddle animals may contain weed seed or propagules.
- Tie or contain stock in ways that minimize soil disturbance and prevent loss of desirable native species.
- Authorized trail sites for tying pack animals should be monitored several times per growing season to quickly identify and eradicate new weeds. Trampling and permanent damage to desired plants are likely. Tie-ups shall be located away from water and in shaded areas where the low light helps suppress weed growth.
- Educate outfitters to look for and report new weed infestations.

Wildlife Habitat Projects

- Incorporate weed prevention into all wildlife habitat improvement project designs.

Watershed Management

- Frequently and systematically inspect and document riparian areas and wetlands for noxious weed establishment and spread. Eradicate new infestations immediately since effective tools for riparian-area weed management are limited.
- Promote dense growth of desirable vegetation in riparian areas (where appropriate) to minimize the availability of germination sites for weed seeds or propagules transported from upstream or upslope areas.
- Address the risk of invasion by noxious weeds and other invasive species in watershed restoration projects and water quality management plans.

Grazing Management

- Consider prevention practices and cooperative management of weeds in grazing allotments. Prevention practices may include:
    - Altering season of use
    - Minimizing ground disturbance
    - Exclusion
    - Preventing weed seed transportation
    - Maintaining healthy vegetation
    - Revegetation
    - Inspection
    - Education
    - Reporting

- When authorized, provide certified weed-free supplemental feed in a designated area so new weed infestations can be detected and treated immediately. Pelletized feed is unlikely to contain viable weed seed. (Supplemental feeding of livestock on public land is not authorized by regulation, unless approved by the authorized officer.)
- If livestock may contribute to seed spread in a weed-infested area, schedule livestock use prior to seed-set or after seed has fallen.
- If livestock were transported from a weed-infested area, annually inspect and treat entry units for new weed infestations.
- Consider closing infested pastures to livestock grazing when grazing will either continue to exacerbate the condition or contribute to weed seed spread. Designate those pastures as unsuitable range until weed infestations are controlled.
- Manage the timing, intensity (utilization), duration, and frequency of livestock activities to maintain the competitive ability of desirable plants and retain litter cover. The objective is to prevent grazers from selectively removing desirable plant species and leaving undesirable species.
- Exclude livestock grazing on newly seeded areas with fencing to ensure that desired vegetation is well established, usually after 2-3 growing seasons.
- Reduce ground disturbance, including damage to biological soil crusts. Consider changes in the timing, intensity, duration, or frequency of livestock use; location and changes in salt grounds; restoration or protection of watering sites; and restoration of yarding/loafing areas, corrals, and other areas of concentrated livestock use.
- Inspect areas of concentrated livestock use for weed invasion, especially watering locations and other sensitive areas that may be particularly susceptible to invasion. Inventory and manage new infestations.

Fire Management Plans

- Prescribed fire plans should include pre-burn invasive weed inventory and risk assessment components as well as post-burn mitigation components.
- Integrate prescribed fire and other weed management techniques to achieve best results. This may involve post-burn herbicide treatment or other practices that require careful timing.
- Include weed prevention and follow-up monitoring in all prescribed fire activities. Include in burn plans the possibility for post-burn weed treatment.
- For prescribed burns, inventory the project area and evaluate potential weed spread with regard to the fire prescription. Areas with moderate to high weed cover should be managed for at least 2 years prior to the prescribed burn to reduce the number of weed seeds in the soil. Continue weed management after the burn.
- Ensure that a weed specialist is included on a Fire Incident Management Team when wildfire or prescribed operations occur in or near a weed-infested area. Include a discussion of weed prevention operational practices in all fire briefings.
- Use operational practices to reduce weed spread (e.g., avoid weed infestations when locating fire lines).
- Identify and periodically inspect potential helispots, staging areas, incident command posts, and base camps and maintain a weed-free condition. Encourage network airports and helibases to do the same.
- Develop a burned-area integrated weed management plan, including a monitoring component to detect and eradicate new weeds early.

Fire-Fighting

- Ensure that all equipment (including borrowed or rental equipment) is free of weed seed and propagules before entering incident location.
- When possible, use fire suppression tactics that reduce disturbances to soil and vegetation, especially when creating fire lines.

- Use wet or scratch-lines where possible instead of fire breaks made with heavy equipment.
- Given the choice of strategies, avoid ignition and burning in areas at high risk for weed establishment or spread.
- Hose off vehicles on site if they have traveled through infested areas.
- Inspect clothing for weed seeds if foot travel occurred in infested areas.
- When possible, establish incident bases, fire operations staging areas, and aircraft landing zones in areas that have been inspected and are verified to be free of invasive weeds.
- Cover weed infested cargo areas and net-loading areas with tarps if weeds exist and can't be removed or avoided.
- Flag off high-risk weed infestations in areas of concentrated activity and show weeds on facility maps.
- If fire operations involve travel or work in weed infested areas, a power wash station should be staged at or near the incident base and helibase. Wash all vehicles and equipment upon arrival from and departure to each incident. This includes fuel trucks and aircraft service vehicles.
- Identify the need for possible fire rehab to prevent or mitigate weed invasion during fire incident and apply for funding during the incident.

Post-Fire Rehabilitation

- Have a weed specialist review burned area rehabilitation reports to ensure proper and effective weed prevention and management is addressed.
- Thoroughly clean the undercarriage and tires of vehicles and heavy equipment before entering a burned area.
- Treat weeds in burned areas. Weeds can recover as quickly as 2 weeks following a fire.
- Schedule inventories 1 month and 1 year post-fire to identify and treat infestations. Eradicate or contain newly emerging infestations.
- Determine soon after a fire whether revegetation is necessary to speed recovery of a native plant community, or whether desirable plants in the burned area will recover naturally. Consider the severity of the burn and the proportion of weeds to desirable plants on the land before it burned. In general, more severe burns and higher pre-burn weed populations increase the necessity of revegetation. Use a certified weed-free seed mix.
- Inspect and document weed infestations on fire access roads, equipment cleaning sites, and staging areas. Control infestations to prevent spread within burned areas.
- Seed and straw mulch to be used for burn rehabilitation (e.g., for wattles, straw bales, dams) shall be certified weed-free.
- Prevent seeded species from being grazed during the first two growing seasons (>18 months) following seeding, or until site-specific analysis and/or monitoring data indicates that vegetation cover, species composition and litter accumulation are adequate to support and protect watershed values, meet vegetation objectives and sustain grazing use.

Recreation

- Special Recreation Permits will contain noxious weed management stipulations (e.g., pre-event inventories to avoid infested areas, event management to avoid or isolate activities that could cause weed introduction or spread, monitoring and treatment of infestations exacerbated by the activity, and other appropriate noxious weed management stipulations).
- Promote the seven standard principles of Leave No Trace outdoor ethics through print and electronic media, and through personal communications with recreationists participating in non-motorized recreation activities on BLM-managed public lands. (www.lnt.org)

- Promote the principles of Tread Lightly outdoor ethics through print and electronic media, and through personal communications with recreationists participating in recreation activities on BLM-managed public lands. (www.treadlightly.org)
- Apply Recreation Management Guidelines to Meet Public Land Health Standards on BLM Lands in Colorado. Website: http://www.blm.gov/co/st/en/BLM_Information/newsroom/2000/recguidefnr/guide_final.html.
- Apply Guidelines for a Quality Built Environment. Website: http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/recreation_images/national_programs/VRM.Par.62809.File.dat/GQBE_WEB.pdf.
- Route design, construction and maintenance will follow: BLM guidelines, guidelines established in the Gold Book (BLM 2007) and technical recommendations of partner groups (e.g. International Mountain Bicycling Association (IMBA), Volunteers for Outdoor Colorado - Crew Leader Manual, Backcountry Horsemen, National Off-Highway Vehicle Conservation Council (NOHVCC)).

Lands and Realty

- Power lines shall be constructed in accordance to standards outlined in "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996" (Avian Power Line Interaction Committee 2006). Right-of-way applicants shall assume the burden and expense of proving that proposed pole designs not shown in the above publication are “raptor safe.” Such proof shall be provided by a raptor expert approved by the BLM Authorized Officer.
- Rights-of-way and other lands and realty authorizations, including power lines, pipelines, transmission corridors, energy development sites and related development, and gravel pits, will contain noxious and invasive plant management terms or stipulations for all ground-disturbing actions. These will include conducting a pre-disturbance noxious weed inventory, designing to avoid or minimize vegetation removal and weed introduction or spread, managing weeds during the life of the right-of-way or authorization to prevent or minimize weed introduction or spread, abandoning the right-of-way or authorization to establish competitive vegetation on bare ground areas, and monitoring revegetation success and weed prevention and control for a reasonable number of years.
- Rights-of-way will be constructed to avoid physical damage to range improvements and rangeland study areas.
- No signs or advertising devices shall be placed on the premises or on adjacent public lands, except those posted by or at the direction of the BLM Authorized Officer.
- The Holder shall promptly remove and dispose of all waste caused by its activities. The term “waste” as used herein means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, petroleum products, ashes, and equipment. No burning of trash, trees, brush, or any other material shall be allowed.
- The Proponent shall notify all existing right-of-way holders in the project area prior to beginning any surface-disturbance or construction activities. The Holder shall obtain an agreement with any existing right-of-way holders or other parties with authorized facilities that cross or are adjacent to those of the holder to assure that no damage to an existing right-of-way or authorized facility will occur. The agreement(s) shall be obtained prior to any use of the right-of-way or existing facility.
- The Holder shall participate in the formation of a Road User’s Association for the road if new rights-of-way are granted for use of the existing road. All new users will be required to join the association.
- The Holder will provide a performance bond for the authorized facility, acceptable to the BLM Authorized Officer, in the amount of $(_) that must be maintained in effect until restoration of the right-of-way has been accepted by the BLM Authorized Officer. The bond shall be furnished by the holder within 30 days of signing the grant (_) and shall be applied to all additional authorizations associated with the project as necessary.

- Incorporate conditions of approval and mitigation measures from the Final Programmatic EIS on Wind Energy Development on BLM-administered Lands in the Western US, as applicable (BLM 2005).
- Incorporate conditions of approval and mitigation measures from the Solar Energy PEIS, as applicable (pending completion of Solar PEIS).
- All construction activities shall be confined to the minimum area necessary. The exterior boundaries of the construction area shall be clearly flagged prior to any surface-disturbing activities.
- Existing roads will be used wherever possible. Additional roads shall be kept to the minimum. Route locations must be approved by the BLM prior to construction.
- When blasting is necessary, the following precautions will be used:
    - In areas of human use, blasting blankets will be used.
    - Landowners or tenants in close proximity to the blasting will be notified in advance of the blasting so that livestock and other property can be removed adequately protected.
    - Access to the blasting area will be restricted by construction personnel stationed at each end of the area to be blasted.
    - Blasting within 0.25-mile of federally-owned or controlled springs and flowing water wells must be approved in writing by the area manager.
    - No blasting will be permitted within 0.25-mile of historic trails, natural areas, identified archaeological sites, and recreation areas.
    - Powder magazines will be located out of sight or at least 0.5-mile from roads. Loaded shot holes will not be left unattended. Approval from the area manager will be obtained for the magazine locations.
- Roads will be constructed and maintained to BLM road standards (BLM Manual 9113 [BLM 2012]). All vehicle travel will be within the approved driving surface.

Best Management Practices for Pipeline Projects

- A preconstruction field conference shall be requested by the grantee at least five working days prior to any construction activities unless otherwise agreed upon by the BLM Authorized Officer.

- Once the pipeline is constructed, the grantee/operator shall restore the existing roadway to meet or exceed conditions prior to construction. The preconstruction width of the driving surface shall also be restored and erosion control structure installed subject to approval of the BLM Authorized Officer. The grantee/operator shall be responsible for road maintenance from the beginning to completion of operations. This may include, but not be limited to, blading the roadway, cleaning ditches and drainage facilities, dust abatement, or other requirements as directed by the BLM Authorized Officer.
- Construction width shall include the existing road. The pipeline shall be located two to three feet from the edge of the ditch along the existing road. The existing road shall be on the working side of the trench.
- The grantee shall accomplish the crossing of the pipeline owned by (company name) in accordance with an agreement between the grantee/operator.
- Pipeline location warning signs shall be installed within five days of construction completion. Each sign shall be permanently marked with the right-of-way serial number.

Geophysical Exploration

- The operator will furnish a map with the Notice of Intent showing approximate line to be used. A map will also be filed with the Notice of Completion showing the completed line. The map will be of a minimum scale of 0.5-inch equals 1.0 mile.
- Rehabilitation of disturbed areas is to be done concurrent with the geophysical operations.

- Blasting or vibrating within 0.25-mile of federally-owned or controlled springs and flowing water wells or cultural resource sites must be approved in writing by the area manager.
- Plugging of drill holes will conform to the Colorado Reclamation Standards Abandoned Drill Holes Act. Drill hole cuttings will be returned to the hole. LR
- No blading or other dirt work will be allowed without written permission from the area manager.
- Standard Terms and Conditions described in BLM Handbook H-3150-1: Onshore Oil and Gas Geophysical Exploration Surface Management Requirements (BLM 1994 Rev. 2007).
- Coordinate with the Colorado Parks and Wildlife early in the sale process on proposals to sell public land encumbered by a small capacity wildlife water development.

Wildlife, Aquatic

- Consider the following options regarding erosion control to limit sedimentation into
    - perennial, ephemeral, and intermittent drainages:
    - Placement of straw waddles
    - Construction of silt fencing
    - Placement of geo-textile matting/fabrics
    - Timely and appropriate reseeding methods and species
    - Hydro-mulching
    - Topsoil stockpiling
    - Recontouring slopes at a minimum of 2:1 to facilitate revegetation
    - Hay bales
    - Sediment retention dams
    - Water dips

- Avoid direct discharge of pipeline hydrostatic test water to any reservoir, lake, wetland, or natural perennial or seasonally flowing stream or river.
- When constructing stream crossings or other in-channel structures, divert water around the construction site to minimize sedimentation.
- Avoid low water crossings of live streams, but if done, armor crossings with appropriate sized native substrate to limit sedimentation and maintain water depths for fish passage.
- For perennial stream crossings use professional engineering to design and consider using bridges or appropriately sized culverts of at least bank-full flow width.
- When possible, design road crossings of streams and riparian corridors at right angles and preferably along straight, stable stream reaches to minimize the area and amount of disturbance. However, when needed, place culverts in alignment with natural stream sinuosity.
- Address aquatic organism passage and appropriate life-stage requirements of target species when designing new or modifying existing road/stream crossings.
- Identify and protect access to ephemeral/temporary pools and ponds to provide breeding, aestivating, and hibernating habitat for amphibians.
- To avoid spread of aquatic nuisance species and disease vectors clean and disinfect all equipment and gear used in water by one of the following methods:
    - by spraying with 409, bleach, or a similar germicide solution and let equipment thoroughly dry.
    - wash/spray equipment and gear with hot tap water > 140 degrees Fahrenheit for 10 minutes and then drain onto the ground, not down a drain or into another water body.
- Improve stream conditions associated with past, ongoing, and future planning, construction, and maintenance actions in the I-70 mountain corridor as per Stream and Wetland Ecological Enhancement Program (SWEEP) MOU.
- Identify limiting habitat factors based on site characteristics and habitat capabilities using channel type and geology classifications (e.g., Rosgen). Upon identification of limiting factors,

prioritize and fix those that can be fixed using proven river, stream, lake, and riparian methodologies (e.g., in-channel habitat structures to create pools, riparian plantings, tamarisk removal), or by changing management of other program activities (e.g., changing livestock grazing season of use) to achieve desired future condition.

- Identify in-channel features (e.g., culverts, water diversion structures) that block aquatic organism movement and/or impair stream connectivity and replace, modify, or remove these impediments as they are identified and as opportunities allow. Consider and address aquatic organism passage and appropriate life-stage requirements when designing new or modifying existing stream crossings. Where in-channel barriers are needed to protect native fish species from competitive species and/or disease vectors, consider placement in coordination with CPW Aquatic Biologists and BLM staff.

- Minimize the spread of aquatic nuisance species including but not limited to zebra mussels, New Zealand mud snails, quagga mussels, and rusty crayfish, as well as disease vectors including whirling disease, and chytrid fungus when working in water and do the following:

    - Before leaving a particular water or entering a new water body, inspect and clean equipment and gear used in the water, including heavy equipment, watercraft (boats, canoes, kayaks, rafts, etc.), trailers, oars, nets, waders, wading boots, sandals, and life jackets. Remove vegetation, mud, grit, algae, etc. and drain water from boats and other gear.

Fire Management:

- In wildland fire situations work with the Fire Resource Advisor(s) during suppression efforts in the CRVFO to address water use and spread of aquatic nuisance species and disease vectors:
    - If possible, avoid the use of these water sources for use in fire suppression actions (i.e., helicopter bucket dips, water pumps, etc.). If these waters are used for fire suppression, screen water pump intakes with ¼ inch mesh to avoid entrainment of fish.
    - Clean and disinfect all fire suppression equipment including water hoses, water pumps, pumpkins, blivets, helicopter buckets, etc. between suppression incidents to avoid the transfer of aquatic nuisance species and disease vectors into the Colorado River and ponds, reservoirs, and lakes within 0.5 miles of the river.
    - Do not release unused water from water tenders, fire engines, or aircraft into the Colorado River or ponds, reservoirs, or lakes within 0.5 miles of the river. Discharge unused water on upland habitats away from these water sources to avoid possible spread of aquatic nuisance species and disease vectors.
- Avoid dropping fire retardant or foam within 300 feet of water bodies and avoidlocating staging, fire retardant chemicals, refueling sites, or other chemicals within 300 feet of these waters.
- When fighting fires within 300 feet of occupied stream/lake drainages containing conservation populations of cutthroat trout, use water located from within the drainage for all suppression efforts..
- When obtaining water from the Colorado River the following actions should be taken:
    - The best method to avoid entrainment of fish is to pump from off-channel locations (e.g., ponds, lakes, and diversion ditches), not directly connected to the mainstem streams or rivers even during high spring flows.
    - If the pump head must be located in the river channel where larval fish are known to occur, the following measures apply:
        - do not situate the pump in a low-flow or no-flow area as these habitats tend to concentrate larval or young-of-year fishes. Instead place the pump into fast moving/riffle habitat;

        - limit the amount of pumping, to the greatest extent possible, during that period of the year when larval fish may be present (June 1 to August 15); and avoid pumping, to the greatest extent possible, during the pre-dawn hours (two hours prior to sunrise) as larval fish drift studies indicate that this is a period of greatest daily activity.
        - Screen all pump intakes with ¼" or finer mesh material.
    - Report any fish impinged on any intake screens to the Fish and Wildlife Service (970.243.2778) or the Colorado Parks & Wildilfe Department:
      Northwest Region
      711 Independent Ave., Grand Junction, CO 81505
      Phone: (970.255.6100)
- Require spill Prevention Plans for all pipeline companies and fluid mineral companies
- and their sub-contractors who haul or transport hazardous substances.
- Require Spill Contingency Plans for all pipeline companies and fluid mineral companies and their sub-contractors who haul or transport hazardous substances.
- When developing or improving water sources, consider development designs such as water wells and guzzlers, rather than surface impoundments, to minimize impacts to surface water hydrology resulting from attenuation of flood peaks and evaporative loss.
- Pro-actively manage special status species aquatic habitats. Identify limiting habitat factors based on site characteristics and habitat capabilities using channel type and geology classifications. Upon identification of limiting factors, prioritize and fix those that can be fixed using proven river, stream, lake, and riparian methodologies (e.g., in-channel habitat structures to create pools, riparian plantings) or by changing management of other program activities (e.g., changing livestock grazing season use) to achieve desired future condition.

Transportation

- Oil and gas development roads will be crowned, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards [USDI and USDA 2007] as outlined in BLM Manuals 9113, Roads Design Handbook [BLM 2011a] and 9113-2, Roads National Inventory and Condition Assessment Guidance and Instructions Handbook [BLM 2011b].
    - All vehicle travel will be within the approved driving surface.
    - All construction activities will be confined to the minimum area necessary.
    - The exterior boundaries of the construction area will be clearly staked or flagged prior to any surface-disturbing activities.
    - If requested by the BLM representative, the operator will schedule a pre-construction meeting, including key operator and contractor personnel, to ensure that construction plans and/or any unresolved issues are fully addressed prior to initiation of surface-disturbing activities.
    - Initial gravel application shall be a minimum of 6 inches.
    - The operator shall provide timely year-round road maintenance and cleanup on the access roads.
    - A regular schedule for maintenance shall include, but not be limited to, blading, ditch and culvert cleaning, road surface replacement, and dust abatement.
    - When rutting within the traveled way becomes greater than 6 inches, blading and/or gravelling shall be conducted as approved by the BLM.

- Other BLM resource roads that do not serve oil and gas development or do not serve as primary (collector) roads within the transportation system will be designed, constructed, and maintained as outlined in BLM Manual 9115-1, Primitive Road Handbook [BLM 2012a] and 9115-2, Primitive

Roads National Inventory and Condition Assessment Guidance and Instructions Handbook [BLM 2012b].

- All vehicle travel will be within the approved driving surface.
- All construction activities will be confined to the minimum area necessary.
- The exterior boundaries of the construction area will be clearly staked or flagged prior to any surface-disturbing activities.
- If requested by the BLM representative, the operator or proponent will schedule a pre-construction meeting, including key representative(s) and contractor personnel, to ensure that construction plans and/or any unresolved issues are fully addressed prior to initiation of surface-disturbing activities.

- In order to ensure public access and safety, CRVFO shall continue an active road maintenance program including, but not limited to, road redesign or realignment, blading, brush or tree removal for sight distance and safety concerns, scarification, graveling, water barring, low water crossings, spur ditching, seeding and installation or cleaning of culverts and cattleguards. Such road maintenance work will adhere to standards and guidance outlined in appropriate BLM Road Handbooks

Wildlife

Planning

- Design plans of development to consolidate activity during wildlife sensitive times into geographic areas approved by the regulatory agencies in order to minimize impact.
- Where possible, develop existing or previously disturbed surface locations to reduce impacts on undisturbed areas and minimize impact to wildlife habitat.
- Design power lines to minimize raptor attraction.
- Install perch guards on utility lines to reduce risk of raptor electrocution and discourage raptor perching on utility poles by the use of anti-perching devices, or bury new utility lines.
- Minimize noise by using appropriate noise reduction devices.
- Require all refuse containers employ a bear-proof design and be emptied on a regular basis.
- Initiate an education program that reduces bear conflicts
- Adjust tower changes, material deliveries, and all other recurring transportation activity to and from the well pad to occur between 9:00 am and 4:00 pm and between 9:00 pm and 4:00 am, excluding emergencies.
- Use carpooling for activities like crew rotations and shift changes.
- Monitor and enforce speed limits using multiple techniques.
- Implement dust control BMPs in a timely manner.
- Reinforce wildlife training of employees and contractors at worksite tailgate meetings, monthly safety meetings, and the Environmental Health and Safety (EHS) hazard identification program, and through the use of signs.
    - Prohibit pets on all locations.
    - Prohibit possession of firearms by all employees and contractors on all locations.

Drilling

- Implement drilling technology improvements, such as directional and horizontal drilling, to maximize resource recovery and minimize environmental impacts.
- Use natural gas drilling rigs to reduce emissions.
- Use dual-fuel natural gas/diesel engines, reducing diesel delivery to the well site by as much as 70%.
- Implement closed-loop drilling systems on all active rigs with only a small cuttings mixing area on each location.
- Conduct pre-rig move meetings with all parties to discuss access and concerns to reduce impacts to environment and landowners, to ensure a safe and efficient rig move.
- Net all oil and gas reserve and permanent pits to exclude birds; enclose pits within an 8-foot-high fence to exclude ungulates; enclose pits within a 2-foot solid barrier buried 6 inches into the soil to exclude small mammals and reptiles, and lined to prevent infiltration to groundwater.

Completions

- Restrict venting of natural gas to the atmosphere during new well completions.
- Require secondary spill containment for pump trucks on all active completions operations (e.g., portable containment, not earthen berms).
- Use permanent buried or temporary surface water delivery lines to reduce truck traffic.
- Optimize completion operations to minimize impact. Techniques include:
    - Use simultaneous drilling and completion operations (SIMOPS) to minimize the operating time on the well pad.
    - Remote completion operations using nearby existing well pads minimizes overall surface disturbance.
- Recycle all water used in completion activities to meet water needs for completion of subsequent wells on location; this will reduce fresh water consumption and reduce truck traffic.

Production

- Reduce visits to well sites through remote monitoring (i.e., SCADA) and the use of multi-function contractors.
- Use solar panels as an alternative energy source for on location production equipment, to limit trips to the location for production maintenance.
- Monitor wildlife as needed to document impacts of planned development on population dynamics or behavior; and develop and implement mitigation based on the results of monitoring.
- All stacks, vents, or openings must have screens to prevent wildlife entry.

Well Pad Construction and Reclamation

- Use advanced reclamation techniques to reclaim pads and pipeline construction within 6 months or less after completion activities are finished to establish desirable vegetation more effectively. Advanced reclamation techniques include:
    - Hydraulic erosion-control mulch on topsoil and wind-row perimeter control

  - Landform grading and hydraulic erosion-control mulch on steeper slopes
  - Use of crimped straw mulch on shallower slopes
- Use integrated vegetation management techniques to simultaneously control weeds while developing successful reclamation.
- Construct well pads prior to onset of winter to minimize additional displacement of wildlife utilizing the area
- Use the Colorado Parks and Wildlife recommendations for wildlife friendly fence whenever fencing is required.
- If appropriate, employ habitat enhancement in suitable areas to offset habitat loss or fragmentation caused by the planned development.
- Prepare third party Biological Assessment Reports (BAR) completed for all new disturbances to customize the reclamation plan and to optimize the topsoil segregation, seed mix, and soil amendments to improve reclamation success.

Pipelines

- Expand the water distribution system to efficiently move water in pipelines, reducing truck traffic for drilling and completion activities.
- Install gathering lines adjacent to roads wherever possible.se multiple gathering lines placed in a single trench to minimize disturbance and construction costs.
- Install trench plugs (sloped to allow wildlife or livestock to exit the trench should they enter) at known wildlife or livestock trails to allow safe crossing on long spans of open trench.
- Install pipeline crossings at right angles to the drainages, wetlands, and perennial waterbodies.
- Install equipment bridges for pipeline construction made from either clean rock and flume pipes or timber equipment mats with flume pipes.
- Use horizontal directional boring techniques under perennial waterbodies and/or wetland complexes.
- Enforce all In-stream construction activity to 24-hour periods for waterbodies less than 10 feet wide and to 48 hours for waterbodies greater than 10 feet wide at locations where horizontal boring is not possible.
- Maintain a minimum of 5 feet of soil cover between the pipeline and the lowest point of any drainage or water body channel.
- Restrict refueling equipment within 100 feet of a drainage, stream, or wetland during pipeline construction and employ secondary containment (e.g., portable containments).

Roads

- Use existing roads instead of new construction segments wherever feasible.
- Create topsoil windrows on all new facility construction for perimeter control to divert to terminal discharge points.
- Strategically apply fugitive dust control measures to reduce coating of vegetation and deposition in water sources, including enforcing speed limits on BLM and private roads.

- Install toe berms of adequate size on all fill slopes facing and or adjacent to potential water to contain any erosion from the fill slope.
- Implement stormwater perimeter control(s) on all new facility construction adequate to contain a 100-year storm event.
- Use hydraulic erosion control mulch or armoring on all exterior slopes adjacent to waterways.
- Seed all access roads and facilities other than well pads seeded in a timely manner after construction has been completed and seeding of all topsoil on pad construction.

Cultural Resources

- The operator/holder/applicant is responsible for informing all persons who are associated with the project that they will be subject to prosecution for knowingly disturbing archaeological sites or for collecting artifacts.
- If any archaeological materials are discovered as a result of operations under this authorization, activity in the vicinity of the discovery will cease, and the BLM WRFO Archaeologist will be notified immediately. Work may not resume at that location until approved by the AO. The operator/holder/applicant will make every effort to protect the site from further impacts including looting, erosion, or other human or natural damage until BLM determines a treatment approach, and the treatment is completed. Unless previously determined in treatment plans or agreements, BLM will evaluate the cultural resources and, in consultation with the State Historic Preservation Office (SHPO), select the appropriate mitigation option within 48 hours of the discovery. The operator/holder/applicant, under guidance of the BLM, will implement the mitigation in a timely manner. The process will be fully documented in reports, site forms, maps, drawings, and photographs. The BLM will forward documentation to the SHPO for review and concurrence.
- Pursuant to 43 CFR 10.4(g), the operator/holder/permittee/applicant must notify the AO, by telephone and written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), and the operator/holder/permittee/applicant must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the AO.

Appendix I

Disturbed Site Reclamation Standards

and

Implementation, Monitoring, and Evaluation
(from Colorado River Valley Field Office Proposed Resource Management Plan (PRMP)/Final Environmental Impact Statement (FEIS))

http://www.blm.gov/style/medialib/blm/co/field_offices/crvfo/crvfo_proposed_rmp.Par.0827.File.dat/35%20Appendix%20S%20Monitoring.pdf

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DISTURBED SITE RECLAMATION STANDARDS, MONITORING AND SUCCESS CRITERIA

1.0 INTRODUCTION AND SUCCESS CRITERIA

The goal of the following reclamation standards and success criteria is to mitigate anticipated impacts to vegetation, soil and water resources from ground-disturbing activities by re-establishing a self-sustaining, diverse vegetation community composed of species native to the region in sufficient species density and diversity to closely approximate natural, undisturbed vegetation potential.

This Appendix supplements the discussion found in "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (BLM 2006), commonly referred to as "The Gold Book". All ground-disturbing activities will be subject to these reclamation standards and monitoring requirements. These include resource improvements initiated by BLM, as well as permitted activities such as fluid and solid mineral development activities, including oil and gas development.

BLM is responsible for implementing these standards and compliance with monitoring requirements. Project proponents for all permitted activities will typically perform the reclamation work, and effect on-the-ground implementation. Projects must meet both interim and final reclamation objectives in order to retrieve any associated bonds, or for reclamation to be considered successful. For oil and gas development activities within the Federal Unit atop the plateau, five-year interim criteria must be met in order to have areas released from the total maximum disturbance area for the unit, or in order to move to the next development area. Interim reclamation objectives and success criteria have been split into short- term (two-year) and long-term (five-year) groupings. Two-year criteria are to be met in two or fewer years, while five-year criteria must be met in five or fewer years. For example, five-year criteria may be met in a little as two years, but must be met within five years for reclamation to be considered successful.

1.1 Short-Term (Two Year) Interim Reclamation Objectives and Success Criteria

Interim reclamation refers to those actions taken immediately after cessation of ground-disturbing activities. Interim actions are typically taken to stabilize a portion of a site that is no longer undergoing disturbance while activities simultaneously continue to disturb other portions of the same area. For example, interim reclamation may be conducted in perimeter areas of a natural gas well site when the larger footprint required for the development is reduced in area to that necessary for production. The following interim reclamation success requirements will be used to determine success after two years (two complete growing seasons):

a. Re-grade the site to approximate pre-disturbance topography to the extent practicable, in order to minimize disturbance, and lessen erosion potential.
b. Stabilize disturbed soil surface areas to reduce erosion and runoff to or below naturally occurring levels.
c. With the exception of active work areas, all disturbed soils that remain exposed, unprotected, or unreclaimed for longer than one month will be stabilized as approved by BLM. This may be done through the use of a BLM approved native seed appropriate for the site's native plant community, or application of a covering such as mulch or matting,
d. Establish and maintain a healthy and diverse composition of the species which are or should naturally grow on the site, according to the Ecological Site Description or reference site plant community, which will provide for natural plant and community succession.
e. Prevent establishment of noxious weeds and undesirable plants on the disturbed areas and expansion onto adjacent uninfected areas.

f. Restore wildlife habitat and livestock forage.
g. Reduce visual contrast to meet established visual resource management objectives in all reclaimed areas.

1.2 Long-Term (Five Year) Interim and Final Reclamation Objectives and Success Criteria Final reclamation will occur when no more ground-disturbing activities are expected to occur. The following reclamation success requirements will be used to determine success after five years (five complete growing seasons):

a. Stabilize the disturbed soil surface to reduce erosion and runoff to or below natural background levels. Flow pattern development will not have resulted in rills deeper than three inches, or spaced closer than on adjacent undisturbed hillsides. Activities do not contribute to pre-existing gullies actively down cutting or head cutting. No slumping or subsidence will occur as a result of surface disturbing activities.
b. With the exception of active work areas, all disturbed soils that remain exposed, unprotected, or unreclaimed for longer than one month will be stabilized as approved by BLM. This may be done through the use of a BLM approved native appropriate for the site's native plant community, or application of a covering such as mulch or matting.
c. Re-grade the site to approximate pre-disturbance topography to the extent practicable, in order to minimize disturbance, and lessen erosion potential.
d. Achieve or exceed the pre-disturbance cover and diversity of native species on the site. Total cover will be at least 80 percent of the reference area and have a similar composition of trees, shrubs, grasses, and forbs. Frequency of the most dominant species will be at least 80 percent of their relative contribution on the reference site. Vegetative composition and density will include the following: 1) Grass and forb species, by percent cover, 2) Litter accumulation as determined by percent ground cover, 3) Bare ground as determined by percent ground cover, 4) Noxious weed species, by percent cover (with a treatment objective of zero percent relative cover) 5) Other non-native and invasive species (with a treatment objective of actual cover of less than five percent), and 5) Soil surface stability as determined by the absence or limited degree of surface erosion and plant pedestals.
e. State of Colorado A, B, or C listed noxious weeds or other undesirable plant species will be absent (including kochia and Russian-thistle), with an exception for cheatgrass. It may be necessary to treat adjacent infestations of noxious and undesirable species prior to disturbance. If cheatgrass is present adjacent to the disturbed area in overall concentrations of less than 50 percent vegetative cover, the percentage vegetative cover of cheatgrass on the reclaimed site will not exceed five percent. In areas where adjacent lands have greater than 50 percent cheatgrass cover, the percentage cover on reclaimed lands will not exceed 20 percent.
f. Restore visual quality, reduce visual contrast and enhance aesthetic values to meet visual resource management objectives on all areas of surface disturbance.

2.0 RECLAMATION PLANS

Reclamation plans will be submitted for BLM review and approval prior to surface disturbing activities. Reclamation plans will be considered as COAs for oil and gas leases and reviewed and approved through activity or project specific planning for other resource management activities. Reclamation plans will address the following requirements in sufficient detail to demonstrate an understanding of the potential reclamation site and activities required to achieve the stated success criteria. These plans will incorporate the following reclamation topics and fully develop appropriate site-specific BMPs for each permitted action and location.

2.1 Site-specific Baseline Information:

a. Pre-disturbance terrain and contour
b. Pre-disturbance land use
c. Seasonal weather patterns
d. Topsoil depth and other limitations to plant root growth
e. Vegetation type, dominant species cover, density, and productivity by strata

2.2 Reference Site Selection and Documentation:

a. Appropriate reference sites will be assessed, selected, and characterized following Ecological Site Inventory (ESI) methods and standards, or an approved equivalent system (see Attachment A for an example).
b. Reference sites will be approved by BLM prior to a permitted disturbance.

2.3 Site-specific Revegetation Plan:

a. Size of disturbed versus reclaimed area
b. Proposed surface finish and grades
c. Proposed topsoil handling and treatment
d. Proposed seed mix (seeding rate, species, and variety)/container stock planting (container size and off- center spacing)
e. Treatment of noxious and undesirable species
f. Proposed seeding/mulching techniques
g. Ongoing maintenance activities expected
h. Monitoring plan

2.4 Bond Agreement Information (if applicable), or Conditions for Future Activity

Bonds to be held against achievement of reclamation success criteria will be negotiated on a site-by-site basis. In general, the amount of a bond will be considered a percentage of the total reclamation costs for a project sufficient to ensure reclamation success. These costs will be demonstrated in the reclamation plan. Documentation of compliance with bonding requirements sufficient to assure reclamation will also be included as part of the approved reclamation plan.

Future associated development activities may be precluded until successful reclamation is achieved for a given area or project.

3.0 RECLAMATION PRACTICES AND STANDARDS

The following practices and standards are intended to be applied simultaneously to all appropriate BMPs to all reclamation sites. Some standards are only appropriate for interim or final reclamation, while others will be used in either situation. Practices and standards are intended to provide direction and clarify BLM's intent for reclamation activities. The intent of BLM's land use planning (RMP) process is to identify standards and objectives to be met on public lands. Specific methodologies are considered to be activity or implementation level planning decisions and not RMP decisions. As such, practices are provided to clarify BLM's intent for reclamation activities. The following list is not considered to be all- inclusive, but rather is presented to provide a sense of the minimum requirements that will be required to produce acceptable reclamation outcomes. Additional practices may be required, practices may be withdrawn, or practices may be modified during activity, implementation, or project level planning; this may be done without future land use plan (RMP) decisions or amendments. Monitoring and adaptive management practices will be used to refine and clarify needed actions consistent with the goals and objectives of this plan. Reclamation practices and standards are listed below.

3.1 Interim Reclamation Practices and Standards

a. Limit surface disturbance to the minimum area necessary by avoiding development of roads, pipelines, and well pads on steep slopes; minimize the potential for surface disturbance through careful planning; grouping facilities to the extent possible; and sharing rights-of-way such as burying pipelines along roadways.

b. Stockpile topsoil when possible and prudent (not in areas of seleniferous or erosive soils, or in areas with noxious weed populations), following all topsoil salvage and storage BMPs; or if directed by BLM plan for salvage, direct-haul, and application (live handling) of topsoil from a disturbance site to a site undergoing concurrent revegetation.

c. Minimize the area necessary for construction activities; determine the minimal area needed to facilitate necessary activities, and initiate interim reclamation as quickly as practicable after construction.

d. Silt fencing will be necessary in areas in proximity to water features such as streams, ponds, and wetlands or in other situations where wind or water erosion may otherwise move sediments into sensitive or valuable surrounding habitat.

e. Interim reclamation will include recontouring of the disturbed surface to blend with surrounding terrain, spreading salvaged or stockpiled topsoil evenly on areas to be reclaimed, and revegetating with native plants.

f. Use BLM approved seed mixes containing native, early-successional species, or species with ability to readily establish quickly in recently-disturbed soil areas. In areas subject to occasional vehicle travel, interim revegetation will include species selected to accommodate occasional activity such as vehicle travel, vehicle parking, or temporary staging areas.

g. Drill seed the disturbed area with a seed mix of species native to the local area at a rate sufficient to achieve site stabilization and achieve desired cover based on reference sites (rate would be doubled for broadcast or hydroseeding where drill seeding is impracticable) following adequate soil preparation that includes removal of weeds and undesirables species, decompaction ("fluffing") of compacted soil, and harrowing to prepare the seedbed. If the seed mix contains sagebrush or small seeded species, this seed will be broadcast sown rather than drill seeded. Planting of containerized stock may also be required.

h. Mulching will be required to stabilize soil, maximize moisture infiltration, and improve the chances for revegetation success. Mulch seeded areas in salt desert shrub, sagebrush, and pinyon-juniper habitats with certified weed-free native hay or straw, or with hydromulch, at a rate sufficient to achieve site stabilization and establish native species. If physical conditions preclude use of straw or hay mulch, such as on steep slopes, apply appropriate hydromulch with a non-asphalt tackifier. Hay or straw mulch should not be used in mountain shrub or subalpine sites, but hydromulch may be used in these habitats on steep slopes.

i. Control and eradicate all State of Colorado A-, B-, and C-listed noxious weeds and undesirable species within reclaimed areas, with the exception of cheatgrass in areas where cheatgrass is a component of the adjacent undisturbed vegetation. One aspect of reducing the potential for noxious weed establishment is consideration of the sequence and timing of revegetation.

j. Fencing will be required to limit wildlife and livestock grazing for a minimum of two growing seasons or until plants are sufficiently established to persist under some physical disturbance. Seeded species will be considered established when at least 50 percent of plants are producing seeds. Fencing will be installed after dirtwork, grading, and seeding are completed and prior to livestock turnout on the allotment. The use of less-palatable grasses and forbs or fencing will be used as approved by BLM to limit wildlife and livestock presence along roadways, pipelines, or

other disturbed areas.

3.2 Long-Term (Five Year) Interim and Final Reclamation Practices and Standards

a. Remove all equipment, debris, and surface structures that are not necessary for the intended use of the site. Remaining structures will blend in to the extent possible with the surrounding terrain. At final reclamation, all structures will be removed. Consider the use of natural features such as trees, rock formations, terrain, or berms to conceal roads, pipelines, and well pads. Paint structures a color that blends with the surrounding vegetation.

b. Recontour all disturbed areas to blend with the surrounding terrain to the extent practicable. Areas that have received heavy equipment use such as roads and well sites will be ripped to a depth sufficient to accommodate the establishment of native vegetation similar to the surrounding undisturbed area.

c. As soon as practicable, spread salvaged or stockpiled topsoil to a uniform depth across all disturbed areas. The surface must blend with the surrounding non-disturbed area. (A rough surface will accommodate broadcast seeding better than a smooth surface.)

d. Revegetate with BLM approved native plant species similar in mix and kind to the appropriate reference plant community, including grasses, forbs, and shrubs. The type of cultural material (seeding or planting) used will depend on the attributes of the site and revegetation goals. As needed, utilize a combination of seeding and containerized nursery stock planting.

e. Drill seed the disturbed area with a seed mix of species native to the local area at a rate sufficient to achieve site stabilization and achieve desired cover based on reference sites (rate would be doubled for broadcast or hydroseeding where drill seeding is impracticable) following adequate soil preparation that includes removal of weeds and undesirables species, decompaction ("fluffing") of compacted soil, and harrowing to prepare the seedbed. If the seed mix contains sagebrush or small seeded species, this seed will be broadcast sown rather than drill seeded.

f. Seed disturbed areas in fall or early winter (depending on elevation) to exploit elevated moisture normally available in winter and spring as an aid in germination and seedling establishment, or as approved by BLM.

g. Mulching will be required to stabilize soil, maximize moisture infiltration, and improve the chances for revegetation success. Mulch seeded areas in salt desert shrub, sagebrush, and pinyon-juniper habitats with certified weed-free native hay or straw, or with hydromulch, at a rate sufficient to achieve site stabilization and establish native species. If physical conditions preclude use of straw or hay mulch, such as on steep slopes, apply appropriate hydromulch with a non-asphalt tackifier. Hay or straw mulch should not be used in mountain shrub or subalpine sites, but hydromulch may be used in these habitats on steep slopes.

h. State of Colorado A-, B-, or C-listed noxious weeds or other undesirable plant species will be absent (including kochia and Russian-thistle), with an exception for cheatgrass. It may be necessary to treat adjacent infestations of noxious and undesirable species prior to disturbance. If cheatgrass is present adjacent to the disturbed area in concentrations of less than 50 percent vegetative cover, the percentage vegetative cover of cheatgrass on the reclaimed site will not exceed five percent. In areas where adjacent lands have greater than 50 percent cheatgrass cover, the percentage cover on reclaimed lands will not exceed 20 percent.

i. Plant containerized native shrubs and trees (as appropriate based on the surrounding plant community) when conditions warrant following successful noxious weed control, in natural-appearing groups at a spacing that approximates the structure of local plant communities.

j. Fencing will be required to limit wildlife and livestock grazing for a minimum of two growing

seasons or until plants are sufficiently established to persist under some physical disturbance. Seeded species will be considered established when at least 50 percent of plants are producing seeds. Fencing will be installed after dirtwork, grading, and seeding are completed and prior to livestock turnout on the allotment. The use of less-palatable grasses and forbs or fencing may be required or approved by BLM to limit wildlife and livestock presence along roadways, or other disturbed areas.

4.0 MONITORING

Annual monitoring and reporting of results will be required for all reclaimed areas. Monitoring will occur annually for either a minimum of five years or until performance standards are achieved, whichever is longer. Monitoring methods and reporting standards will be included in reclamation plans and approved by BLM prior to disturbance. Current monitoring methods are outlined below. Required monitoring methodology may change over time in accordance with changes in CRVFO monitoring protocols. An example of a potential foreseeable change would be implementation of the BLM's new Assessment, Inventory, and Monitoring Program (AIM) monitoring protocols.

4.1 Methods

Monitoring methods will be approved as part of a site reclamation plan, prior to site disturbance. In general, methods must be used that will yield appropriate quantitative measures by which to address success criteria parameters against a reference site.

a. Plant species composition and cover will be sampled using either point intercept transect or plot sampling at a sufficiency to demonstrate statistical adequacy at the 85 percent level.
b. Woody species (tree and shrub) density and survivorship will be assessed using plot or belt transect sampling.
c. Fixed photo points (location to be determined and used during baseline conditions sampling).

4.2 Monitoring Reports

Reports of annual monitoring efforts will be submitted annually to BLM for approval. Each report will address the results of the monitoring in terms of each success criterion and compared to the same parameters for the reference site. Additionally, each report will address the following items:

a. Text and data to illustrate trends in terms of site conditions against each of the agreed-upon success criteria
b. Tabulated woody (tree and shrub species) containerized planting survivorship
c. Quantitative percent cover data by species for all plant species present on the

site, including planted and seeded species, native volunteer species, non-native

species, and noxious weeds

d. Annotated photographs from fixed photo points illustrating conditions before and after mitigation activities are completed
e. A figure showing locations of fixed photo points and data sampling locations
f. A brief discussion of the overall mitigation success, incorporating monitoring data. Problem areas identified during the monitoring session will be discussed and adaptive management remediation activities will be recommended, as necessary.
g. A description of any adaptive management activities performed since the previous annual report for the site as well as planned actions to be taken if plant establishment efforts are sub-standard or completely fail. For these circumstances, the cause of failure must be stated and how corrective actions will mitigate these causes.

ATTACHMENT
A:
Alternative Approach to ESI Reference Sites
Example of a Quantitative Success Sampling Assessment Tool

FLORISTIC QUALITY INDEX

I. Floristic Quality Indices (after Taft et al., 1997)

1. For the reference species list, assign an index based on the affinity to "natural areas". Individual species assignment range from 0-10 with "10" being considered the highest fidelity to natural areas. This index is termed the coefficient of conservatism (C). General categories for species assignments consist of the following:

X 0-1: Taxa that are adapted to severe disturbance, particularly anthropogenic. Disturbance occurs so frequently that often only brief periods are available for growth and reproduction. Generally considered ruderal species/opportunistic invaders.
X 2-3: Taxa within this category are associated with more stable, though degraded habitat. Generally considered ruderal-competitive species, found in a variety of habitats.
X 4-6: Taxa that have a high consistency of occurrence within a given community type and will include many dominant or matrix species for several habitats. Species will persist under moderate disturbance.
X 7-8: Taxa associated mostly with natural areas but can persist where the habitat has been somewhat degraded. Increases in the intensity or frequency of disturbance may result in reduction in population size, or taxa may be subject to local extirpation.
X 9-10: Taxa exhibiting a high degree of fidelity to a narrow range of synecological parameters. Species within this category are restricted to relatively intact natural areas.

Assignment of the "C" value should be based upon field experience of principal investigators (A-Team), consultation with local or regional plant ecologist/ taxonomists, description of habitat preferences in floristic manuals or published synecological or autecological studies. Values to be assigned should be considered in the context of the defined reference domain (geographic distribution) and range of variability (disturbance gradient) within the HGM subclass of interest.

2. Calculation of the Floristic Quality Index

X Determine the mean coefficient of conservatism ($\bar{C}$) by summarizing all coefficients in the inventory unit (reference site or sample within the reference site) and dividing by the number of taxa (N), or $\bar{C} = \Sigma C/N$.
X Multiply the mean coefficient of conservatism ($\bar{C}$) by the square root of the total number of taxa. The floristic quality index is then indicated by:

$$FQI = \bar{C} (\sqrt{N})$$

From:
Taft, J.B., G.S. Wilhelm, D.M. Ladd, and L.A. Masters. 1997. Floristic quality assessment in Illinois; a method for assessing vegetation integrity. Erigenia 15:3-95

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Appendix J

Comprehensive Air Resource Protection Plan

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July 2015

COLORADO BUREAU OF LAND MANAGEMENT

COMPREHENSIVE AIR RESOURCE PROTECTION PROTOCOL (CARPP)

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CARPP Change History

Section	Revision	Date
III.D.1	Amended paragraph to reflect final approved LN language.	2/11/2014
III.B	Added summary language for newly developed guidance appendix	5/5/2015
App. A	Added appendix A (Air Resources Oil and Gas NEPA Analysis Process)	5/5/2015
I.A	Clarified scope language (living doc) and added website reference	7/6/2015

COMPREHENSIVE AIR RESOURCES PROTECTION PROTOCOL (CARPP)

SECTION I – PURPOSE, SCOPE, AND RESPONSIBILITIES

This Comprehensive Air Resources Protection Protocol (CARPP) describes the process and strategies the BLM will use when authorizing activities that have the potential to adversely impact air quality within the state of Colorado. This protocol also outlines specific measures that may be taken to address BLM-approved activities with the potential to cause significant adverse impacts to air resources (via the generation of significant quantities of air emissions) within any planning area (as determined on a case by case basis). Further, the purposes of this protocol are to address air quality issues identified by the Bureau of Land Management (BLM), or public scoping, in its analysis of potential impacts on air resources for BLM Colorado Resource Management Plans and Environmental Impact Statements (RMP/EIS); and clarify the mechanisms and procedures that BLM will use to achieve the air resources goals, objectives, and management actions set forth in BLM Colorado RMPs.

I.A CARPP Scope

The CARPP is not a decision document, but rather a strategy to address air quality concerns throughout BLM-managed lands and resources in Colorado. Because the CARPP is not a field office specific management tool, it may be modified as necessary to comport or comply with changing laws, regulations, BLM policy, or to address new information and changing circumstances without maintaining or amending any specific Field Office RMP (see reference version date on the cover page).

However, changes to the goals, objectives, or management actions set forth in any Colorado Field Office RMP/EIS as a result of the changes in the CARPP (or more specifically, any subsequent analysis based on such changes) would require an amendment of the specific RMP being affected.

The CARPP is designed to be a living document; ergo readers should always refer to the BLM's Air Resources Webpage at to ensure they are viewing the most up to date version (http://www.blm.gov/co/st/en/BLM_Information/nepa/air_quality.html).

I.B BLM Responsibilities under FLMPA and MLA

The BLM has the authority and responsibility under the Federal Land Policy and Management Act (FLPMA) to manage public lands in a manner that will protect the quality of air and atmospheric values [FLPMA Sec. 102(a)(8)]. The FLPMA also provides that the public lands be managed in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands and includes provisions for implementing the Mining and Minerals Policy Act of 1970 [FLPMA Sec. 102(a)(12)]. The BLM has the responsibility under the Mineral Leasing Act (MLA) to

implement the decisions of any RMP/EIS in a manner that recognizes valid and existing lease rights[1].

Further, the FLPMA provides that "In the development and revision of land use plans, the Secretary shall provide for compliance with applicable pollution control laws, including State and Federal air, water, noise, or other pollution standards or implementation plans;" [FLPMA Sec. 202(c)(8)][2].

SECTION II – INTERAGENCY AIR RESOURCES COLLABORATION

The Bureau of Land Management is firmly committed to working with federal, state, tribal, and local air resource management partners to address complex and often cross-jurisdictional air quality issues. As a federal agency, we have a role to provide leadership in addressing known air quality issues within our authority and domain, while upholding our responsibility to manage the public lands for multiple-use under the FLPMA. We also recognize that the State of Colorado, specifically the Colorado Department of Public Health and Environment (CDPHE), has the primary responsibility and authority delegated by the EPA to regulate and maintain air quality standards within Colorado in accordance with the Clean Air Act. Interagency collaboration is the key to management of air quality, as no single agency has all the necessary tools to solve these complex issues alone. We must act together.

To that end the BLM will work collaboratively with other local, state, federal, and tribal agencies involved in the management of air resources to develop a comprehensive strategy to protect air resources from potentially significant adverse impacts resulting from BLM approved activities in Colorado.

II.A National Air Quality MOU

When making oil and gas implementation decisions, the BLM will consider or apply, as appropriate, the provisions of the *Memorandum of Understanding Among the US Department of Agriculture, US Department of the Interior, and US Environmental Protection Agency, Regarding Air Quality Analyses and Mitigation for Federal Oil and Gas Decisions Through the NEPA Process*, signed June 23, 2011.

SECTION III – ACTIONS TO ANALYZE & PROTECT AIR QUALITY

[1] H-1601-1 - LAND USE PLANNING HANDBOOK: A plan-level decision to open the lands to leasing represents BLM's determination, based on the information available at the time, that it is appropriate to allow development of the parcel consistent with the terms of the lease, laws, regulations, and orders, and subject to reasonable conditions of approval. When applying leasing restrictions, the least restrictive constraint to meet the resource protection objective should be used.

[2] Note: Where sources of air pollution emissions are regulated by an entity/agency (Federal, State, Tribal, Local), the BLM shall not craft alternatives with features or conditions that interfere with a proponents ability to comply with such laws or standards. IBLA has held that the meaning of "providing for compliance" does not require that the BLM has any obligation to ensure compliance where another agency holds such responsibility [*Wyoming Outdoor Council, et al*176 IBLA 15, 27 (2008); Powder River Basin Resource Council, 183 IBLA 83, 94-95 (2012)]. However, the BLM should appropriately analyze such sources (as well as non-regulated sources) within the applicable NEPA context to disclose potential impacts, determine significance, and provide for mitigation as necessary and within our authority for any specific finding.

The following sections describe actions the BLM will take to ensure an adequate analysis and subsequent protection for air quality resources within Colorado. Appropriate air resources protection requires the BLM to manage its authorized activities and actions at broad spatial and temporal scales that are dynamic and thus subject to change. The BLM will accomplish this through an adaptive management approach, which includes establishing baseline conditions, monitoring, reevaluation, and adjustment as necessary. Adaptive management therefore contemplates regular review and adjustment of management approaches during the authorization of emissions generating activities commensurate with changing circumstances.

III.A MONITORING

Ambient air monitoring provides valuable data for determining current and background concentrations of air pollutants, describing long term trends in air pollutant concentrations, and evaluating the effectiveness of air control strategies. The BLM's comprehensive air resource protection protocol includes the ambient air monitoring measures described in this section.

III.A.1 – Air Monitoring Network

The BLM will participate in a cooperative effort with industry, CDPHE, Forest Service, National Park Service, EPA, local counties, and other entities as appropriate, to establish, operate, and maintain a comprehensive air monitoring network within the planning areas where a need for monitoring has been identified (contingent upon available funding). The BLM will cooperate in the sharing of air monitoring data collected by the air monitoring network with other agencies and the public.

III.A.2 – Pre-Construction Air Monitoring

The BLM may request proponents of projects with the potential to generate significant air emissions, to submit pre-construction air monitoring data from a site within or adjacent to the proposed development area. The purpose of this air monitoring is to determine baseline air quality conditions prior to development at the site. The need for monitoring will be determined by the BLM based on the availability or absence of existing representative air monitoring data and the factors listed in Section III.D of this protocol. If the BLM determines that pre-construction monitoring is necessary, the project proponent must provide a minimum of one year of representative ambient air monitoring data for the pollutants of concern. The project proponent will be responsible for siting, installing, operating, and maintaining any new air monitoring equipment needed to fulfill this requirement in the absence of existing representative air monitoring data.

III.A.3 – Life of Project Air Monitoring

The BLM may require proponents or operators of Federal mineral development projects, or proponents of other potentially significant emission generating projects, to conduct air monitoring for the life of the project based on the availability or absence of representative air monitoring data and the factors listed in Section III.D of this protocol. The purpose of this air monitoring is to

measure impacts potentially attributable to the project over time and to determine the effectiveness of emissions control measures required for the project. The project proponent will be responsible for siting, installing, operating, and maintaining any new air monitoring equipment needed to fulfill this requirement in the absence of existing representative air monitoring data.

III.A.4 – Monitoring Data Transparency

Project-specific monitoring data may be used by the BLM in subsequent NEPA analysis required for project approvals. Thus public disclosure of such data is assured via the NEPA process, if used. Additionally, the BLM will ensure that ambient air monitoring data collected as a COA for any BLM authorized activity will be made publicly available within the body or our annual report required under Section V of this protocol.

III.B EMISSIONS INVENTORIES

The BLM will request the proponent of an oil and gas development activity (as proposed in a permit application, plan of development, or Master Development Plan) to submit a comprehensive inventory of anticipated direct and indirect emissions associated with the proposed project. The emissions inventory will include estimated emissions of regulated air pollutants from all sources related to the proposed activity, including fugitive emissions and greenhouse gas emissions, for each year or distinct project phase over the life of the project. The BLM will review the emissions inventory to determine its completeness and accuracy. In most cases the BLM will accept inventory data reported to other agencies for the purposes of meeting this requirement. For example BLM would accept copies of actual emissions data for criteria pollutants, volatile organic compounds, hazardous air pollutants, and greenhouse gases that are submitted to CDPHE as required for applicable air permitting or APEN requirements, or submittals to COGCC in the form of drilling and production data reports, and data to EPA under the Greenhouse Gas Reporting Rule (40 CFR Part 98 Subpart W) for the authorized action.

The BLM COSO developed guidance for the purposes of improving the adequacy, consistency, and efficiency of the Bureau of Land Management (BLM) Colorado air resources analysis. The guidance provides the CO BLM field offices with: 1) a standardized process to follow for completing air resource analysis for project specific O&G development, 2) field office specific air resource NEPA sections of the affected environment and cumulative impacts (to be updated as required, but not less than annually by COSO Air Resource Specialists), and 3) tools to enable field office staff and project proponents to adequately develop the information necessary to analyze and disclose potential air resource impacts within NEPA documents.

In brief, the guidance requires a project level emissions inventory for ALL oil and gas projects that utilizes the COSO air resource specialists (ARS) developed Emissions Inventory Tool. Once the inventory has been completed, BLM staff will follow the analysis framework (found in Appendix A) to compare the emissions inventories and project parameters against in order to determine the level of NEPA analysis required.

III.C MODELING

Air dispersion and photochemical grid models are useful tools for predicting project-specific impacts on air quality, predicting the potential effectiveness of control measures and strategies, and forecasting trends in regional concentrations of air pollutants. The BLM will use regional air modeling and project-specific modeling, in conjunction with other air analysis tools, to develop air resource protection strategies consistent with our responsibilities under FLPMA. Further, the BLM will provide appropriate disclosure for any modeling of direct, indirect, and cumulative impacts of proposed actions during the required NEPA analysis.

III.C.1 – Project-specific Modeling

The BLM may require project-specific air quality modeling, consistent with the Air Resources MOU to analyze potential impacts from a proposed Federal mineral development project or other proposed activity that has the potential to emit significant quantities of a regulated air pollutant and the effectiveness of any air emission control measures. Project proponents may submit results from other modeling analyses that include activities similar to the proposed project for BLM's review and approval, and if approved, those modeling results may be used in lieu of new project-specific modeling. The decision as to whether to require air quality modeling will be based on factors listed in Section III.D of this protocol. The BLM will not require an air modeling analysis when it can be demonstrated that the project will not cause a substantial increase in emissions of the pollutants of concern.

III.C.2 – Modeling Protocol

The BLM will determine the parameters required for a project-specific modeling analysis through the development of a modeling protocol for each analysis. When conducting a regional model or EIS level project specific oil and gas air modeling analysis, the BLM will adhere to the *Memorandum of Understanding Among the US Department of Agriculture, US Department of the Interior, and US Environmental Protection Agency, Regarding Air Quality Analyses and Mitigation for Federal Oil and Gas Decisions Through the NEPA Process*, signed June 23, 2011.

III.C.3 – Regional Air Modeling

The BLM will support and participate in regional modeling efforts through multi-state and/or multi-agency organizations such as Western Governors' Association – Western Regional Air Partnership (WRAP) and the Federal Leadership Forum (FLF). In addition, BLM will, contingent upon available funding, conduct and facilitate regional air modeling as needed. Currently, the BLM is facilitating the Colorado Air Resources Management Modeling Study (CARMMS). CARMMS is a BLM funded regional air quality modeling study of expected impacts on air quality from projected increases in oil and gas development across Colorado and certain upwind adjacent states.

- The CARMMS modeling protocol/study will be developed by the BLM with involvement from appropriate local, state, federal, and tribal agencies

involved in the management of air resources and the authorization and regulation of oil and gas development.

- The CARMMS results will include the predicted impacts from all projected federal and non-federal oil and gas development within the region.
- The CARMMS results and analysis will be made available to the public.

III.C.4 – Evaluation of Modeling Results

The BLM will cooperate in an interagency process to develop a comprehensive strategy to manage air quality impacts from future oil and gas development within the region. As part of that strategy, the local, state, federal, and Tribal agencies involved in the regulation of air quality and the authorization of oil and gas development would evaluate modeling results from CARMMS or other future modeling studies and identify potential air quality concerns and necessary reductions in air emissions. If the modeling predicts significant impacts, these agencies would use their respective authorities to implement appropriate enhanced emission control strategies, operating limitations, equipment standards, and/or pacing of development.

III.C.5 – Future Modeling Studies

Future iterations of the CARMMS, or a similar regional modeling study of expected impacts from oil and gas development, may be conducted through a collaborative interagency management mechanism and interagency / industry funding mechanism.

III.D PERMITTING

As part of the NEPA process and prior to the authorization of any Federal mineral development activity the BLM will conduct an air analysis to determine the potential impacts on air quality based on the estimated emissions from the activity being authorized. The BLM may conduct such an analysis for other authorized activities with the potential to generate significant emissions of a regulated pollutant. The BLM will consider the following factors to identify pollutants of concern and make decisions regarding the appropriate level of air analysis, monitoring, and reporting requirements for the proposed activity.

- magnitude of potential air emissions from the proposed activity
- duration of proposed activity and distinct phase considerations
- proximity to a federally mandated Class I area, sensitive Class II area (as identified on a case-by-case basis by CDPHE or a federal land management or tribal agency), population center, or other sensitive receptor
- location within or adjacent to a non-attainment or maintenance area
- meteorological and geographic conditions

- existing air quality conditions including measured exceedances of NAAQS or CAAQS and measured adverse impacts on air quality related values (AQRVs) at Class I and sensitive Class II areas
- intensity of existing and projected development in the area
- issues identified during project scoping

III.D.1 – Statewide Lease Notice

The following Lease Notice language will be incorporated into all new leases.

Due to potential air quality concerns, supplementary air quality analysis may be required for any proposed development of this lease. This may include preparing a comprehensive emissions inventory, performing air quality modeling, and initiating interagency consultation with affected land managers and air quality regulators to determine potential mitigation options for any predicted significant impacts from the proposed development. Potential mitigation may include limiting the time, place, and pace of any proposed development, as well as providing for the best air quality control technology and/or management practices necessary to achieve area-wide air resource protection objectives. Mitigation measures would be analyzed through the appropriate level of NEPA analysis to determine effectiveness, and will be required or implemented as a permit condition of approval (COA). At a minimum, all projects and permitted uses implemented under this lease will comply with all applicable National Ambient Air Quality Standards and ensure Air Quality Related Values are protected in nearby Class I or Sensitive Class II areas that are afforded additional air quality protection under the Clean Air Act (CAA).

III.E MITIGATION

Many activities that the BLM authorizes, permits, or allows generate air pollutant emissions that have the potential to adversely impact air quality. The primary mechanism to reduce air quality impacts is to reduce emissions via project design features and mitigation. Appropriate emission reduction measures are best identified and required at the project authorization stage, when the temporal and spatial characteristics and technological specifications of the proposed action have been defined. The project-specific information available at that stage allows for the development of an emissions inventory and impact analysis that can be used to identify effective mitigation options for predicted adverse impacts. Section IV, Emissions Reduction Strategies and Best Management Practices, provides some emission reduction technologies and strategies as an example. The list in Table VI-1 is not intended to be all inclusive or preclude the use of other effective air pollution control technologies that may be proposed.

The BLM will ensure implementation of reasonable mitigation, control measures, and design features through appropriate mechanisms, including lease stipulations identified in RMPs, notices to lessees, and conditions of approval (permit terms and conditions) as provided for by law and consistent with lease rights and obligations. In the absence of, or in addition to effective control technologies, the BLM may manage the pace, place,

density, and intensity of leasing and development to meet air quality goals and objectives as defined under any applicable RMP.

III.E.1 – Emissions Reduction Planning / Minimizing Air Emissions

The BLM will request proponents of oil and gas development projects that have the potential to significantly adversely impact air quality or predicted to exceed an air quality standard to provide an emissions reduction plan where air quality has been identified as a resource of concern in applicable NEPA analysis. Plans shall include a detailed description of operator committed measures to reduce project related air pollutant emissions including greenhouse gases and fugitive dust. All projects are required to comply with all applicable state and federal regulations.

III.E.2 – Project-specific Mitigation

If the project-specific air quality analysis predicts future impacts on NAAQS or CAAQS (i.e. exceedances) or adverse impacts to AQRVs in Class I or sensitive Class II areas, the BLM will analyze air quality mitigation measures for emission sources. Further, if the regional air quality modeling study conducted under Section III.C.3 predicts significant cumulative impacts on air resources from expected oil and gas development in the region, the BLM may require the proponent of an oil and gas development project to apply reasonable mitigation including but not limited to best management practices (see Section VI), emissions offsets, and other control technologies or strategies identified in the project-specific air quality analyses.

Where identified and analyzed mitigation measures cannot be reasonably implemented for a particular proposed action due to the overall project design, or substantial technical or economic barriers, the BLM will work with project proponents during the NEPA process to develop operator-committed measures or acceptable emissions offsets that would be included as conditions of approval (COA). Any operator committed measures would be required to provide an air quality benefit sufficient in type, scale, location, and timing to avoid the anticipated adverse impact or at a minimum, to reduce it to an acceptable level for the specific area and pollutant(s) analyzed.

III.F Protocol Implementation

The BLM will ensure that air resource protection strategies and mitigation measures are implemented by including project-specific COAs (operator-committed and/or required mitigation) for each authorized action. Any COAs applied to projects as a result of this process shall be clearly consistent with the applicable RMP management decisions and/or subsequent analysis of new or previously unavailable information upon which the BLM can reasonably rely.

SECTION IV – ADAPTIVE MANAGEMENT PROCESSES FOR AIR RESOURCES

Adaptive management incorporates the principles of monitoring current conditions, predicting future impacts, and adapting management strategies to account for changing conditions. An adaptive management strategy for air quality resources allows the BLM to comply with NEPA and complete an appropriate analysis to ensure that activities approved by the BLM minimize adverse impacts to air quality; while allowing for development of important domestic energy resources.

The BLM will implement an adaptive management strategy to account for changing air quality conditions and to minimize adverse impacts to air resources from BLM-authorized activities. The strategy includes evaluating air quality on an on-going basis, and if necessary, implementing appropriate mitigation measures to meet the identified objectives and targets for any applicable Colorado RMP. The adaptive management strategy is intended to be transparent and as such the process includes an annual reporting component that will be made available to the public, as well as case by case incorporation of specific plan elements within individual project approvals. Components of this adaptive management strategy include the following:

IV.A Establish Baseline Air Quality Conditions

Existing air quality conditions will be established and continuously updated on an annual basis. To establish a periodic baseline, data must be compiled and analyzed such that air quality value trends (NAAQS & AQRVs for Class I and sensitive Class II areas) can be established or evaluated for the purpose of predicting future impacts from BLM-authorized activities. Sources of data for this analysis may include raw air quality monitoring station data, air quality monitoring reports prepared by others (CDPHE, EPA, NPS or USFS), and/or appropriate regional modeling results.

In addition to monitored or predicted background data, regional emissions inventories will be continuously or periodically updated to reflect the annual mass of pollutants added to the atmosphere. The data will provide an understanding between mass emissions and monitored/modeled air quality conditions and provide a reasonable basis from which to evaluate impacts from future projects or actions.

The last component of the baseline analysis includes providing a brief synopsis of the current meteorological conditions that exist for any planning area such that exceptional events and historical deviations in atmospheric values can be documented to provide additional context for the observed/reported air quality values.

IV.B Emissions Tracking

To provide for the periodic baseline the BLM will use the project-specific information used in its NEPA analyses as a mechanism to track emissions of criteria pollutants, volatile organic compounds, hazardous air pollutants, and greenhouse gases from BLM authorized oil and gas activities within each field office planning area. (NOTE: the BLM may incorporate emissions inventories for other authorized activities with significant emissions to provide for an appropriate cumulative inventory, where such sources are not already included as a Colorado Air Pollution Emissions Notice, or National Emissions Inventory component). The BLM will use emissions data from APDs to inform iterative elements of our adaptive management strategy, including modeling inputs and any

subsequent prescriptive or comparative project tiering from any applicable modeling results.

IV.C Prescriptive Model Validation

Prescriptive model validation includes comparing the annual NEPA emissions data from BLM authorized oil and gas activities within the planning areas to emission levels analyzed in the CARMMS modeling study (or the most recent BLM or interagency air impacts analysis conducted in accordance with the provisions of the modeling Section III above). Emissions data will include specific oil and gas indicators, such as the number of wells drilled, number of producing wells, production data, compressor stations installed, centralized liquids gathering stations, and gas treatment facilities constructed. The actual emissions levels and new baseline air quality observations will be correlated against the modeled parameters to determine the reasonableness of the model for predicting impacts and its continued appropriateness as a reference for any subsequent project analysis.

If during the course of our annual analysis it is determined that the model has not demonstrated a reasonable correlation of predicted impacts (for modeled emissions inventory levels) compared against the actual emissions recorded for a planning area, the BLM will investigate the potential sources of the discrepancy to determine a potential cause, such as meteorological factors (ex: winter time ozone, which cannot be modeled at this time), or fee mineral development (i.e. non-BLM authorized actions). If a probable cause for the discrepancy cannot be established, then the BLM will initiate interagency coordination with our regulatory partners to determine if a new modeling analysis is potentially warranted.

IV.D Responding to Monitored Exceedances of the NAAQS

If during the course of a year a Federal Reference or Equivalent air monitor within any planning area records a validated exceedance of any NAAQS (excluding any non-attainment areas) the BLM will review the available data to determine if any BLM authorized activity caused or significantly contributed to the exceedance event. The review will encompass the following steps.

IV.D.1– QA/QC

The BLM will ensure the validity of the monitored data by: (a) reviewing Quality Assurance/Quality Control (QA/QC) metadata to ensure against false high readings, and (b) reviewing meteorological data to determine if an exceptional atmospheric event such as stratospheric ozone intrusion occurred. The BLM may contact CDPHE for technical consultation and concurrence regarding possible exceptional events.

IV.D.2 – Screening Analysis

If the monitoring data are validated, the BLM will conduct a screening analysis to determine the likely cause, source, or origin of the exceedance and whether any BLM authorized source(s) within or adjacent to the planning area caused or contributed to the monitored exceedance. If the screening analysis indicates

BLM-authorized sources did NOT cause or significantly contribute to the exceedance, then no further action will be taken by the BLM. The data, analysis, and conclusions will be included in the annual public report described under I.C above.

IV.D.3 – Enforcement

Should the results of the screening analysis indicate that a BLM authorized source(s) caused or significantly contributed to the monitored exceedance, the BLM will review the COA from the authorization for the source(s) to determine if all the COA were implemented as required. Where it is determined that operators did not comply with the conditions of approval for their authorized activities, and did not submit an appropriate sundry notice for approved deviations from such conditions, BLM may issue a notice of incident of noncompliance or take other appropriate enforcement action.

IV.D.4 – Contingency Planning

If, after review the BLM determines that an authorized source(s) caused or significantly contributed to the monitored exceedance, the BLM will initiate consultation with CDPHE, EPA, and any other applicable local, state, federal, and tribal agencies with responsibility for managing air resources to address appropriate responses to the monitored exceedances. Responses to monitored exceedances may include employing more stringent mitigation measures within the agencies' respective authority to reduce projected future emissions and performing additional modeling and analysis to determine the overall effectiveness of such mitigation measures.

Additionally, the BLM may implement reasonable temporary measures that have been included in a project specific authorization as conditions of approval, which could limit drilling operations, completions or well stimulations, blowdowns, or other non-essential operations during specified time periods (i.e. a timing limitation). Other actions the Bureau may take would include limiting the number of annual APD approvals issued for the affected area until such time that updated regional modeling can be conducted to provide an appropriate assessment of the expected impacts from a reasonable level of development.

IV.E Evaluating Projected Future Development/Emissions

Periodically, but not less than every three years, the BLM will evaluate the available or reasonably foreseeable oil and gas development projections for each planning area for the following three to five year period, and compare these projected levels to the level of predicted future development analyzed in the CARMMS modeling study (or the most recent BLM or interagency air impacts analysis conducted under the provisions of the modeling section(s) III.C.3 or III.C.5 above). The BLM will use the projected development/emissions data to determine whether the modeling analysis remains appropriate as a reference for any subsequent project analyses.

Section V – Annual Summary Report

Annually, the BLM will prepare a comprehensive summary report (from actual project data and analysis). This report will be made available to the public. The BLM will use this annual review to evaluate whether current air resources protection strategies are meeting the goals and objectives established within the BLM Colorado RMPs. If the analysis shows that the strategies are not achieving our defined air resource protection goals, the BLM will collaborate with CDPHE and the EPA to develop or modify air resource protection strategies as necessary to effectively protect air resources within any deficient planning area. Should this result in changes to RMP goals and objectives, additional planning level analyses will be required.

Section VI – Oil and Gas Development Emissions Reduction Strategies & BMPs

Table VI-1 displays some emission reduction measures, their potential environmental benefits and liabilities, and feasibility. The table is not meant to be exhaustive in terms of available or acceptable emissions reduction/control technologies or techniques, but provides a baseline or starting point from which to construct design features and mitigation options for project specific or regional analyses.

Table VI-1 Best Management Practices and Air Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Control Strategies for Drilling and Compression			
Multi-well pad directional or horizontal drilling.	When compared to single pad vertical drilling, reduces construction related emissions, decreases surface disturbance, reduces trip frequencies, and reduces habitat fragmentation.	Could result in higher air impacts in one area with longer sustained drilling times.	Depends on geological strata, topography, and other physical constraints.
Improved engine technology (Tier 2 or 4) for diesel drill rig engines.	Reduced NOx, PM, CO, and VOC emissions.		Dependent on availability of technology from engine manufacturers and, potentially differentials in cost for small operators..

Table VI-1 Best Management Practices and Air Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Selective Catalytic Reduction (SCR) for drill rig engines and/or compressors.	NO_x emissions reduction, potential decreased formation of visibility impairing compounds and ozone. NOx control efficiency of 95% achieved on drill rig engines. NOx emission rate of 0.1 g/hp-hr achieved for compressors.	Potential NH3 emissions and formation of visibility impairing ammonium nitrate. Regeneration/disposal of catalyst can produce hazardous waste.	Not applicable to 2-stroke engines.
Non-selective catalytic reduction (NSCR) for drill rig engines and/or compressors.	NOx emissions reduction, potential decreased formation of visibility impairing compounds, and ozone. NOx control efficiency of 80-90% achieved for drill rig engines. NOx emission rate of 0.7 g/hp-hr achieved for compressor engines greater than 100 hp.	Regeneration/disposal of catalysts can produce hazardous waste.	Not applicable to lean burn or 2-stroke engines.
Natural Gas fired drill rig engines.	NOx emissions reduction, potential decreased formation of visibility impairing compounds, and ozone.	May require construction of infrastructure (pipelines and/or gas treatment equipment). May require onsite gas storage. May require additional engines to supplement needed torque.	Requires onsite processing of field gas.
Electrification of drill rig engines and/or compressors	Decreased emissions at the source. Transfers emissions to more efficiently controlled source (EGU).	Displaces emissions to EGU. Temporary increase in emissions with construction of power lines.	Depends on availability of power and transmission lines.
Improved engine technology (Tier 2, 3 or 4) for all mobile and non-road diesel engines.	Reduced NOx, PM, CO, and VOC emissions.		Dependent on availability of technology from engine manufacturers.

Table VI-1 Best Management Practices and Air Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Reduced emission (a.k.a. "green") completions.	Reduction in VOC and CH4 emissions. Reduces or eliminate flaring and venting and associated emissions. Reduces or eliminates open pits and associated evaporative emissions. Increased recovery of gas to pipeline rather than atmosphere.	Temporary increase in truck traffic and associated emissions due to delivery of onsite equipment or due to construction of infrastructure.	Need adequate pressure and flow. Need onsite infrastructure (tanks/dehydrator). Availability of sales line. Green completion required where feasible per COGCC Rule 805(b)(3) and NSPS 40 CFR 63 OOOO.
Flaring of completion emissions	Reduces methane, VOC, and some HAP emissions. Converts CH4 to CO2.		
Minimize/eliminate venting and/or use closed loop process where possible during "blow downs".	Reduces methane, VOC, and some HAP emissions		
Eliminate evaporation pits for drilling fluids.	Reduces VOC and GHG emissions. Reduces potential for soil and water contamination. Reduces odors.	May increase truck traffic and associated emissions. May increase pad size.	Requires tank and/or pipeline infrastructure.
Electrification of wellhead compression/ pumping.	Reduces local emissions of fossil fuel combustion and transfers to more easily controlled source.	Displaces emissions to EGU.	Depends on availability of power and transmission lines.
Wind (or other renewable) generated power for compressors.	Low or no emissions.	May require construction of infrastructure. Visual impacts. Potential wildlife impacts.	Depends on availability of power and transmission lines.
Compressor seals – replace wet with dry or use mechanical seal.	Reduce gas venting (VOC and GHG emissions).		May be costly or not mechanically feasible.
Compressor rod packing system – use monitoring and replacement system.	Reduce gas leaks (VOC and GHG emissions).		Requires establishing a monitoring system and doing replacements.

Table VI-1 Best Management Practices and Air Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Control Strategies Utilizing Centralized Systems			
Centralization (or consolidation) of gas processing facilities (e.g., separation, dehydration, sweetening).	Reduces vehicle miles traveled (truck traffic) and associated emissions. Reduced VOC and GHG emissions from individual dehydration/ separator units.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure, infeasible for highly dispersed or exploratory wells.
Liquids Gathering systems (for condensate and produced water).	Reduces vehicle miles traveled and associated emissions. Reduced VOC and GHG emissions from tanks, truck loading/unloading, and multiple production facilities.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure . May be infeasible for highly dispersed or exploratory wells, difficult terrain, or patchy surface ownership.
Water and/or fracturing liquids delivery system.	Reduced long term truck traffic and associated emissions.	Temporary increase in construction associated emissions. Higher potential for pipe leaks/groundwater impacts.	Requires pipeline infrastructure. May be infeasible for highly dispersed or exploratory wells, difficult terrain, or patchy surface ownership.
Control Strategies for Tanks, Separators, and Dehydrators			
Eliminate use of open top tanks.	Reduced VOC and GHG emissions.		
Capture and control of flashing emissions from all storage tanks and separation vessels with vapor recovery and/or thermal combustion units.	Reduces VOC and GHG emissions.	Pressure buildup on older tanks can lead to uncontrolled rupture.	
Capture and control of produced water, crude oil, and condensate tank emissions.	Reduces VOC and GHG emissions.		95% VOC control required by COGCC in some areas and by CDPHE statewide with applicability thresholds

Table VI-1 Best Management Practices and Air Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Capture and control of dehydration equipment emissions with condensers, vapor recovery, and/or thermal combustion.	Reduces VOC, HAP, and GHG emissions.		90% VOC control required by COGCC in some areas and by CDPHE statewide with applicability thresholds
Use zero emissions dehydrators or use desiccants dehydrators.	Reduces VOC, HAP, and GHG emissions.	Requires desiccants (salt tablets and forms a brine solution that must be disposed of.	Can be as effective as Triethylene glycol (TEG) dehydration.
Control Strategies for Misc. Fugitive VOC Emissions			
Install plunger lift systems to reduce well blow downs.	Reduces VOC and GHG emissions.		Can be more efficient at fluids removal than other methods; must have adequate pressure.
Install and maintain low VOC emitting seals, valves, hatches on production equipment.	Reduces VOC and GHG emissions.		
Initiate equipment leak detection and repair program (e.g., including use of FLIR infrared cameras, grab samples, organic vapor detection devices, and/or visual inspection).	Reduction in VOC and GHG emissions.		
Install or convert gas operated pneumatic devices to electric, solar, or instrument (or compressed) air driven devices/controllers.	Reduces VOC and GHG emissions.	Electric or compressed air driven operations can displace or increase combustion emissions.	
Use "low" or "no bleed" gas operated pneumatic devices/controllers.	Reduces VOC and GHG emissions.		Required by COGCC and by CDPHE in non-attainment areas.
Use closed loop system or thermal combustion for gas operated pneumatic pump emissions.	Reduces VOC and GHG emissions.		

Table VI-1 Best Management Practices and Air Emission Reduction Strategies for Oil and Gas Development

Emission Reduction Measure	Potential Environmental Benefits	Potential Environmental Liabilities	Feasibility
Install or convert gas operated pneumatic pumps to electric, solar, or instrument (or compressed) air driven pumps.	Reduces VOC and GHG emissions.	Electric or compressed air driven operations can displace or increase combustion emissions.	
Install vapor recovery on truck loading/unloading operations at tanks.	Reduces emissions of VOC and GHG emissions.	Pressure build up on older tanks can lead to uncontrolled rupture.	
Control Strategies for Fugitive Dust and Vehicle Emissions			
Unpaved surface treatments including watering, chemical suppressants, and gravel.	20% - 80% control of fugitive dust (particulates) from vehicle traffic.	Potential impacts to water and vegetation from runoff of suppressants.	
Use remote telemetry and automation of wellhead equipment.	Reduces vehicle traffic and associated emissions.		Not possible in some terrain.
Speed limit restrictions on unpaved roads.	Reduction of fugitive dust emissions.		
Reduce commuter vehicle trips through car pools, commuter vans or buses, innovative work schedules, or work camps.	Reduced combustion emissions, reduced fugitive dust emissions, reduced ozone formation, reduced impacts to visibility.		
Miscellaneous Control Strategies			
Use of ultra-low sulfur diesel (e.g., in engines, compressors, construction equipment).	Reduces emissions of particulates and sulfates.		Fuel not readily available in some areas.
Reduce unnecessary vehicle idling.	Reduced combustion emissions, reduced ozone formation, reduced impacts to visibility, reduced fuel consumption.		
Reduced pace of (phased) development.	Peak emissions of all pollutants reduced.	Emissions generated at a lower rate but for a longer period. LOP, duration of impacts is longer.	May not be economically viable or feasible if multiple mineral interests.

Appendix A Air Resources Oil and Gas NEPA Analysis Process / Methodology

1) Develop emissions scenarios. The Bureau of Land Management (BLM) field office (FO) staff should encourage proponents to use the BLM Colorado's Emissions Tool to develop the emissions scenarios for the Proposed Action and Alternatives (if applicable & proponent proposed). BLM FO staff or Air Resource Specialists (ARS) may have to develop Alternative emissions inventories for scenarios proposed by the government or public. Both proponents and BLM FO staff can contact Colorado State Office (COSO) ARS for help using the Emissions Tool.

The tool is based on Google's Apps Script technology (a web scripting framework) and therefore works best with the Chrome browser. Google's website indicates that the technology is also supported by the latest two browser editions for all of the other major modern browsers (e.g., Microsoft Internet Explorer 10 & 11). The BLM currently uses Internet Explorer 9, which will NOT render the tool.

2) Evaluate the emissions inventories, including the underlying parameters, specifications, and any assumptions to ensure they are reasonable and comprehensive to fully account for the emissions generating activities and sources of the Proposed Action and Alternatives (if applicable). Example: If an oil & gas proposal called for fracking during completion and proposed pipeline construction in the Surface Use Plan of Operation (SUPO), but the emissions inventories lack estimates from these operations, the inventory would be deemed incomplete and not representative of the proposal/alternative.

3) Compare the emissions inventories and project parameters against the cases below to determine the level of NEPA analysis required.

> Case 1: The estimated annual emissions of any single criteria pollutant (PM_{10}, $PM_{2.5}$, CO, NO_X, SO_X) are less than 2 tons per year. This project is not likely to cause impacts to air quality. The 2 ton threshold is what the State of Colorado requires for Air Pollutant Emission Notice (APEN) submissions and thus anything less than 2 tons is something that air quality regulators have deemed to be negligible (AQCR 3.II.D.I). For all practical purposes the BLM Colorado shall consider these sources to be of a similar nature with respect to NEPA impacts.
>
> NEPA analysis: Dismiss air quality as an issue for further analysis due to the project not having a potential for significant impacts. Incorporate the following language into the issues considered but eliminated from detailed analysis:
>
> *"As required for all oil and gas projects seeking to develop federal minerals administered by the BLM CO, an emissions inventory was prepared for the proposed action (and alternatives, if applicable) which provided the basis for dismissing air quality as an issue to be carried forward for further analysis. The resulting inventories indicate that the proposed action will result in not more than 2 tons per year of emissions (1 ton for non-attainment or maintenance area pollutants) for any criteria pollutant. The BLM has adopted the Colorado Department of Public Health and Environments Air Pollution Emissions Notice thresholds as the basis for which the BLM would not consider additional analysis when emissions are below the threshold. Sources or activities that emit less than a threshold level of pollutants per year are considered negligible for their potential to impact air quality."*

No further analysis or air quality discussion is required, i.e. no affected environment, environmental consequences, or cumulative impacts sections should be present in document.

Case 2: The specific project parameters and associated emissions were previously analyzed (to current standards/thresholds) as part of a larger NEPA analysis (i.e., a parent document), such that the information can be tiered to and incorporated by reference. An example of a parent document might be a master development plan that provided for an analysis (total or portions thereof) that a site specific APD EA could reference.

NEPA analysis: Identify which portions of the previous analysis (affected environment, environmental consequences, and cumulative impacts) are relevant to the current project and incorporate by reference in accordance with the NEPA handbook procedures (H-1790 NEPA Handbook pg. 27). Disclose the emissions inventory results and how they are covered by the previous analysis.

Case 3: The project parameters and associated emissions match those from a previously completed and applicable analysis, such that the information can be incorporated by reference. Case three is different from case two in that the analysis that describes the impacts from your matching project may be from another field office or state (i.e., the analysis is not a direct descendant of an overall parent project document). COSO ARS will assist in collating this data into a repository with descriptions of the emissions, analysis, and results to aid FO staff in finding and applying these analyses as they become available (future tool development).

NEPA analysis: Identify which portions of the previous analysis (affected environment, environmental consequences, and cumulative impacts) are relevant to the current project and incorporate by reference in accordance with the NEPA handbook procedures (H-1790 NEPA Handbook pg. 27). Disclose the emissions inventory results and how they are covered by the previous analysis. In many cases the ARS developed descriptions describing the referenced analysis will provide the basis for drafting the correlations for how the projects are similar and thus why the previous analysis would be applicable and appropriate for disclosing impacts for the current action being considered.

Case 4: The project parameters and associated emissions do not fit within the previous three cases, such that some level of "new" analysis is required.

Tier I Analysis: Run the ARS developed Dispersion Screening Tool to evaluate site specific receptor impacts (emissions inputs are derived from the Emission Tool results). This may be accomplished by FO personnel or with the assistance of COSO ARS staff. If the impacts at "sensitive receptor distances" are acceptable and the project parameters meet the requirements for using the Tier I method, then:

- Obtain the most recent version of the affected environment (derived from annual BLM CO CARPP report - Section V) for your FO from the internal ARS website and paste it into your NEPA document or incorporate the information by reference

(the same data will be available to the public on our external site). The section will contain the most recent annual analysis for air resources indicator values, trends, and issues relevant for the project area.

- Obtain the screening tool methodology and language for acceptable results (basis) from the internal ARS website, and paste it into the environmental consequences section of your NEPA document along with the emissions inventory and screening tool results.

- Obtain the most recent version of the cumulative impacts analysis (derived from the annual CARPP report) for your FO from the internal ARS website and paste it into your NEPA document or incorporate the information by reference (the same data will be available to the public on our external site). The section will contain the most recent annual analysis for cumulative FO development and its relationship to one of the three Colorado Air Resource Management Modeling Study (CARMMS) modeled scenarios (low, medium, high) for Colorado. The section will contain language for the impacts expected under the matching scenario and any required mitigation as a result of those impacts that can be incorporated directly into the FO's cumulative NEPA analysis.

Tier II Analysis: The Tier II method is essentially the same as the Tier I, except that the results at "sensitive receptor distances" are NOT acceptable (i.e., they are above a threshold of concern). Contact the COSO ARS to discuss options.

Tier III Analysis: The project is of significant size or duration (typically an EIS) such that the project parameters do not lend themselves to being adequately analyzed by the methods described in analysis Tier I. Contact COSO ARS staff to discuss site specific analysis or refined modeling options.

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Appendix K

Settlement Agreement

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Nos. 12-1322 & 12-1339

UNITED STATES COURT OF APPEALS
FOR THE TENTH CIRCUIT

CONSERVATION COLORADO EDUCATION FUND, et al.,
Plaintiffs-Appellees/Cross-Appellants

SALLY JEWELL, in her official capacity as Secretary of the Department of the Interior, et al.,
Defendants-Cross-Appellees

BILL BARRETT CORPORATION,
Intervenor-Appellant/Cross-Appellee, and

OXY USA INC., et al.,
Intervenors-Cross-Appellees.

On Appeal from the United States District Court for the District of Colorado
Civil Action No. 1:08-cv-01460-MSK-KLM
The Honorable Marcia S. Krieger, District Judge

STIPULATED SETTLEMENT AGREEMENT

Plaintiffs-Appellees/Cross-Appellants Conservation Colorado Education Fund, Colorado Mountain Club, Colorado Trout Unlimited, Rocky Mountain Wild, Rock the Earth, Natural Resources Defense Council, National Wildlife Federation, Sierra Club, The Wilderness Society, and Wilderness Workshop (collectively, "Plaintiffs"); Intervenor-Appellant/Cross-Appellee Bill Barrett Corporation ("BBC"); former Defendant-Intervenor, Vantage Energy Piceance LLC ("Vantage"); Intervenors-Cross-Appellees WPX Energy Rocky Mountain, LLC ("WPX"), OXY USA, Inc. ("OXY"), and Ursa Piceance, LLC ("Ursa") (Intervenor-Appellant/Cross-Appellee, former Defendant-Intervenor, and Intervenors-Cross-Appellees collectively, "Defendant-Intervenors" or "Lessees"); and Federal Defendants-Cross-Appellees (collectively, "BLM" or "Federal Defendants") (collectively, the "Parties") hereby enter into this Settlement Agreement for the purpose of settling this lawsuit without further judicial proceedings. The Parties hereby state as follows:

WHEREAS, Vantage originally purchased the leases identified in Paragraph 2 from the United States;

WHEREAS, Vantage sold a ninety percent interest in the leases identified in Paragraph 2 to BBC on June 12, 2009 and retained a ten percent interest in said leases;

WHEREAS, on July 11, 2008, Plaintiffs filed a Complaint for Declaratory and Injunctive Relief against the Federal Defendants alleging that BLM's 2007 Roan Plateau Record of Decision ("2007 ROD") and 2008 Record of Decision ("2008 ROD") approving the Roan Plateau Resource Management Plan Amendment and BLM's decision to offer oil and gas leases in the Roan Plateau Planning Area (the "Planning Area") violated the National Environmental Policy Act ("NEPA") and the Federal Land Policy and Management Act ("FLPMA");

WHEREAS, on June 22, 2012, the United States District Court for the District of Colorado ruled in Plaintiffs' favor on three issues (the "District Court Order");

WHEREAS, BBC has appealed the District Court Order, and Plaintiffs have filed a cross-appeal, both of which are pending in this Court;

WHEREAS, on January 28, 2013, BLM published its Notice of Intent to Prepare a Supplemental Environmental Impact Statement (the "SEIS") and Resource Management Plan Amendment for the Roan Plateau, Colorado (the "RMPA"), which will provide management direction for the Planning Area and amend two existing resource management plans: the Glenwood Springs Field Office Resource Management Plan ("RMP") and the White River Field Office RMP;

WHEREAS, the Parties, through their authorized representatives, and without any admission or adjudication of the issues of fact or law, have reached a settlement resolving the claims in this case;

WHEREAS, the State of Colorado has provided BLM an acknowledgement and acceptance of the fact that, by operation of law as required by 30 U.S.C. § 1721a, it will be required to reimburse the United States for its percentage of the previously disbursed bonus payments and annual rental payments attributable to the leases that will be canceled pursuant to this Settlement Agreement;

THEREFORE, the Parties enter this Settlement Agreement and stipulate and agree as follows:

A. Effective Date and Stay of Appeal

1. The Effective Date of this Settlement Agreement is the date on which it is executed by the last party to sign this Settlement Agreement. Within 10 days of the Effective Date of this Settlement Agreement, the Parties will file a joint motion for stay of proceedings in this Court, as set forth in the motion and proposed order attached as Exhibit 1.

B. Cancellation of Leases and Refund of Bonus Bids and Rentals

2. The BLM will cancel the following leases pursuant to its authority under 43 C.F.R. 3108.3(d): COC73066, COC73073, COC73074, COC73075, COC73076, COC73077, COC73078, COC73079, COC73080, COC73081, COC73082, COC73084, COC73086,

COC73087, COC73088, COC73089, and COC73090. The BLM will cancel the leases no later than 60 days after the Effective Date of this Settlement Agreement.

3. Upon cancellation of the leases identified in Paragraph 2, BLM shall refund to BBC, pursuant to Section 111A of the Federal Oil and Gas Royalty Simplification and Fairness Act, 30 U.S.C. §1721a, the bonus payments and annual rental payments attributable to the cancelled leases, on condition that, within 30 calendar days following such cancellation, BBC and Vantage jointly submit to the Office of Natural Resources Revenue a request for a refund pursuant to 30 U.S.C. § 1721a(b)(1). BBC and Vantage explicitly waive any claim of interest pursuant to 30 U.S.C. § 1721(h) for the bonus payments and annual rental payments attributable to the cancellation of the leases identified in Paragraph 2, and agree not to request any refund of interest when making the request for a refund herein contemplated.

4. BBC and Vantage agree that the refund of monies referenced in Paragraph 3 of this Settlement Agreement (hereinafter "refund monies") shall be made directly to BBC. BBC warrants that no party, other than Vantage, has an interest in the leases identified in Paragraph 2 or is entitled to the refund of monies based on the cancellation of those leases. BBC and Vantage agree not to appeal or otherwise object to the cancellation of the leases described in Paragraph 2 of this Settlement Agreement or make any claim against the United States related to the cancellation of the leases described in Paragraph 2 of this Settlement Agreement. BBC and Vantage agree that BBC shall be solely responsible for providing Vantage with its share of the refund monies. In the event any entities other than BBC and Vantage are determined to have an ownership interest in the leases described in Paragraph 2, BBC agrees to assume sole liability, and will hold the United States harmless, for any monetary claims asserted by those entities.

C. Resource Management Plan Amendment and Supplemental Environmental Impact Statement

5. BLM agrees that, as part of the SEIS being prepared in response to the District Court Order, it will examine in detail an alternative for the RMPA (the "Settlement Alternative") that includes the following elements:

a. Making the lands covered by the leases described in Paragraph 2 closed to new leasing;

b. Making the lands on top of the Roan Plateau that are presently contained within leases COC73091 and COC73092 ("BBC Retained Leases") open to oil and gas leasing and development, subject to lease notices, stipulations, and standard lease terms and conditions consistent with those for the BBC Retained Leases, except as modified by a new stipulation that incorporates the terms and conditions set forth in Exhibit 2; and

c. Making the lands at the base of the Roan Plateau that are presently contained within leases COC73064, COC73065, COC73067, COC73068, COC73069, COC73070, COC73071, COC73072, COC73083, COC73085, COC73093, and

COC73094 (collectively, the "Base Leases") open to oil and gas leasing and development, subject to lease notices, stipulations, and standard lease terms and conditions consistent with those for the Base Leases, except as modified by a new stipulation that incorporates the terms and conditions set forth in Exhibit 3.

6. BLM agrees that the SEIS will address the following:

a. Impacts to air quality as required by pages 29-37 of the District Court Order;

b. Impacts to greater sage grouse, taking into consideration the analysis in the Environmental Impact Statement for the Northwest Colorado Greater Sage-Grouse Resource Management Plan Amendment, and any resulting decisions;

c. The management of lands having wilderness characteristics consistent with BLM Manual 6320, considering the BLM's most recent inventory of such lands; and

d. Other matters as required by applicable law and policy, including consideration of new information or changed circumstances that may result in significantly different environmental effects from those addressed in the 2006 Environmental Impact Statement prepared by the BLM for the Planning Area.

7. BLM agrees that it will make its best effort to complete the final SEIS and issue a Record of Decision within 24 months of the Effective Date of this Settlement Agreement. The BLM will use information from existing NEPA analyses and other materials, as appropriate, consistent with 43 C.F.R. § 46.120 and 40 C.F.R. § 1502.21.

8. BLM agrees that: (a) pursuant to Onshore Oil and Gas Order Number 1, 72 Fed. Reg. 10308 (Mar. 7, 2007), BLM shall post any Application for Permit to Drill ("APD") or Master Development Plan ("MDP") submitted on leases described in Paragraphs 5.b. and 5.c. for 30 days prior to approval on BLM's Colorado River Valley Field Office APD web page; and (b) before authorizing construction of a new well pad (including wells for exploratory drilling), or centralized development or production facility, when the majority of the pad or facility is located within any portion of a Base Lease that is subject to a no surface occupancy/no ground disturbance ("NSO") stipulation, BLM will prepare a site-specific NEPA analysis of the proposed development.

D. Dismissal of Case and Agreements Not to Sue

9. Within 10 days following the cancellation of the leases identified in Paragraph 2, the Parties will jointly move to withdraw all pending motions filed with the U.S. Court of Appeals for the Tenth Circuit and will stipulate, pursuant to Fed. R. App. P. 42, to the voluntary dismissal of all appeals filed in this case, with each Party to bear its own costs, except as provided in Paragraph 16.

10. Plaintiffs agree that if BLM's final Record of Decision adopts the Settlement Alternative, they will not pursue an administrative protest, petition for state director review,

appeal to the Interior Board of Land Appeals ("IBLA"), or judicial challenge to (1) the Record of Decision for the RMPA, or (2) any approved APD, MDP, geographic area plan, or other plan for oil and gas activities on leases that complies with the applicable requirements of the Settlement Alternative as set forth in Paragraph 5 and Exhibit 2 (for the BBC Retained Leases) or Exhibit 3 (for the Base Leases). Plaintiffs additionally agree to engage as broad a spectrum of the environmental and conservation community as possible not to pursue an administrative protest, petition for state director review, IBLA appeal, or judicial challenge to those decisions.

11. Defendant-Intervenors agree that if BLM's final Record of Decision adopts the Settlement Alternative, they will not pursue an administrative protest, petition for state director review, appeal to the IBLA, or judicial challenge to the Record of Decision for the RMPA. Defendant-Intervenors further agree not to pursue a petition for state director review, appeal to the IBLA, or judicial challenge to any decision by BLM to modify their leases to include the terms and conditions set forth in Paragraph 5 and Exhibits 2 and 3, or to impose applicable terms and conditions from Paragraph 5 and Exhibits 2 and 3 on the approval of any APD, MDP, geographic area plan, or other plan for oil and gas activities on Defendant-Intervenors' leases.

12. Plaintiffs and Defendant-Intervenors further agree that they will not fund any other entity or person not a party to this Settlement Agreement to commence an administrative or judicial challenge that would be barred by this Settlement Agreement if brought by Plaintiffs or Defendant-Intervenors.

13. Except as expressly provided in Paragraphs 10-12 and Exhibits 2 and 3, nothing in this Settlement Agreement is intended to limit or waive Plaintiffs' and Defendant-Intervenors' rights to challenge: (a) the Record of Decision on remand (including a decision not to adopt the Settlement Alternative); or (b) any BLM decision related to oil and gas activities in the Planning Area (including, but not limited to, preserving Plaintiffs' right, subject to Paragraphs 10-12 and Exhibits 2 and 3, to challenge the approval of surface disturbing activities at a location identified in a Base Lease as being subject to an NSO stipulation and the grant of any exceptions, modifications or waivers of lease stipulations).

14. The Parties acknowledge that nothing in this Settlement Agreement affects BLM's discretion to adopt the plan of its choice among the alternatives (or a combination of the alternatives) analyzed in the SEIS.

E. Additional Terms

15. In the event any of the Parties believes a Party has breached its obligations under this Settlement Agreement, the Party alleging breach shall provide the allegedly breaching Party written notice and a reasonable opportunity to cure the alleged breach. The Parties agree that no Party shall be subject to any claim for money damages as a result of a breach of this Settlement Agreement, except for breaches of Paragraphs 3 and 16. The Parties further agree that the obligations set forth in Paragraphs 5 through 8 are not enforceable through a judicial action for breach of contract or other similar claim, and that any challenge to the sufficiency

of the SEIS, including the BLM's compliance with the obligations set forth in Paragraphs 5 through 8, may be brought only in a separate administrative or judicial action challenging the validity of the Record of Decision under the Administrative Procedure Act ("APA"), 5 U.S.C. §§ 551–559.

16. Each Party will bear its own attorneys' fees, costs and other expenses incurred during the entirety of this case, including those related to negotiation of this Settlement Agreement and prior attempts to reach settlement, except as otherwise outlined herein below:

a. BLM agrees to settle Plaintiffs' entire claim for any and all attorneys' fees, expenses, and costs by payment in the amount of $400,000.00.

b. Plaintiffs agree to accept payment of $400,000.00 in full satisfaction of any and all claims for attorneys' fees, expenses, and costs of litigation to which they allege they may be entitled in the above-captioned case, including any all claims, demands, rights, and causes of action pursuant to the Equal Access to Justice Act ("EAJA"), or any other statute, provision, or common law theory.

c. Effective upon Plaintiffs' receipt of payment from Federal Defendants, Plaintiffs herein release the United States, including each named Federal Defendant, from any claims for attorneys' fees, expenses, and costs of litigation in the above-captioned case pursuant to the EAJA, and any other statute, provision, or common law theory, for attorneys' fees, expenses, and costs in the above-captioned case.

d. Federal Defendants agree to submit all necessary paperwork to the appropriate offices of the federal government within 20 business days after all appeals are dismissed, or Plaintiffs provide the necessary information as required by Paragraph 16.e. to facilitate the payment, whichever is later.

e. Federal Defendants' payment will be made by electronic funds transfer of the agreed upon settlement amount into the account of Plaintiffs' attorney. Plaintiffs' attorney is receiving funds in trust for Plaintiffs, and Plaintiffs agree to this procedure. Plaintiffs and their attorneys agree to hold harmless Federal Defendants in any litigation, further suit, or claim arising from the payment of the agreed upon settlement amount pursuant to this Paragraph, other than for an allegation of Federal Defendants' breach of Paragraph 16 of this Settlement Agreement. Undersigned Plaintiffs' attorney shall provide all necessary account information to make the electronic funds transfer(s) including, as necessary: (1) Plaintiffs' counsel's tax identification number; (2) payee account name; (3) routing/transit number; (4) account number; (5) type of account; (6) name and address of banking institution; and (7) any other necessary information needed to make the payment, to the undersigned Federal Defendants' counsel. Thereafter, the Federal Defendants shall submit all necessary paperwork as provided in Paragraph 16.d. Undersigned Plaintiffs' counsel agrees to provide confirmation of the receipt of the agreed upon settlement amount to undersigned Federal Defendants' counsel within 14 days.

f. The Parties agree that Paragraph 16 was negotiated in good faith and it constitutes a settlement of claims for attorneys' fees and costs that were vigorously contested, denied, and disputed by the Parties.

17. This Settlement Agreement was negotiated for the purpose of avoiding further litigation. The Parties agree that this Settlement Agreement has no precedential value and does not represent an admission or waiver by any Party to any fact, claim, or defense relating to any issue in this lawsuit and shall not be admissible as evidence of any fact, claim, or defense in any litigation, other than litigation to enforce the terms of this Settlement Agreement. This Paragraph is not intended to limit or override any specific provisions in this Settlement Agreement.

18. The terms of this Settlement Agreement constitute the entire Settlement Agreement of the Parties, and no statement, agreement, or understanding, whether oral or written, which is not contained herein, shall be recognized or enforced, unless all Parties agree in writing to amend this Settlement Agreement.

19. Nothing contained in this Settlement Agreement shall be construed as a commitment or requirement that the Federal Defendants obligate or pay funds in contravention of the Anti-deficiency Act, 31 U.S.C. § 1341, or other applicable law.

20. Nothing in the terms of this Settlement Agreement shall be construed to limit or deny the power of the federal government to promulgate or amend regulations.

21. This Settlement Agreement applies to the Parties and upon Plaintiffs' and Intervenor-Defendants' successors, agents, and assignees.

22. The undersigned representatives of the Parties certify that they are authorized by the Parties they represent to execute this Settlement Agreement.

Date Signed: November 19, 2014

Sam Hirsch, Acting Assistant Attorney General
Environment & Natural Resources Division
Jason A. Hill, Trial Attorney
Natural Resources Section
Brian Toth, Trial Attorney
Appellate Section

Attorneys for Federal-Defendants/Cross-Appellees

Date Signed: November 19, 2014

Michael S. Freeman
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Attorneys for Plaintiffs-Appellees/Cross-Appellants
Conservation Colorado Education Fund, *et al.*

Date Signed: November __, 2014

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Senior Vice President, Government and Regulatory Affairs for Intervenor-Appellant/Cross-Appellee, Bill Barrett Corporation

Date Signed: November __, 2014

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Vice President - Business Development for Intervenor-Cross-Appellee Ursa Piceance, LLC

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Vice President – Piceance Asset Team for Intervenor-Cross-Appellee WPX Energy Rocky Mountain, LLC

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Division Manager, Piceance-South Texas for Intervenor-Cross-Appellee OXY USA, Inc.

Date Signed: November __, 2014

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President and Chief Financial Officer for former Defendant-Intervenor, Vantage Energy Piceance LLC

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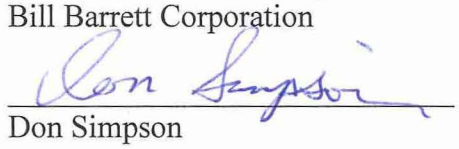
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Michael S. Freeman
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Attorneys for Plaintiffs-Appellees/Cross-Appellants
Conservation Colorado Education Fund, *et al.*

Date Signed: November __, 2014

_____
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Date Signed: November __, 2014

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Don Simpson

Vice President - Business Development for Intervenor-Cross-Appellee Ursa Piceance, LLC

Date Signed: November __, 2014

_____
Chad Odegard

Vice President – Piceance Asset Team for Intervenor-Cross-Appellee WPX Energy Rocky Mountain, LLC

Date Signed: November __, 2014

_____
Jeff Alvarez

Division Manager, Piceance-South Texas for Intervenor-Cross-Appellee OXY USA, Inc.

Date Signed: November 19, 2014

_____
Thomas B. Tyree, Jr.

President and Chief Financial Officer for former Defendant-Intervenor, Vantage Energy Piceance LLC

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Exhibit 1

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Case Nos. 12-1322, 12-1339

IN THE UNITED STATES COURT OF APPEALS
FOR THE TENTH CIRCUIT

CONSERVATION COLORADO EDUCATION FUND*, et al.*,
Plaintiffs – Appellees/Cross-Appellants,

v.

SALLY JEWELL,[1] in her official capacity as
Secretary of the Interior, *et al.*,
Federal Defendants – Cross-Appellees,

BILL BARRETT CORPORATION,
Intervenor – Appellant/Cross-Appellee,

and

OXY USA, INC., *et al.*,
Intervenors – Cross-Appellees.

JOINT MOTION FOR A STAY OF APPELLATE PROCEEDINGS

Pursuant to discussions held under Tenth Circuit Rule 33.1, the undersigned have reached a settlement agreement that they expect will eventually result in the dismissal of the appeals with prejudice. The undersigned jointly request that the Court stay the proceedings on

[1] Sally Jewell was sworn in as the Secretary of the Interior while this appeal was pending and is substituted for her predecessor, Kenneth Salazar, pursuant to Fed. R. App. P. 43(c)(2).

appeal for a period of 75 days while the parties carry out their commitments under that agreement that are necessary before they file their stipulation for voluntary dismissal.

Counsel for intervenors/cross-appellees OXY USA Inc. and WPX Energy Rocky Mountain, LLC and counsel for intervenors/cross-appellees Ursa Piceance LLC have been consulted and do not oppose this motion.

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Case Nos. 12-1322, 12-1339

IN THE UNITED STATES COURT OF APPEALS
FOR THE TENTH CIRCUIT

CONSERVATION COLORADO EDUCATION FUND*, et al.*,
Plaintiffs – Appellees/Cross-Appellants,

v.

SALLY JEWELL, in her official capacity as
Secretary of the Interior, *et al.*,
Federal Defendants – Cross-Appellees,

BILL BARRETT CORPORATION,
Intervenor – Appellant/Cross-Appellee,

and

OXY USA, INC., *et al.*,
Intervenors – Cross-Appellees.

PROPOSED ORDER

In accordance with 10th Cir. R. 33.1 and upon consideration of the parties' joint motion, and the lack of opposition thereto, the proceedings in this appeal are hereby stayed for a period of 75 days.

Entered for the Court,

ELISABETH A. SHUMAKER,
Clerk

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Exhibit 2

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EXHIBIT 2

RETAINED LEASES

Under the Settlement Alternative, the lands contained within the Retained Leases would be open to oil and gas leasing and development, subject to lease notices, stipulations, and standard lease terms and conditions consistent with those for the Retained Leases, except as modified by a new stipulation that includes the following terms and conditions:

A. No more than 7 well pads may be located on the Retained Leases; including pads drilled for either exploration or production activities. Subject to onsite inspection and approval by the Bureau of Land Management ("BLM") and other regulatory agencies, well pads shall be located approximately as depicted in the attached map. Exhibit 2.A.

Each well pad may disturb no more than 10 acres of the surface when drilling operations are occurring, and may be limited to a smaller size if BLM determines 10 acres are not needed for projected drilling operations. Each well pad shall be limited to approximately 3 acres of un-reclaimed surface during production.

There shall be no more than four pads on the Retained Leases at any time that take up more than three acres each of un-reclaimed surface. Those four pads may take up to a total of approximately 40 acres of un-reclaimed surface, with drilling operations occurring on no more than two of the pads at any one time. For purposes of this requirement, surface is considered reclaimed if BLM determines that its interim reclamation requirements have been met.

The Retained Leases are not required to be joined in a federal unit.

B. Primary access shall be limited to designated roads approximately as depicted on the attached map, Exhibit 2.A., subject to BLM's onsite inspection and approval. Operators may not use Cow Creek Road or the Rim Road east of the retained leases for access except in emergencies. For purposes of this requirement, an "emergency" means unforeseeable physical inaccessibility for other routes or an unforeseeable condition creating a significant risk of environmental harm or injury to persons. Limitations on contractual access from the south or west, or foreseeable delays in obtaining access for drilling, site preparation, completion activities, or regularly-scheduled maintenance and other activities, do not represent an emergency. Where an emergency situation exists, access for maintenance of on-going active drilling and completion operations, and service for existing production, is allowed.

C. Pipeline and gathering line infrastructure, water lines, and utility lines, shall be collocated with designated access roads as depicted on the attached map, Exhibit 2.A., subject to BLM's onsite inspection and approval, and may depart from designated access roads if BLM determines that doing so reduces net disturbance or visual impacts. No less than 90 percent of the total pipeline length shall be collocated.

D. Prior to exploration and/or lease development on the Retained Leases, the operator must submit a proposed Master Development Plan ("MDP") identifying projected activity (including well locations, roads, pipelines, facilities and associated infrastructure) and appropriate monitoring and methodologies in conformance with the requirements of the resource management plan as adopted to incorporate the Settlement Alternative.

E. Prior to submitting the MDP, the operator shall consult with the Colorado Division of Parks and Wildlife and BLM to develop terms that minimize impacts to wildlife and other resources. Agreed-upon terms shall be included in the operator's proposed MDP.

F. The following will be required in any approved MDP, and incorporated as conditions of approval for all drilling permits:

a. Road engineering standards to minimize disturbance associated with road improvements;

b. Requirements for removing unnecessary infrastructure as soon as feasible;

c. The required reclamation plan will include reclamation processes that can be reasonably expected to meet the 5 year reclamation standard within 3 growing seasons;

d. Closed-loop drilling systems and/or tanks shall be used instead of pits, except for pits used solely to store fresh water;

e. Telemetry for remote monitoring of producing wells;

f. Wellheads to be subject to appropriate measures for visual impact mitigation;

g. Conveyance by pipeline of drilling water, water used for hydraulic fracturing and completions, and flowback water, to minimize truck traffic;

h. Centralized water management during drilling, completion and production (e.g., not every location will have pits);

i. Recycling of water used during well completions, and recycling of produced water while well completion activities are in progress;

j. Conveyance by pipeline of produced water and condensate to centralized facilities to minimize truck traffic;

k. Utilize centralized compression, storage, separation and dehydration facilities;

l. No more than 3 centralized facilities will be constructed for all centralized management purposes in Paragraphs F.h., F.j. and F.k., and those facilities will be located on three of the potential locations indicated on the attached map, Exhibit 2.A.;

m. Disclosure of all chemicals used during drilling and production activities. Chemicals used during completion activities shall be disclosed pursuant to Colorado Oil and Gas Conservation Commission rules;

n. Tier III equivalent or lower emissions for drill rigs for all wells;

o. Vapor combustors or vapor recovery on all condensate tanks, water tanks and dehydrators, and no/low-bleed control valves on all facilities;

p. Reduced-emission ("green") completions, as defined by 40 C.F.R. § 60.5430; and

q. Utilize liquids lifting practices to limit venting, including plunger lifts or alternative technologies that are at least as effective in limiting venting.

G. Potential conditions of approval identified in the applicable record of decision replace those identified in the 2006 Proposed Resource Management Plan Amendment/Final Environmental Impact Statement and associated records of decision.

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Exhibit 2A

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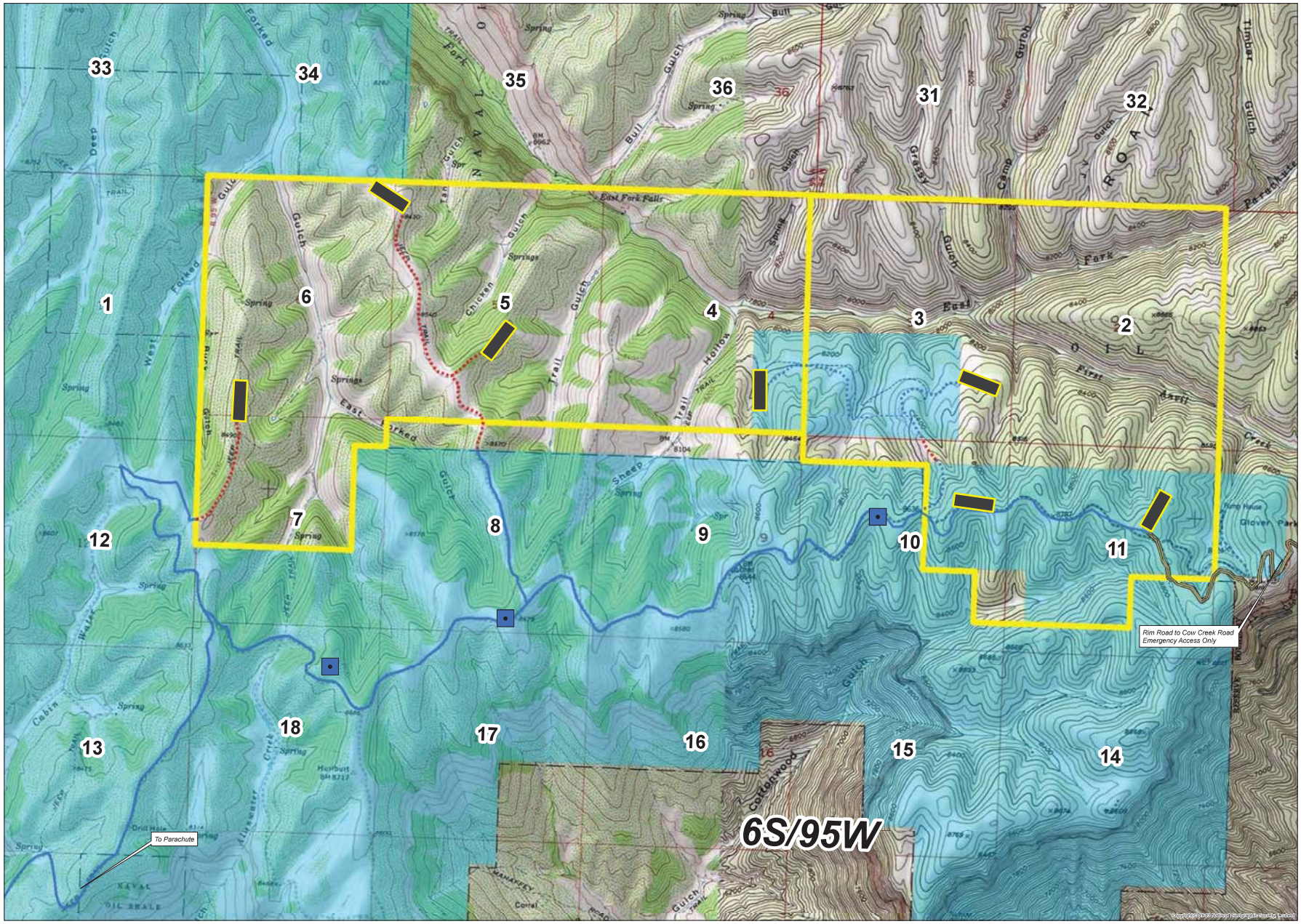

Bill Barrett Corporation

Exhibit 2 - Attachment A
Roan Plateau Retained Leases
Development Plan

Legend

- Potential Central Gathering Facility Locations
- BBC Retained Leases
- BBC Proposed Well Pads

Federal Surface Access Roads

- Existing O&G ROW
- Upgrade of Existing Road

Private Surface Access Roads

- Existing O&G ROW
- Upgrade of Existing Road
- Rim Road to Cow Creek Road
- Private Surface Ownership

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Exhibit 3

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EXHIBIT 3

BASE LEASES

Under the Settlement Alternative, the lands contained within the Base Leases would be open to oil and gas leasing and development, subject to lease notices, stipulations, and standard lease terms and conditions consistent with those for the Base Leases, except as modified by a new stipulation that includes the following terms and conditions:

A. Prior to exploration and/or lease development on it Base Leases, an operator shall submit a proposed master development plan ("MDP") identifying its projected activities. Prior to submitting the MDP, an operator shall consult with the Colorado Division of Parks and Wildlife and Bureau of Land Management to develop terms that minimize impacts to wildlife and other resources. Agreed-upon terms shall be included in the operator's MDP.

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