

**United States Department of the Interior
Bureau of Land Management**

**Environmental Assessment
DOI-BLM-CO-S010-2012-0024**

October 2012

**HB 6, HE 6, YB 6 Well Pads, Associated Flowlines, and
Production Pipelines**

***Location:* Canyons of the Ancients National Monument and surrounding area
Montezuma County, Colorado**

***Applicant/Address:* Kinder Morgan CO₂ Company, LP
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**U.S. Department of Interior
Bureau of Land Management
Canyons of the Ancients National Monument
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LIST OF ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
ACMUA	Anasazi Culture Multiple Use Area
APD	Application for Permit to Drill
AUM	Animal Unit Month
BA	Biological Assessment
bbl	barrel
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
BMP	Best Management Practice
CDA	Colorado Department of Agriculture
CDPHE	Colorado Department of Public Health and Environment
CEDS	Colorado Economic Development Strategy
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CO	carbon monoxide
CO ₂	carbon dioxide
COA	Condition of Approval
COGCC	Colorado Oil and Gas Conservation Commission
CPW	Colorado Parks and Wildlife
dBA	decibel
DOLA	Department of Local Affairs
EA	Environmental Assessment
Ecosphere	Ecosphere Environmental Services
EIS	Environmental Impact Statement
FEL	from east of line
FNL	from north of line
FONSI	Finding of No Significant Impact
FSL	from south of line

FWL	from west of line
GIS	Geographic Information System
H ₂ S	hydrogen-sulfide gas
IDA	International Dark-Sky Association
IDLH	Immediately Dangerous to Life or Health
KOP	Key Observation Points
MBTA	Migratory Bird Treaty Act
MHI	median household income
MSDS	Material Safety Data Sheets
NEPA	National Environmental Policy Act
NO _x	nitrogen oxides
NRCS	Natural Resource Conservation Service
P.L.	Public Law
PA	Project Area
PAC	Protected Activity Center
RFD	Reasonable Foreseeable Development
RMP	Resource Management Plan
ROW	right-of-way
RSWMP	Regional Storm Water Management Plan
SHPO	State Historic Preservation Office
SWD	Salt Water Disposal
T&E	threatened, endangered, proposed, and candidate species
U.S.C.	United States Code
UIC	underground injection control
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	visual resource management

HB 6, HE 6, YB 6 Well Pads, Associated Flowlines, and Production Pipelines

(DOI-BLM-CO-S010-2012-0024)

1. PURPOSE AND NEED

1.1 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental effects of the development of three well pads and associated infrastructure (Project) as proposed by Kinder Morgan CO₂ Company, LP (Kinder Morgan). The EA is a site-specific analysis of potential effects that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the Bureau of Land Management (BLM) in project planning and ensuring compliance with the National Environmental Policy Act of 1969 (NEPA), and in making a determination as to whether any “significant” effects could result from the analyzed actions. “Significance” is defined by NEPA and is found in Title 40 of the Code of Federal Regulations (CFR) Part 1508.27.

A Decision Record, including a “Finding of No Significant Impact” (FONSI) documents the rationale for why implementation of the selected alternative would not result in “significant” environmental effects beyond those already addressed in the San Juan/San Miguel Planning Area Resource Management Plan (RMP) dated September 1985, as amended in October 1991, and the Canyons of the Ancients National Monument Resource Management Plan (RMP) dated June 2010 (BLM 2010).

This chapter presents the purpose and need for the Proposed Project, as well as the relevant issues, that is, those elements of the human environment that could be affected by the implementation of the Proposed Project. In order to meet the purpose and need of the Proposed Project in a way that resolves the issues, the BLM has considered and/or developed a range of action alternatives. These alternatives are presented in Chapter 2. The potential environmental effect or effects of each alternative considered in detail are analyzed in Chapter 3 for each of the identified issues.

1.2 Background

Kinder Morgan has submitted Colorado Oil and Gas Conservation Commission (COGCC) applications and BLM Applications for Permits to Drill (APDs) for three (3) carbon dioxide (CO₂) gas wells and associated well tie pipelines on private land within and adjacent to Canyons of the Ancients National Monument (the Monument) administered by the BLM in Montezuma County, Colorado (Figure 1). Kinder Morgan has also submitted sundry notices to BLM for improvements to existing production lines associated with the proposed wells. BLM will

consider approval of the proposed drilling and pipeline improvements in a manner that: 1) avoids or reduces effects on cultural resources and other resources and activities as identified in the RMP; 2) best meets the objectives of the Monument; 3) is consistent with the lease rights granted to the applicant; and 4) prevents unnecessary or undue degradation of public lands.

The legal descriptions for the proposed wells are provided in Table 1. The locations of the proposed wells, pipelines, and access roads are provided in Figures 1, 2, 3, and 4.

Table 1. Lease summaries and legal descriptions for proposed well pad locations.

Well Name	Mineral Lease - Surface/Bottom Hole (Issue Date)	Lease Stipulations	Surface Location (Ownership)	Bottom Hole Location (Mineral Ownership)	Vertical Depth (feet) ¹
HB 6	COC-001713	Standard lease terms and conditions	T38N; R19W; S36; 1,138' FNL; 2,443' FEL (Fee)	T38N; R19W; S25; 862' FSL; 2,459' FEL (BLM)	8,000
HE 6	COC-022375	Standard lease terms and conditions	T37N; R19W; S1; 275' FNL; 10' FWL (Fee)	T37N; R19W; S1; 1,714' FSL; 1,420' FWL (BLM)	8,000
YB 6	COC-002653	Standard lease terms and conditions	T37N; R18W; S24; 1,111' FNL; 812' FWL (Fee)	T37N; R18W; S23; 1,112' FNL; 1,188' FEL (BLM)	8,000

Note:

¹ Each of the proposed wells would have a 2,000-foot horizontal completion installed from the bottom hole location, at the vertical depth of the given well.

Key: FEL = from east of line; FNL = from north of line; FSL = from south of line; FWL = from west of line.

Kinder Morgan developed project-specific Design Features that would achieve the project purpose and need while providing project-specific environmental protection measures.

Figure 2. Location of the project elements.

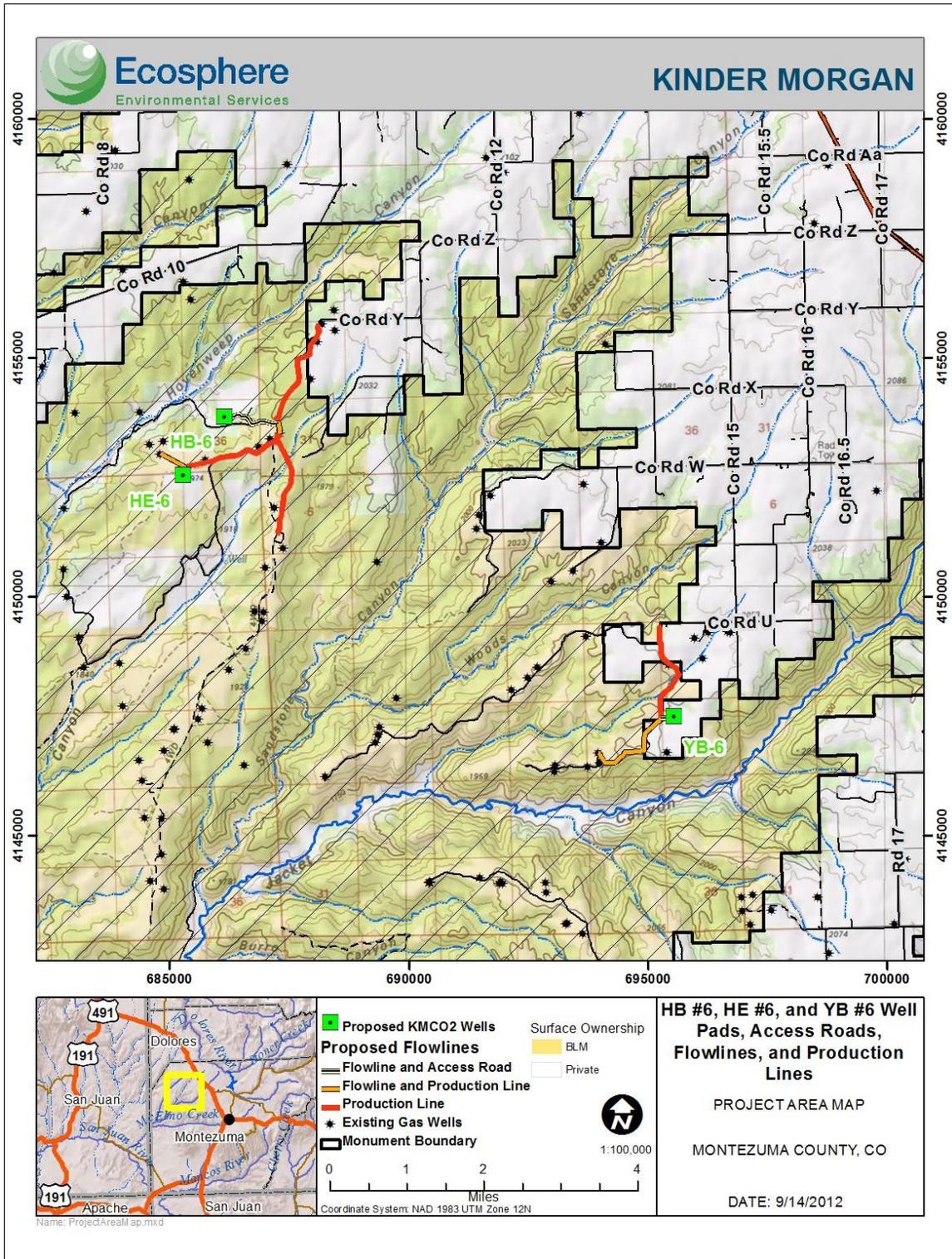


Figure 3. Access roads, flowlines, and production lines for the proposed HB 6 and HE 6 wells.

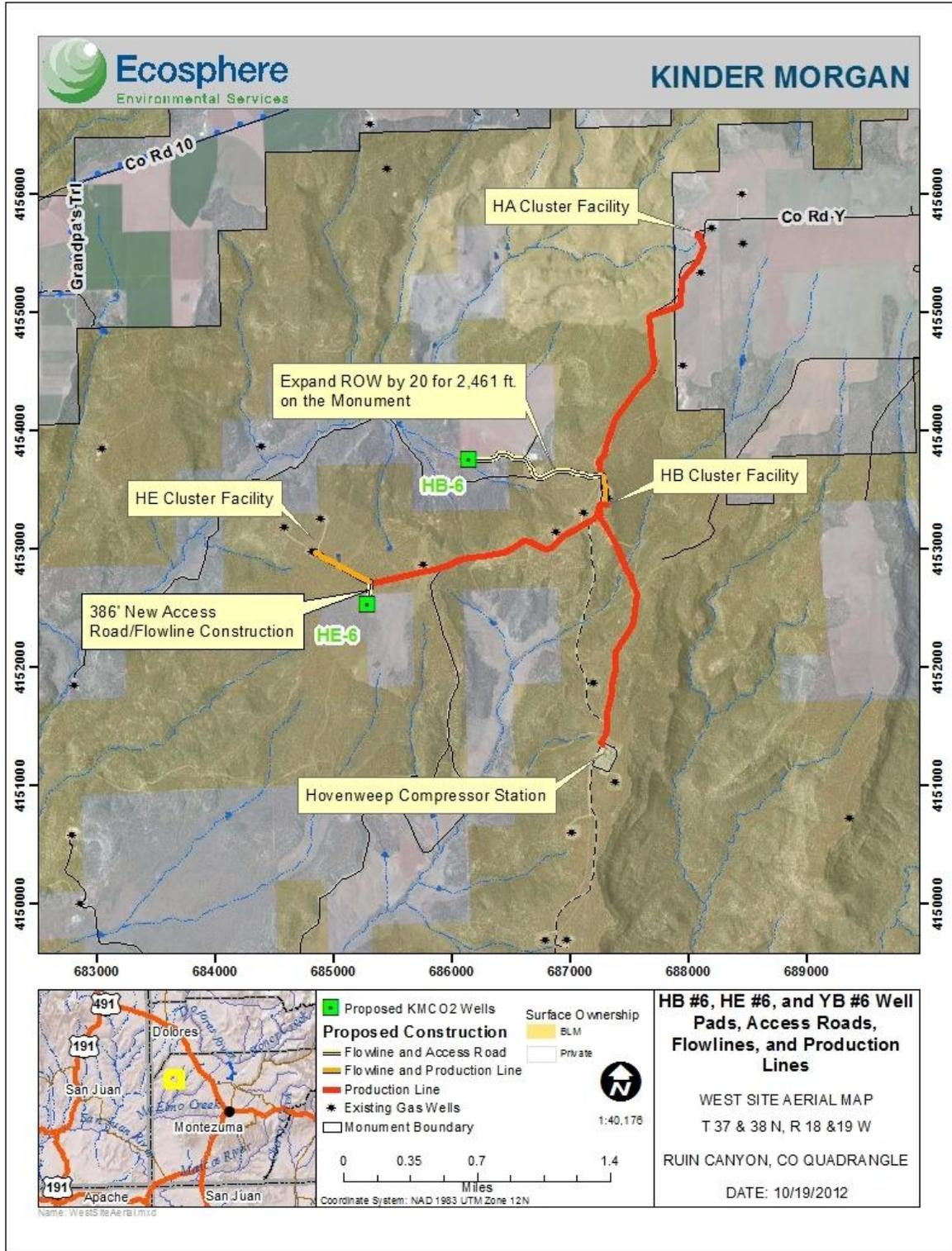
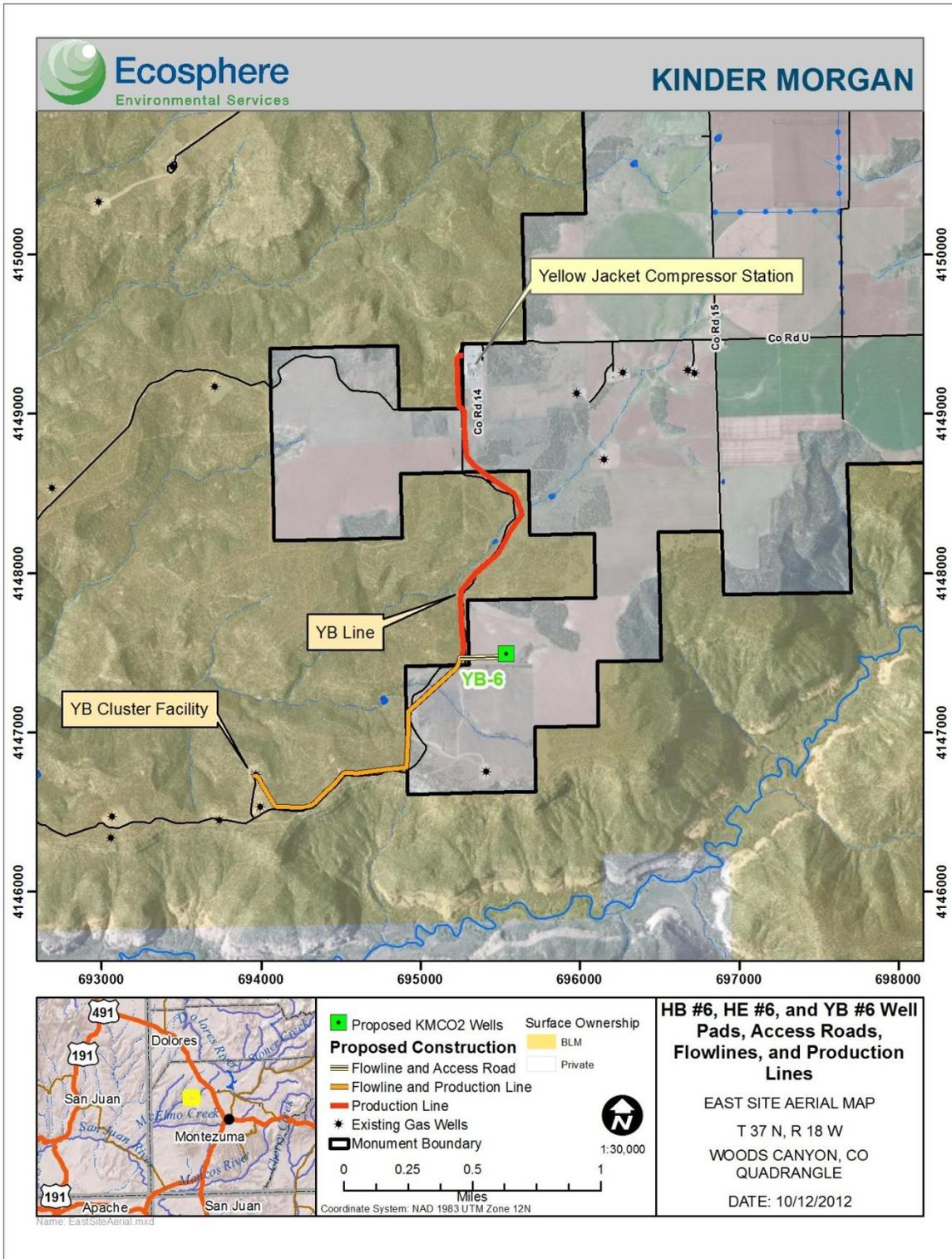


Figure 4. Access road, flowline, and production line for the proposed YB 6 well.



1.3 Need for the Proposed Action

The BLM's need is to respond to the applicant's APD for three well pads on private lands within and adjacent to the Monument, and sundry notices for the production line upgrades in accordance with the Mineral Leasing Act of 1920, as amended by the Federal Land Policy and Management Act of 1976 and Federal Onshore Oil and Gas Leasing Reform Act of 1987.

BLM will consider approval of the proposed drilling in a manner that: 1) avoids or reduces effects on cultural resources and other resources and activities as identified in the RMP (RMP, 2010, RMP 1985); 2) best meets the objectives of the Monument; 3) is consistent with the lease rights granted to the applicant; and 4) prevents unnecessary or undue degradation of public lands.

1.4 Purpose(s) of the Proposed Action

BLM's purpose is to consider Kinder Morgan's proposal to develop its Federal Leases, COC-001713, COC-022375, and COC-002653, consistent with the leases' terms and conditions is recognized as an appropriate use of public lands in the Canyons of the Ancients National Monument Record of Decision / Resource Management Plan (June 2010) and the San Juan/ San Miguel Planning Area Record of Decision / Resource Management Plan (September 1985).

1.5 Decision to be Made

The BLM will decide whether or not to approve the APDs and sundry notices, and if so, under what terms and conditions.

1.6 Conformance with BLM Land Use Plan(s)

The Proposed Action is subject to and has been reviewed for conformance with the following land use plans and amendment (43 CFR 1610.5, BLM 1617.3):

- Plan:** *San Juan/San Miguel Planning Area Resource Management Plan (RMP, 1985)*
- Date Approved:** September 1985
- Page Number:** Page 17 states —BLM actively encourages and facilitates the development by private industry of public land mineral resources so that national and local needs are satisfied and economically and environmentally sound exploration, extraction, and reclamation practices are provided.
- Amendment:** *San Juan/San Miguel Resource Management Plan Amendment Record of Decision (1991)*. The Final Environmental Impact Statement (FEIS) is also known as the Amendment to the RMP.

Date Approved: October 28, 1991

Page Number: Page 11 states that the objective is to —Facilitate orderly, economic, and environmentally-sound exploration and development of oil and gas resources using balanced multiple-use management. Also, page 2-2 of the FEIS states that: —In addition to this EIS, an Environmental Assessment (EA) will be completed on each Application for Permit to Drill or group of APDs.

Plan: *Canyons of the Ancients Resource Management Plan (RMP, 2010)*

Date Approved: June 2010

Page Number: Page 5 states “The Monument Proclamation requires that existing lease rights be honored. However, it also requires that development should not create any significant new impacts to cultural resources or to other objects that the Monument was established to protect. In order to implement management objectives, the preferred management strategy is to protect cultural resources, their associated settings, and surface and subsurface resources, especially in areas of high site density.”

The Proposed Action would fulfill the objective and intent of the 1985 San Juan/San Miguel RMP and 1991 Amendment that public land mineral resources be developed in an environmentally sound way, and thus is in conformance with the RMP. The Proposed Action would fulfill the objective and intent of the 2010 Monument RMP that mineral resources be developed in an environmentally sound way with special emphasis on protecting cultural resources within the Monument, and thus is in conformance with the RMP. A written decision by the Authorized Officer would include a decision on conformance.

1.7 Relationship to Statutes, Regulations, or Other Plans

Exploration and development of Federal oil and gas leases by private industry is an integral part of the BLM’s oil and gas leasing program under authority of the Mineral Leasing Act of 1920, as amended, the Mining and Minerals Policy Act of 1970 (30 U.S.C. 21), the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1761-1777), the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (30 U.S.C. 195 et seq.), and applicable BLM Onshore Oil and Gas Orders (43 CFR 3160).

BLM regulates oil and gas development so as to minimize environmental impacts to public lands as required by numerous Federal laws, including:

- The Endangered Species Act of 1973 (P.L. 94-325)
- The Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-712)

- The Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. 668-668d)
- The Federal Water Pollution Control Act of 1948, as amended (33 U.S.C. Chap. 26)
- The Clean Air Act of 1963, as amended (P.L. 88-206)
- Clean Water Act of 1972, amended 1977
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 U.S.C. Chap. 103)
- The Antiquities Act of 1906, as amended (P.L. 52-209)
- The National Historic Preservation Act of 1966, as amended (P.L. 89-665)
- The Archaeological and Historic Preservation Act of 1974 (P.L. 86-253)
- The Archaeological Resources Protection Act of 1979, as amended (P.L. 96-95)
- The American Indian Religious Freedom Act of 1978, as amended (42 U.S.C. 1996)
- The Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601)
- Executive Order 12898 of 1994, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”

This EA considers the requirements of these laws and implementing regulations, as applicable, as part of the Proposed Action. The Proposed Action, including associated applicant-committed mitigation measures, complies with the laws and implementing regulations indicated above.

1.7.1 Conformance with Colorado Standards for Public Lands Health

In September 1997, Colorado BLM established standards for health of public lands in the state. The standards relate to all uses of public lands, and a finding for each standard must be included in each EA. The five standards for protecting Public Lands Health are:

1. Ensure healthy upland soils;
2. Protect and improve riparian systems;
3. Maintain healthy, productive, native plant and animal communities;
4. Maintain or enhance threatened or endangered species and their habitats; and
5. Ensure water quality meets minimum Water Quality Standards established by the State of Colorado.

The standards describe conditions needed to sustain public land health and relate to all uses of the public lands. The standards are applied on a landscape scale and relate to the potential overall health and sustainability of the landscape. Additional information on the standards and guidelines can be found at the Colorado BLM website: <http://www.co.blm.gov/standguide.htm>. Findings for each of the specific project study area standards (if applicable) are described in the

relevant resource description in Chapter 3, Affected Environment and Environmental Consequences.

1.8 Scoping

A scoping letter describing the Proposed Project was sent to adjacent landowners and interested parties on December 5, 2011. The proposed project has been continuously listed on the BLM's online NEPA Register (<http://www.co.blm.gov/nepa/sjplcnepa.htm>) since approximately December 5, 2011. Tribal consultation is described in Section 3.9. Finally, BLM issued a press release to the Cortez Journal on May 3, 2012.

Four scoping comments were received and are located in the project file at the BLM Tres Rios Field Office.

1.9 Identification of Issues

Issues identified for the project include:

- Impacts to cultural sites within the Monument
- Impacts to Mexican spotted (*Strix occidentalis lucida*) owl habitat

1.10 Issues Considered but Eliminated from Further Analysis

There are no prime or unique farmlands, known paleontological resources, wilderness or wilderness study areas, floodplains, wetlands or riparian areas, or wild and scenic rivers within the project area. These resources were not considered in Chapter 3, Affected Environment and Environmental Consequences.

2. DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Introduction

The Proposed Action has been proposed by Kinder Morgan to allow for development of the fluid mineral resources (CO₂ gas) present in the area while minimizing environmental effects to land surface resources. The proposed action consists of drilling three wells on three different well pads, plus constructing access roads, flowline and production lines. In this EA, flowlines are defined as pipelines that transport CO₂ gas from a well to the local “cluster” facility where initial processing of the gas takes place. Production lines are pipelines that transport the CO₂ gas from the local “cluster” facility to a main compressor station (Figures 1 - 4).

As part of the site evaluation process, archaeological, biological, and surface hydrological resources were considered prior to choosing the locations for each well pad, and access road, and flowline and production line routes. Based upon an initial screening of the proposed project area and vicinity, the proposed project locations were chosen as representative of the locations that would least affect area resources while allowing efficient and economical development of the mineral resources.

The following steps were performed by Kinder Morgan in choosing the locations for the proposed wells. This sequence outlines the process used to minimize the environmental effects of the Proposed Action.

Existing information and new archaeological inventory information was used by the contract archaeologist to identify potential well locations that had the largest distance between cultural site boundaries and construction limits. From this initial screening process, the contract archaeologist recommended well pad locations that would minimize effects to cultural resources. The contract archaeologist also conducted cultural surveys of potential access roads and flowline and production line routes to identify routes that would minimize effects to cultural resources. Consideration was also given to topography at the proposed well sites and pipeline routes, the presence of arroyos or drainage channels, distance to canyon rims, and the distance to existing access roads. Based on this screening method, the locations of wells, access routes, and pipelines, as described in the Proposed Action, were chosen as having the least potential effect to Monument resources.

Alternatives considered in detail are described below, followed by alternatives considered but not analyzed in detail. The environmental consequences described in Chapter 3 are based on this detailed description of alternatives. The Proposed Action incorporates the items described by the operator in the APD and sundry notice packages. In addition, Kinder Morgan would apply Conditions of Approval (COAs), as specified by BLM, for each well pad, access route, flowline and production line as detailed in Appendix A.

2.2 Alternative A – No Action

The NEPA (42 U.S.C. 4321-4347, as amended) requires that a “no action” alternative be considered in all environmental documents. The Proposed Action involves Federal subsurface minerals that are encumbered with Federal oil and gas leases, which grant the lessee a right to explore and develop the lease. Although the BLM cannot deny the right to drill and develop the leasehold, individual APDs can be denied to prevent unnecessary and undue degradation. The no action alternative constitutes denial of the APDs and sundry notices associated with the Proposed Action.

2.3 Alternative B – Proposed Action

Kinder Morgan has filed Notices of Staking and APDs with the BLM and the COGCC to drill and develop three CO₂ gas wells on private lands within or adjacent to the Monument boundary in Montezuma County, Colorado. The wells would be drilled to the Leadville Formation of the McElmo Dome Unit under the terms of existing mineral leases with the BLM. The Notices of Staking were submitted in October 2011, and the APDs for the wells were submitted to the BLM on March 16, 2012. As part of the mineral development activities, Kinder Morgan proposes to produce and transport the CO₂ gas in new flowlines and four production lines. Sundry notices for the proposed production line improvements were submitted to the BLM and are being analyzed as part of this EA. A summary of the proposed construction activities is provided below, with additional details provided in Section 2.3.1. A summary of the disturbance (46.4 acres) for the proposed project activities is provided in Tables 2 and 3. As described in Section 2.3.1 Plan for Surface Reclamation, approximately 42.4 acres will undergo interim reclamation, leaving about 4 acres of long-term (lifetime of the wells) disturbance associated with access roads and well pad areas. In addition, Kinder Morgan would apply Conditions of Approval (COAs), as specified by BLM, for each well pad, access route, flowline and production line as described in Appendix A.

Wells and Access Roads. The Proposed Action includes construction and drilling of three new CO₂ wells. Each of the new wells would require construction of well pads and access roads. The well pads provide the necessary space for drilling and completion of the wells. When the wells go into production, the well pads will be reclaimed back to a small production pad of about ½-acre (about one-tenth the original pad size). The roads provide access for drilling, completion, operation, and maintenance of the wells (Figures 3 and 4). Approximately 5,027 feet of new access roads would be constructed (Table 2). After the drilling and completion phases are complete, these roads will be reclaimed back to a driving width of approximately 20 feet and will be maintained for the life of the wells. If any wells were unproductive, the well bore would be plugged and abandoned, and the well pad and access road would be reclaimed per the BLM Conditions of Approval (COAs).

Flowlines. When drilling and testing of the wells are completed, and the wells are deemed productive, they would be connected via construction of a 10-inch buried flowline to three

existing CO₂ gathering system and processing facilities (cluster facilities) known as the HB cluster, the HE cluster, (both shown on Figure 3) and the YB cluster (Figure 4). The majority of flowlines would be installed in existing, previously disturbed rights-of-way (ROWs) (9,576 feet) with a disturbance width of 25 feet, and the remainder would be installed parallel to the proposed new access roads (5,027 feet) (Table 2). The combined access road and flowline ROW width for all project components would be 50 feet. After construction, the flowline right-of-ways (ROW) will be reclaimed so that they are re-vegetated with native vegetation, or appropriate vegetation on private lands, and will be maintained weed-free for the life of the wells. If any well was unproductive, the associated flowline would not be constructed.

Acres of Disturbance for well pads, access roads and flowlines

Total disturbance required for Well HB-6 would be about 8.88 acres (Figure 3 and Table 2). The proposed well pad is a 410-ft x 420-ft rectangle consisting of about 3.95 acres, entirely on private land. The access road and flowline ROW would extend about 3,930 feet east from the well pad to the unnamed arterial road that is a southern extension of CR Y. The existing road on the Monument is a well-established road that is roughly 30-feet wide. However, it is not wide enough to accommodate the access road and flowline. Therefore, the ROW in the 2,461-ft-long section of road on the Monument would be widened 20 feet to create a 50-ft ROW and would create new disturbance on the Monument of about 1.13 acres. The portion of the access road that is on private land is a 2-track and the access and flowline ROW would create a 50-ft wide ROW that is about 1,469-feet long. This section of the ROW would create about 1.69 acres of disturbance. This, combined with the well pad disturbance, equals a total of about 5.64 acres on private land. Approximately 725 feet of flowline would need to be buried in the existing pipeline ROW along the north-south arterial to reach the HB cluster facility. In summary, about 5.64 acres of the total disturbance would be on private land, about 2.11 acres would be in the existing ROW on the Monument, and about 1.13 acres would be new disturbance on the Monument.

Total disturbance required for Well HE-6 would be about 5.45 acres (Figure 3 and Table 2). The proposed well pad is a 400-ft x 415-ft rectangle of about 3.81 acres, entirely on private land. The access road and flowline ROW would extend about 386 feet south from the unnamed arterial road that is a southern/south-western extension of CR Y, to the well pad. About 228 feet (0.26 acres) of this 50-ft ROW is on the Monument and about 158 feet (0.18 acres) is on private land. The total disturbance for this segment of new access/flowline ROW is about 0.44 acres. The flowline would be buried in the existing north-west trending ROW to reach the HE cluster facility. This ROW is about 2,084-feet long and disturbance on the Monument would amount to about 1.20 acres. In summary, about 3.99 acres of the total disturbance would be on private land, about 1.20 acres would be in the existing ROW on the Monument, and about 0.26 acres would be new disturbance on the Monument.

Total disturbance required for Well YB-6 would be about 9.57 acres (Figure 4 and Table 2). The proposed well pad is a non-rectangular shape consisting of about 4.75 acres, entirely on private land. The access road and flowline ROW would extend west from the well pad Montezuma County Road 14 (CR 14) for about 711 feet, also on private land. The access/flowline ROW would be 50-feet wide to accommodate both the access road and the flowline and would disturb an area of about 0.82 acres. From the intersection at CR 14, the flowline would be installed in the existing ROW south to the YB cluster facility. It would be about 6,963-feet long and would occupy a 25-foot-wide disturbance corridor in the existing ROW, which amount to about 4.0 acres on both private and Monument land. In summary, about 7.17 acres of the total disturbance would be on private land and about 2.3 acres would be in the existing ROW on the Monument.

As described above and detailed in Table 2, total disturbance for the three wells, access roads and flowlines would be about 23.8 acres. About 7.0 acres of that total would occur on the Monument and about 16.8 acres would occur on private lands (Table 2).

Table 2. Project design features – well pads and access roads/flowlines.

Well Name	Length Disturbed for New Access Road & Flowline ¹	Flowlines within existing ROW ²	Well Pad Size and Area to edge of Disturbance ³	Total Affected Surface Area	Private Land Section	Previously Disturbed ROWs within the Monument	New Disturbance on the Monument
Disturbance Based on Facility Type				Totals	Disturbance Based on Land Ownership		
Totals					Totals		
HB 6	3,930 feet/ 4.51 acres	725 feet/ 0.42 acre	410'x 420' 3.95 acres	8.88 acres	5.64 acres	2.11 acres	1.13 acres ⁴
HE 6	386 feet/ 0.44 acre ⁵	2,084 feet/ 1.20 acres	400'x 415' 3.81 acres	5.45 acres	3.99 acres	1.20 acres	0.26 acres
YB 6	711 feet/ 0.82 acre	6,767feet/ 3.90 acres	Non-rectangular shape of approx. 440'x 470' 4.75 acres	9.47 acres	7.17 acres	2.30 acres	0 acres
Totals	5,027 feet/ 5.77 acres	9,576 feet 5.50 acres	12.51 acres	23.8 acres	16.80 acres	5.61 acres	1.39 acres

Notes:

- ¹ Disturbance based on a 50-foot-wide construction corridor for combined access road and flowline construction. Calculations: [(linear feet x 25-ft width)/43,560 ft² per acre] = acres of disturbance.
- ² New disturbance based on a 25-foot-wide construction corridor for flowline construction within existing ROWs along existing county roads and/or local unnamed arterials. Calculations: [(linear feet x 25-ft width)/43,560 ft² per acre] = acres of disturbance.
- ³ New disturbance area based on well-pad dimensions submitted with APD used to calculate well pad area including to edge of disturbance. Well pads are located exclusively on private lands.
- ⁴ The existing road to HB 6 is not wide enough for the access road and flowline. The ROW would need to be widened by 20 feet for 2,461 feet on the Monument.
- ⁵ New access road and flowline construction for HE 6 would occur partially on the Monument (228 feet) and partially on private land (158 feet).

Production Lines. The Proposed Action includes installation of approximately 39,244 feet (7.4 miles) of 10-20 inch diameter buried production lines of which approximately 30,488 feet (5.8 miles) are on the Monument. The proposed production lines would provide transport of the CO₂ from the cluster facilities to existing collection, compression, and treatment stations located either within the Monument (Hovenweep compressor station) or on private land outside of the Monument boundary (Yellow Jacket compressor station) (Figures 3 and 4, respectively).

Table 3. Project design features – production lines.

Production Line	Total Length/Area Disturbed ¹	Private Land Section Length/Area ¹ (associated action)	Previously Disturbed ROWs within the Monument Length/Area ¹
HA – Station line	6,944 feet/4 acres	0	6,944 feet/4 acres
HA line	9,163 feet/5.3 acres	2,369 feet/1.4 acres	6,794 feet/3.9 acres
HE line	8,838 feet/5.1 acres	0	8,838 feet/5.1 acres
YB line	14,279 feet/8.2 acres	6,367 feet/3.7 acres	7,912 feet/4.5 acres
Total disturbance from production lines: 39,224 feet/22.6 acres		8,736 feet/5.1 acres	30,488 feet/17.5 acres

Note:

¹ 25-foot-wide pipeline construction corridor

The total disturbance for the Proposed Action would be 46.4 acres (23.8 acres for well pads, access roads, and flowlines, and 22.6 acres for production lines) (Table 2 and 3).

Interim and final reclamation of the well pads, flowline/access road routes, and production line routes is required by the BLM for areas within the Monument and per surface use agreements for private lands. If a well would be deemed unproductive, the well and well pad location would be abandoned and reclaimed in accordance with applicable BLM COAs for the APDs (Appendix A) and/or surface use agreements for private land. Reclamation efforts would continue until all requirements are met. If a well were productive, final reclamation would occur after the well is no longer economically productive (in an estimated 20 to 30 years). The productive period estimate is based on two factors: (1) the recoverable CO₂ in McElmo Dome is enough to sustain that type of production, and (2) the past history of existing CO₂ wells has shown that this type of production is what would be expected.

2.3.1 Project Construction

The following descriptions of project design features and construction practices are based on the surface use plans of each well site and the project plats.

Existing Infrastructure – Proposed well pads HB 6 and HE 6 are accessed via Montezuma Country Road Y (Figure 3). Proposed well pad YB 6 is accessed via Montezuma County Road 14 (Figure 4). The county roads are both two-lane gravel roads that provide general access to areas of the Monument. Within Monument boundaries, the roads are maintained by Kinder Morgan.

Access Road Construction – New access roads would be constructed for each of the proposed well pads. A summary of the access road lengths is provided in Table 2. Approximately 228 feet of a proposed access road to the HE 6 well pad would be within the Monument Boundary. The existing unmaintained two-track dirt road to the proposed HB 6 well pad would need to be widened by 20 feet for about 2,461 feet of its length on the Monument. The remainder of new disturbance for access roads and flowlines would be on private lands. The following project components would be constructed within the 50-foot-wide access road and pipeline construction corridor: an approximately 16-foot-wide driving surface; bar ditches along both sides of the driving surface; and a gas flowline parallel to the road (if the well is productive). The proposed access roads would be constructed according to specifications outlined in each APD package, and in conformance with the BLM/U.S. Forest Service (USFS) *Surface Operating Standards for Oil and Gas Exploration and Development, The Gold Book* (BLM 2007).

Well Pad Construction – Each well pad location would be stripped of vegetation, leveled, and graded to provide a work area for the drilling activities. Stripped vegetation and topsoil would be stockpiled outside of the well pad work area but within the edge of disturbance limit. The stripped vegetation and topsoil would be utilized for interim reclamation activities as described in the Plans for Surface Reclamation section below.

A gravel surface would be applied in the primary work and parking areas in order to provide a safe working surface and to reduce the potential for wind and water erosion of site soils. Trailers for work and living space for the rig supervisor, tool pushers, mudloggers/ geologists, mud engineers, and safety personnel would be temporarily placed on the pad locations. The proposed well pads would be constructed according to specifications outlined in APD package, and in conformance with the BLM/U.S. Forest Service (USFS) *Surface Operating Standards for Oil and Gas Exploration and Development, The Gold Book* (BLM 2007).

Well Drilling – The following is a brief summary of the proposed drilling activities for the Project. Additional details are provided in the project Drilling Plans that are included with the APD package. The proposed drilling schedule for the project would be provided by Kinder Morgan.

The drilling activities would be completed with a closed loop drilling system. This type of system utilizes solids-control equipment operated on the well pad location to dewater drilling solids and recycle drilling fluids during the drilling process. The closed loop drilling system is beneficial because it does not require open drilling pits, isolates waste products from the environment, reduces potential for spills, and reduces wildlife exposure to hazardous materials.

Two rig crews work on 12-hour shifts each and typically number five people per crew. The rig crews commute back and forth after their shifts and stay in local motels. The drill rig derrick is approximately 132 feet high during drilling operations.

The salt/shale section located from approximately 5,500 feet to approximately 7,000 feet below ground surface has a high risk associated with drilling through the shale due to swelling and sloughing. High concentrations of dangerous hydrogen-sulfide gas (H₂S) are often encountered throughout this interval.

Fresh water for drilling operations would be obtained and trucked from a private, off-lease source during construction and drilling. The source or sources of fresh water have not been determined, but may include the City of Cortez, privately owned ponds, irrigation ditches or other commercial water sources. Water hauling would occur along established truck routes for Kinder Morgan drilling activities within the Hovenweep or Yellow Jacket compressor station areas. All Montezuma County road use rules and regulations would be observed for water hauling. Trucked water would be discharged to a freshwater storage tank onsite. Approximately 8,000 barrels (bbls) of water would be needed for the first drill location. Any leftover fresh water (following drilling) would be stored on site and then hauled to the next drill location (for the wells drilled in succession). It is estimated that another 2,000 bbls would be needed to supplement recycled water for each successive well. In total approximately 12,000 bbls or 2.02 acre-feet of fresh water would be estimated for use in the drilling process. The fresh water usage could vary depending on the severity of lost circulation during drilling.

In addition to fresh water, salt water (brine) would be needed for drilling through the salt Paradox Formation at approximately 5,800 feet. The brine water would be purchased and hauled to the first well site from a private well in Bedrock, Colorado (20 miles west of Naturita). Approximately 4,000 bbls of brine water would be stored in a salt-water storage tank onsite. Any unused brine water would be recycled by hauling it to subsequent drill sites for reuse. It is estimated that an additional 1,500 bbls would be needed for each subsequent drill site to supplement the recycled brine water. In total, approximately 7,000 bbls or 1.18 acre-feet of brine water are estimated for use during the drilling of all the wells.

The water remaining at the end of the drilling program would be disposed of in the nearest Kinder Morgan disposal well, the Moqui Salt Water Disposal (SWD) well #1. It is estimated that approximately 6,000 bbls of fresh water and 2,500 bbls of brine would require disposal upon completion of the drilling operations. The water would be hauled to the SWD along existing truck routes utilized by Kinder Morgan hauling contractors.

Drilling fluids and mud additives would be re-circulated into the wells during drilling. The drilling fluids would be recycled whenever practical. Water generated during production testing would be discharged to a flow-back tank, where it would be collected by vacuum truck and hauled offsite to a permitted underground injection control (UIC) well. Produced water or spent fluids would be hauled to a Class I non-hazardous disposal well.

Well Completion, Testing, and Operation – Production casing would be run and the well would be completed for production following drilling. To protect ground water, near-surface aquifers would be cased off with a 9 $\frac{5}{8}$ -inch diameter surface casing string set between 2,800 to 3,200 feet below ground surface and cemented to surface. The completion activities would include the vertical sections and the horizontal sections included at the bottom of each vertical boring. Wireline logging at the end of drilling operations would be conducted by a double-axle logging truck. All areas of the well pad not needed for production would be reclaimed once production commences (interim reclamation).

Onsite Personnel – During the construction, drilling, and completion of each well, the following personnel would be onsite for varying durations: Rig supervisor, tool pusher, mud logger (2), mud engineer (1), H₂S safety technicians (2), and the regular rig crew (5) that work 12-hour shifts. Other personnel such as welders and mechanics may be at the site as needed. Other miscellaneous drilling and production staff, specialists, and consultants may also be needed. Due to safety concerns, all unnecessary personnel and vendors would be kept off these closed and gated locations. Onsite personnel each have a vehicle on location.

Transportation – Typically 25 tractor-trailer loads are required to move the bulk of the drilling equipment onto the surface location, and the same numbers of loads are required to relocate the drilling equipment away from the location. Approximately 125 trips (total) per well are needed to supply water for drilling, plus two trips for fuel and four trips for cement. An additional 10 vehicle trips per day would be needed for transportation of crews to the site. Approximately 70 trips per well would be needed to locate (first well) and dispose (final well) of fresh water and brine water after completion of drilling. Each well in the series would require approximately 10 trips to transfer fresh water and brine, and to provide make up water and brine. Solid waste and liquid waste would be disposed of once per week for a total of 24 trips per well. Cuttings removal may require 35 trips per well. This would be a total of approximately 600 vehicle trips per well.

Safety and Hazards – Safety and security are of primary concern for all drilling and operations activities. One of the main safety hazards for drilling the proposed wells would be from possible releases of H₂S during drilling and completion operations.

In order to assure that only personnel certified in H₂S safety protocols and the use of specialized H₂S safety and emergency equipment are permitted onsite; all well pad locations would be fenced and gated during drilling and completion operations. All personnel would be required to check in and out with the H₂S safety supervisor upon arrival or departure from the site. All

personnel would be required to wear H₂S monitors on the outside of clothing when working in the project area. Finally, the drill rig would be equipped with several H₂S monitors with audible and visual alarm systems to alert all project site personnel when H₂S is present.

Kinder Morgan's H₂S Safety Plan is provided in the APDs. Other standard industry safety policies would also be in effect during all operations at the well sites in an effort to prevent any accidents.

Flowline and Production Line Construction – Should the wells prove productive, the flowlines would be constructed to transport the produced CO₂ from the well head to “cluster” CO₂ gathering facilities. A summary of the length and area of disturbance for the proposed access road/flowlines is provided in Table 2. As described previously, the flowlines and access roads would occupy the same construction corridor alignments. Typical construction consists of clearing the corridor, trenching the ditch to 5 or 6 feet, stringing and welding the pipe, placement of the pipe in the trench, backfilling the trench, and reclamation of the disturbed areas of the corridor.

Production lines connect “cluster” CO₂ gathering facilities to CO₂ compressor stations. The production lines would be constructed of 10-20 inch diameter pipe. Pipeline valve boxes would be installed on the well pads. The valve boxes would have pipe guards installed around the boxes to protect the valves from traffic damage. A summary of the length on BLM and private land of the proposed production lines is provided in Table 3.

The proposed flowlines and production lines would be constructed in conformance with the BLM/U.S. Forest Service (USFS) *Surface Operating Standards for Oil and Gas Exploration and Development, The Gold Book* (BLM 2007). A summary of the reclamation activities is provided in the Plans for Surface Reclamation section below.

Operation and Maintenance – Should the wells be productive, Kinder Morgan would own or have control of the following facilities on each location: the wellhead and associated equipment, and a short piece of aboveground piping to connect the well to a new underground flowline.

Normal-producing CO₂ well operation requires approximately weekly visits to monitor well production and pressure. Pipeline operations require monthly surface inspections and annual pressure testing of all lines. All the well pads and pipeline routes would generally be inspected in a single day with a Kinder Morgan maintenance crew. Therefore, normal operations of the proposed production wells and pipelines would require 52 vehicle trips per year, on average.

Schedule - The general progression of activities for the project is to construct access roads and well pads; drill, complete, and test each well; and construct flow lines if the well is productive. The proposed construction activities are scheduled to begin in early-November 2012. The construction activities are anticipated to start on well YB6, move to well HB6, and then finish on well HE6. The drilling and completion activities would generally follow the construction activities from well to well. Well drilling and completion activities take approximately 3 months

per well, with activities occurring intermittently through the 3 month period. If any of the wells are not productive, the well would be plugged and abandoned per COGCC requirements and the surface location would be reclaimed. The flow lines for the wells are generally constructed during drilling and completion activities. The new production lines would be installed when construction activities overlap (occur in the same ROW) with flow line construction and would then continue where they do not overlap. The pipeline construction activities take approximately 1 month per mile of construction from initial clearing through final grading. Construction would be completed on the entire length of a pipeline (flow line or production line) at one time, with reclamation initiated on the entire length after final grading is completed.

The general schedule of activities for the overall project would be as follows:

- Road and well pad construction activities – 4th quarter 2012 and 1st quarter 2013
- Well drilling and completion/testing – 4th quarter 2012 through 3rd quarter 2013
- Production line construction – 2nd, 3rd, and 4th quarters 2013
- Interim reclamation – immediately following well completion/testing on well pads and immediately following flow line and production line construction

This is a general schedule of currently anticipated activities. The schedule would be determined by on-the-ground activities and other factors that would have the potential to change this schedule at any time.

Plans for Surface Reclamation – Interim reclamation of the unused portions of the well pad areas and pipeline routes would be completed after surface disturbance activities were completed and the proposed wells, flowlines, and production lines were operating. Interim reclamation activities would be completed on all but approximately 0.5 acres on each well pad (10.8 acres total for the project); the flowline route portions of the construction corridors, which includes both the areas adjacent to the proposed access roads and the pipelines installed within existing ROWs (9.2 acres); and the production line routes (22.6 acres) for a total area of interim reclamation area of approximately 42.4 acres. Long-term (lifetime of the wells) disturbance associated with access roads and well pad areas would be about 4 acres. All well pad locations would be reclaimed to a production facility area of 0.5 to 0.6 acres, which would remain for the life of the well. Specific interim reclamation activities include: removal of all solid waste from the project site, re-contouring reclaimed areas to near-original contours, spreading 100-percent of stockpiled topsoil and vegetative matter over areas to be reclaimed, drilling or broadcasting native seed or cropland seed specified by the landowners, mulching with cleared vegetation monitoring for revegetation success and noxious weed infestations, and conducting follow-up re-seeding and weed treatment, as necessary.

After completion of the Proposed Project (when the wells are no longer productive), each well pad location and flowline route would be reclaimed according to BLM Surface Use COAs (see Appendix A). Surface use agreements would be followed for private lands. Final reclamation

activities would include removal of facilities and waste, re-contouring abandoned sites, reseeded, and monitoring of re-vegetation efforts and noxious weed management.

2.4 Alternatives Considered, but Eliminated from Further Analysis

An additional well pad, YA 7, was originally located northeast of YB 6 on private land with BLM holding the mineral lease. Kinder Morgan moved this well pad approximately 400 feet to the north since its original position was within 0.5 mile of the Yellow Jacket Canyon rim that was considered potential habitat for the Mexican spotted owl. This removed the well pad from the BLM's mineral lease and out of the analysis for this EA.

No other alternatives have been proposed to respond to unresolved conflicts concerning alternative uses of available resources.

2.5 Connected Action

The Proposed Action includes construction activities on both BLM and private lands. The EA includes analysis of both the private and public lands. BLM's COAs (Appendix A) apply to the public lands, and can apply to private lands unless a variance is requested by the landowner. In addition, the COGCC and private land surface use agreements have jurisdiction over surface disturbance on private lands, and Kinder Morgan has applied for appropriate COGCC permits.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter describes the affected environment and environmental consequences of the Proposed Action Alternatives. The chapter is organized by resource with descriptive information taken from a wide range of sources, including the BLM and other Federal and state agencies, and has been guided by management issues identified by the Tres Rios Field Office, the Monument RMP and by interdisciplinary analyses of the Project Area.

This chapter compares the two project alternatives: the No Action alternative—Alternative A and the drilling and operation of three CO₂ wells along with associated infrastructure—Alternative B.

3.1.1 Resources Considered for the Proposed Action

Table 4 summarizes which resources would be affected by the alternatives described in this document. Discussion of each resource is provided in the following sections.

Table 4. Supplemental Authorities and other resources affected by the Proposed Action.

Critical Elements ¹	Potentially Affected		Noncritical Elements	Potentially Affected	
	Yes	No		Yes	No
Air Quality	X		Access	X	
Areas of Critical Environmental Concern (ACEC)	X		Cadastral Survey		X
Cultural Resources	X		Forest Management		X
Environmental Justice	X		Fire		X
Farm Lands (Prime or Unique)		X	Geology and Minerals	X	
Floodplains		X	Health and Safety	X	
Invasive, Non-Native Species	X		Hydrology/Water Rights		X
Migratory Birds	X		Lands/ROW/Realty Authorizations		X
Native American Religious Concerns	X		Law Enforcement	X	
Threatened or Endangered Species	X		Noise	X	
Wastes, Hazardous or Solid	X		Paleontology		X
Water Quality Drinking/Groundwater	X		Rangeland Management		X
Wetlands/Riparian Zones		X	Recreation		X
Wild and Scenic Rivers		X	Socioeconomic Values	X	
Wilderness		X	Soils	X	
Note: ¹ Tres Rios Field Office resource specialists and the Responsible Official have reviewed the information in this document and concur with the findings summarized in this table and described in the following sections.			Sensitive species	X	
			Vegetation	X	
			Visual Resources	X	
			Wildlife, Aquatic and Terrestrial	X	

There are no prime or unique farmlands, known paleontological resources, wilderness or wilderness study areas, floodplains, wetlands or riparian areas, or wild and scenic rivers within the project area. For this analysis, the project area is defined as the area of immediate effect of the project activities such as well pad and ROW areas. The analysis area is defined as the area within 0.5 mile on either side of the project area. Portions of the project area are located within a National Monument. Primary uses of the project area are recreation, heritage tourism, grazing,

dry-land farming and natural resource development activities consisting primarily of natural gas (including CO₂) production, gathering, and transport.

Onsite field investigations of the well sites, flowline/access road routes, and production line routes were conducted in November and December 2011 by BLM natural resource specialists and Ecosphere biologists. The onsite inspections were utilized to describe the project construction and operation plan to the BLM staff, and to identify potential areas of concern for natural resource protection staff. The onsite meetings identified cultural resources as a potential area of concern for the Proposed Project. In addition, alternative access routes and well pad locations were considered during the onsite inspections. Based on the field inspections, one of the well pads was moved approximately 100 feet to avoid a cultural site.

In accordance with 40 CFR 1502.16, each affected resource is followed by a discussion of the potential environmental consequences of the Proposed Action and No Action alternatives. An environmental effect is defined as a change in the quality or quantity of a given resource due to a modification in the existing environment resulting from project-related activities. Effects may be beneficial or adverse, may be a primary result (direct) or secondary result (indirect) of an action, and may be permanent and long term or temporary and for a short duration. The Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508) define the impacts and effects that must be addressed and considered by Federal agencies in satisfying the requirements of the NEPA process. This includes direct, indirect, and cumulative effects:

- Direct effects are caused by the action and occur at the same time and place (40 CFR 1508.8).
- Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on natural systems (40 CFR 1508.8).
- Cumulative effects are the incremental effects to the environment from the Proposed Action added to effects associated with other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Unless specifically described, short-term effects are defined as those lasting 5 years or less, whereas long-term effects last more than 5 years.

Discussions of potential environmental consequences for each alternative include the effects by alternative (level and duration of effects that would occur as a result of the No Action and Proposed Action alternatives) and any additional Design Features that would be applied to avoid or further reduce effects. Applicant-committed project elements are those described by the

operator in the APD and sundry notice packages. BLM will apply COAs as described in Appendix A. These project elements are collectively described as project ‘Design Features’ as the project proponent will implement the criteria during project implementation.

3.2 Cumulative Effects

As defined in CEQ regulations (40 CFR 1508.7), cumulative effects include direct and indirect effects likely to occur due to the Proposed Project in combination with direct and indirect effects of past actions, other ongoing activities in the area, recently constructed projects in the area, and projects that would likely be implemented in the area in the near future. The scope of this analysis is generally confined to the Project Area since direct and indirect effects, if any, are greatest where the Proposed Project would occur. Effects to air quality or noise may extend beyond the Project Area, and therefore, effects within 0.5 mile of the boundary are included in the cumulative analysis for these resources. Other resources may have larger areas of analysis identified in the specific resource sections. If there are no direct or indirect effects to a resource, then no cumulative effects analysis is completed for the resource.

Cumulative actions are identified below if the effects of the other projects overlap in time and space with the Proposed Action. Past projects that no longer have effects present are not listed because the ground disturbance, vegetation, or air quality effects have passed or recovered and effects no longer exist. Examples are past wells or timber/fuels projects that are complete and the ground disturbance is fully recovered. For purposes of this analysis, projects completed greater than 10 years in the past are not considered for cumulative effects. Ongoing projects, structures, or activities are described if they contribute environmental effects in the analysis area. Actions expected in the next 10 years were considered in cumulative effects, which is the time scale utilized in existing planning documents such as the Monument RMP (BLM 2010) and Montezuma County planning documents.

3.2.1 Past, Present, and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable future actions that have been identified as occurring in the Analysis Area and potentially contributing to effects to area resources are summarized below.

- **Oil/Gas Exploration and Development Activities.** The Monument RMP states that 80% of the Monument is leased for fluid minerals development (includes natural gas and CO₂). Presently, there are approximately 125 wells producing oil, natural gas, and CO₂. It is anticipated that there will be up to 150 wells on up to 121 new locations over the life of the approved RMP (81 oil and natural gas, 69 CO₂; BLM 2010). One specific project within the analysis area is Kinder Morgan drilling the YA 7 well located 2,600 feet northeast of the proposed YB 6 well in 2012. The project will include an access road and flowline. Longer-term development plans include up to 63 additional wells with necessary infrastructure within the Monument in the next 5 to 10 years. Kinder Morgan

also plans to increase their compression capability at their five compressor stations located within and adjacent to the Monument.

- **Range Improvement and Grazing.** Existing range improvements located within the Analysis Area include allotment fences, water diversion, and development projects—such as construction/installation of stock reservoirs, spring boxes, pipelines, and watering troughs. Most structures are in place and do not include ground disturbance at this time. The proposed project area is completely contained within the Sandstone grazing allotment. The Monument RMP states that grazing will continue within the Monument with some allotments seeing reductions in overall Animal Unit Months (AUMs) as monitoring data is received (BLM 2010).
- **Timber Harvest/Timber Management.** Prescribed burns, fuels reduction, and thinning projects have occurred or are planned for the Monument. Currently, the Monument is conducting wildfire hazard assessments throughout the Monument to determine the need for hazardous fuels reductions (BLM 2010).
- **Recreation.** Ongoing recreation activities include hunting, off-highway vehicle use, hiking, snowmobiling, and horseback riding. Within the Monument, mechanized travel is restricted except for mountain biking in the Sand Canyon/Rock Creek area and other specific trails as outlined in the Monument RMP (BLM 2010). No changes in recreation usage on the Monument are currently proposed.
- **Agricultural Activities.** On the private land sections of the project area, there are active dryland farming and hay production activities that will be ongoing into the future. These activities are assumed to continue at current levels through the time frame for cumulative effects analysis.

3.3 Air Quality

The project study area lies within the Southwestern Colorado Air Quality Control Region as defined by the Colorado Air Quality Control Commission Report to the Public 2010-2011, (CDPHE 2011). On-going state air quality monitoring and sources of air quality impairment in the area are summarized in the annual air quality report. Currently, air quality concerns in the Southwestern Region are from effects from energy development including direct emissions, support services, and associated growth. Motor vehicles, wildfires, and the two coal power plants to the south are also a source of air emissions in this region (CDPHE 2011).

The Colorado Department of Public Health and Environment (CDPHE), Air Quality Division regulates air quality effects from oil and gas activities and develops mitigation measures on a case-by-case basis. Effects are evaluated to see if they are allowable or unacceptable. Air quality permits are required for emission sources on well pads if established emission thresholds for designated pollutants are exceeded.

Currently, the Montezuma County is in attainment for all criteria pollutants as defined under the Clean Air Act.

3.3.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no project-related effects to air quality from the Proposed Action. Ongoing effects to air quality such as traffic on area roads, effects from coal-fired power plants, and effects from existing compressor stations would continue.

3.3.2 Environmental Consequences – Alternative B (Proposed Action)

Air emissions associated with CO₂ development and production activities primarily occur during well pad construction and drilling phases. Air emissions during construction activities include: hydrocarbons, carbon monoxide (CO), and nitrogen oxides (NO_x) associated with production equipment; gas-fired drilling equipment; and vehicle exhaust. Other air quality effects associated with the construction, drilling, and operation of the proposed wells and associated access roads and flowline routes would occur from several sources:

- Suspended particulates (dust) generated during site clearing and from vehicular traffic on unpaved roads;
- Suspended particulates (dust) from wind erosion on cleared construction areas; and
- Hydrocarbon emissions from the drill rig, service/support vehicles, and operation of gasoline and diesel engines (e.g., generators).

A temporary increase in emissions and fugitive dust is anticipated due to an increase in vehicle and equipment use in the area; however, the degree at which this increase would affect the air quality is difficult to predict due to variables such as vehicle speed, distance traveled, road conditions, duration of engine idling, and the effectiveness of smog control devices on vehicles. Air quality effects from construction and drilling operations, primarily from vehicle/equipment exhaust and increased fugitive dust, would likely be localized to the analysis area (0.5-mile radius of the project area) and short term. Wind dispersion and dilution would reduce the magnitude of emissions. No permits or authorizations are required from Colorado Air Quality Control Commission for project-related activities.

Under normal conditions, air quality would not be affected during the production phase as a result of the operation of the wells. With the new flowline being aboveground at the well head, there would be the potential for flowline rupture due to vehicle damage or rupture from firearm impacts (accidental or vandalism). If there was a break in flowline integrity, there would be potential for release of produced gas (primarily CO₂, but other compounds such as H₂S would be present in low concentrations). This type of release would be short term, as the flowline pressures are monitored and an alarm would be triggered if there was a sudden decrease in flowline pressure.

Indirect effects to air quality during the production phase would occur from vehicle travel on area roads during ongoing facility and well operation inspections. The operation of the wells and pipelines are not a source of emissions of monitored parameters. No air quality permits are anticipated to be required for this alternative.

There is a potential for releases of H₂S gas during the drilling phase of well development activities. The Drilling Plan for the Proposed Action includes drilling methodologies and a tested H₂S Contingency Plan that is designed to alert and protect the public from accidental releases of H₂S gas. The potential release of H₂S gas is further discussed Section 3.14 – Health and Safety.

3.3.3 Design Features

The potential effects to air quality due to generation of fugitive dust would be reduced by adherence to Surface Use COAs (Appendix A) should the Proposed Action be approved. These include the following:

- Suspended dust from construction would be reduced through sprinkling of disturbed areas with fresh water from a clean water source during construction.
- If the wells prove productive, the unused portions of the well pad area would be re-seeded with a BLM-approved seed mix to stabilize soils and reduce the effects of fugitive dust created from wind erosion of exposed soils.

These actions would not only reduce the amount of dust in the air but would maintain good construction site visibility, thereby minimizing potential health and safety hazards.

3.3.4 Cumulative Effects

A description of cumulative effects to Air Quality for the Monument is provided in the RMP Final EIS (BLM 2009a). Past and current sources of air quality effects within the analysis area include:

- Coal-fired power plants operated in the general vicinity of the Four Corners area;
- Windblown dust from exposed soils, roads, and soil erosion; and
- Emissions from oil and gas and mineral development construction and operation activities, including vehicle operations.

Future sources of air quality effects include mineral development activities within the Monument and on adjacent public and private lands, vehicle travel on dirt and gravel roads, and dust generated from agricultural activities. Kinder Morgan plans to install additional compressors at their five compressor stations within and adjacent to the Monument in the future. The Proposed Action would contribute to cumulative effects during the construction and drilling phase of the project activities (estimated 12-month time frame). With adherence to the Design Features, implementation of the Proposed Action would be limited to localized (within Analysis Area)

effects to air quality. The no action alternative would include on-going effects to air quality from wind-blown dust/particulates and vehicle emissions from on-going activities. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.4 Areas of Critical Environmental Concern

Areas of Critical Environmental Concern (ACEC) are those specific areas of BLM-administered lands that are managed to protect or enhance particular, special, or unique values (BLM 1985). Portions of the proposed project area is within the boundaries of the Monument, which was formerly designated as the Anasazi Culture Multiple Use Area (ACMUA) ACEC. The management objectives of the ACMUA are strengthened by the Monument designation. A description of the resources and management objectives of the Monument is presented in Section 1.5 of this EA.

3.4.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, current land use within the Monument would remain unchanged.

3.4.2 Environmental Consequences – Alternative B (Proposed Action)

The Proposed Action is consistent with the terms of the lease and with the management direction outlined in the RMP (BLM 2010). The Proposed Action would not affect any identified cultural ACECs. Additional descriptions of effects to cultural resources are provided in Section 3.5 below.

3.5 Cultural Resources

Archaeologists from Woods Canyon Archeological Consultants (Woods Canyon; BLM permit BLM-C-39470) conducted a cultural resource inventory for the BLM for this project. Prior to field surveys, a records search was undertaken at both the Monument headquarters and the State of Colorado Office of Archaeology and Historic Preservation in order to identify previously recorded sites within and in proximity to the Project Area. Results of this records review, along with results of the field inventory, are documented in a report on file with the BLM (Bredthauer et al 2012). A general summary of these results and the archaeological methods utilized are presented below, though specific details are not disclosed due to Federal regulation (43 CFR 7.18 - Confidentiality of archaeological resource information).

Archaeological Methodology: For each well pad, a 40-acre area was inventoried by qualified individuals walking a series of parallel transects spaced no greater than 50 feet apart. For each flowline and access road, an area 660 feet wide was inventoried by walking transects no more

than 50 feet apart. These surveys were conducted by qualified staff of Woods Canyon during two periods, between September to October 2011 and March to April 2012.

3.5.1 Archaeological Results

One hundred-two sites were identified in the survey area, of which 48 had been previously documented. Fifty-seven of the sites are recommended as eligible, ten are recommended as requiring additional data for assessment, and 35 are recommended as not eligible to the National Register of Historic Places (36 CFR 60.4). A summary of the number of sites found in the survey areas for respective project components is provided below (Table 5).

Table 5. Number of cultural resource sites within each survey area

Survey Area	Sites in Survey Area ¹
Well HB 6 and Flowline	6
Well HE 6 and Flowline	10
Well YB 6 and Flowline	15
Hovenweep Production Lines (HA station, HA, and HE)	57
Yellow Jacket Production Lines	33

Note:

¹ Several sites were located in two survey areas.

Data from previous cultural resource inventories indicate that the vicinity of the project area has been inhabited by human groups from as early as 5,500 BC to the present. Ancestral Puebloan agricultural settlements on the mesas and canyon rims dominate this regional archaeological record, though numerous other site and feature types are abundant.

Cultural changes within the regional Ancestral Puebloan occupation (AD 1 to 1290) are marked by five named periods: Basketmaker II (AD 1-500); Basketmaker III (AD 500-750); Pueblo I (AD 750-900); Pueblo II (AD 900-1100); and Pueblo III (AD 1100-1300).

Cultural surveys conducted for the currently proposed undertaking suggest that the immediate project vicinity was most intensively utilized during the Basketmaker III, Pueblo II, and Pueblo III periods.

Local evidence indicates that during the Basketmaker III period, Ancestral Puebloans constructed and occupied single- and multiple- pithouse settlements on the deep soils of the mesa tops. During the Pueblo II period, Ancestral Puebloans built single or multiple habitation units composed of masonry and adobe surface rooms and kivas also situated on the deep soils of the mesa centers. During the last century of the occupation in the Pueblo III period, Ancestral

Puebloans built large villages made of masonry, situated away from the mesa centers, often near spring sources at the heads of canyons.

3.5.2 Environmental Consequences – Alternative A (No Action)

No cultural resource properties would be affected under the No Action Alternative.

3.5.3 Environmental Consequences – Alternative B (Proposed Action)

From its inception, the Proposed Project was designed to avoid sites recommended as eligible or potentially eligible (e.g. “needs data”) for the National Register of Historic Places. A majority of the production lines and a portion of the access roads and flowlines for the proposed well pads are in previously disturbed ROWs with no intact subsurface cultural deposits. No sites that are recommended as eligible or “needs data” would be adversely affected by either Alternative.

With the exception of one site, all eligible or need-data sites would be avoided. At eligible site 5MT6358, the proposed pipeline is to be built on the surface through the site in a previously cleared and disturbed pipeline ROW (as according to the COA in Appendix A). This disturbed corridor through site 5MT6358 also contains an above-ground powerline. The proposed construction of the pipeline across the surface of this site would not affect the site’s significance, integrity, or its eligibility for the National Register of Historic Places (NRHP). Two sites determined to be not eligible for the NRHP would be crossed by the project pipelines. Site recordation and extensive subsurface testing have been conducted at these sites in the area of proposed disturbance. Both of these sites have been previously disturbed and neither of these sites retains integrity or significant intact cultural deposits, thus cultural resources will not be adversely affected by the proposed project.

- Based on these efforts, it was the determination of the BLM, with concurrence from the Colorado SHPO (June 29, 2012) and all affiliated Native American tribes (see below: 3.8 Native American Religious Concerns) that the Federal actions with COAs proposed by Alternative A will not adversely affect cultural resources. Measures necessary to ensure this have been incorporated as design features and are outlined as Conditions of Approval in Appendix A, and include personnel education, construction monitoring, placement of avoidance fences, and inadvertent discovery procedures.

3.5.4 Cumulative Effects to Cultural Resources

A description of cumulative effects to cultural resources for the Monument is provided in the RMP Final EIS (BLM 2009a). Most of the human-caused degradation of cultural resources in the Project Area occurred prior to the 1980’s, primarily as a result of land clearing (e.g. “chaining”), recreational looting, and road development. Previous oil and gas development has primarily been

designed to avoid impacts to cultural resources and has, to date, not had a major impact on the resource. Alternatives A and B would not adversely affect cultural resources nor would the impacts from other reasonably foreseeable future projects within the project area. Thus, the proposed project will have no cumulative effect to cultural resources.

Under Alternatives A and B, on-going natural impacts to cultural resources would continue (e.g. weathering, erosion, etc.). On-going human impacts, unrelated to the proposed undertaking (e.g. vandalism), would also continue. Neither Alternative A nor B would result in additional cumulative adverse effects to cultural resources.

3.6 Environmental Justice

Executive Order 12898 requires that “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States...”. The CEQ guidance on incorporating environmental justice into NEPA analysis notes that, “In order to determine whether a Proposed Action is likely to have disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes, agencies should identify a geographic scale for which they will obtain demographic information on the potential effect area. Minority populations should be identified where... “(b) the minority population percentage of the affected area is meaningfully greater than the minority population in the general population or other appropriate unit of geographic analysis.” The same guidance is given for measuring low-income populations. Usually, this is measured by comparing the individual poverty rate for the affected area to a comparison area.

To determine whether a risk or rate of hazards exposure by a vulnerable population such as minority or low-income population is significant according to NEPA, CEQ guidance requires that the risk or rate “much appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.” Therefore, the Environmental Justice effect analysis compares the risk and rate of adverse effects associated with the Proposed Action for the affected area to a comparison group to determine whether there are Environmental Justice effects.

Montezuma County population affected by the Proposed Action includes 25,535 individuals. About 75% of Montezuma County residents identify as white, 11% as Native American, 11% as Latino or Hispanic, 0.2% as Black or African American, and 2.8% as other. In 2010, about 17% of the total population fell below the poverty line, compared to about 13% in Colorado and 14% in the United States (US Census Bureau 2010). Table 6 compares the percent minority population and poverty rates in Montezuma County and Colorado.

Table 6. Total population, minority population, and individual poverty rates for Montezuma County, the State of Colorado, and the United States.

County/State	Total Population (2010)	% Minority Population (2010)	% Native American Population (2010)	% Individual Poverty (2010)
Montezuma County, CO	25,535	24	11	17
Colorado	5,029,196	30	1	13

Source: US Census Bureau 2010.

Montezuma County has a measurably higher poverty rate than Colorado and the United States. While the minority population rate falls below that of the state and the nation, the Native American population in Montezuma County is about 11%, compared to 1% of the state’s and the nation’s populations.

3.6.1 Environmental Consequences – Alternative A (No Action)

There would be no direct or indirect disproportionate adverse effects to vulnerable populations for the no action alternative.

3.6.2 Environmental Consequences – Alternative B (Proposed Action)

There would be no direct or indirect disproportionate adverse effects to vulnerable populations for the Proposed Action because there would be no adverse socioeconomic effects. There would be moderate economic benefits, including increased tax revenues to local government for this alternative.

3.7 Invasive, Non-Native Species

The Monument RMP states that the Monument will “control existing noxious weed populations and prevent new infestations” (BLM 2010). The Colorado Noxious Weed Act prioritizes noxious weed management into three groups (lists): List A-species designated for eradication; List B-species for which noxious weed management plans are designed to stop their continued spread; and List C-species for which management plans are not designed to eradicate or to stop their continued spread, but to provide additional education and research (CDA 2012). The Monument RMP states that the objective is to control List B-species in accordance with the Colorado Noxious Weed Act and to manage List C-species on a case-by-case basis.

Field visits were conducted on November 21 and 22, 2011. No List A noxious weeds were identified during the field visits. However, two List C noxious weed species were identified during the field surveys. Cheatgrass (*Bromus tectorum*), an invasive, non-native annual grass, was observed throughout the project area, and redstem stork’s bill (*Erodium cicutarium*), a

common invasive annual forb occurring on disturbed soils, was identified within the existing disturbed ROW. Because the field surveys occurred after the normal growing season (and outside the flowering period) for most plants, it is possible that additional noxious weeds occur in the project area.

3.7.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no change in existing potential for the introduction or spread of weeds above the risk from existing land uses including road maintenance, ongoing oil and gas development, and recreational vehicle use of the area. Existing land uses would provide a seed source for weeds, and small amounts of disturbance could allow weeds to become established. Existing noxious weed populations in the Monument would provide sources of seeds for further noxious weed establishment. Ongoing noxious weed management activities (e.g., oil and gas operators spraying weeds according to Pesticide Use Plans) would also continue.

3.7.2 Environmental Consequences – Alternative B (Proposed Action)

Ground-disturbing activities (well pad, access road, flowline, and production line route clearing) increase the chances of noxious weed infestation. Because cheatgrass and redstem stork's bill are already present in some portions of the project area, it is likely that some disturbed sites may be invaded by these species following construction or during reclamation efforts. Increased vehicle traffic could increase the potential for noxious weed infestation in the project area from seed transport on vehicles. These effects would be short-term if weeds are controlled following construction. If they are not controlled, the Proposed Action could result in a noticeable change in the composition of the project area vegetation.

3.7.3 Design Features

The following Design Features would minimize and/or avoid the introduction or spread of noxious weeds and are included in the COAs in Appendix A:

- Stripped topsoil and vegetation from construction would be stockpiled for subsequent reclamation of unused areas of the well pads, providing a source of native plant seeds.
- As part of inspection activities associated with Kinder Morgan's Regional Storm Water Management plan (RSWMP) and routine operation inspections, reclaimed areas of the well pads and production line routes would be inspected for invasive and noxious weeds.
- If areas of weed infestation were observed, appropriate control of the outbreaks would be implemented using materials and methods approved in advance by the BLM.

- Cleaning of all heavy machinery to remove seed and soil would be completed prior to construction activities to reduce the potential of introducing invasive species into the project area.
- During the operations phase of the project, reclaimed areas would be monitored by Kinder Morgan and BLM field staff for noxious weeds.
- Interim reclamation would be initiated following completion of construction and drilling activities, and on disturbed areas not required for production operations. Interim reclamation includes re-vegetation with a BLM-approved native seed mix (see Table A-1, Appendix A). Kinder Morgan would notify the BLM prior to initiating seeding activities on well pads and production line routes.
- When the wells are no longer productive, final reclamation would be initiated, which would include re-contouring the well pads and re-vegetation with a BLM-approved native seed mix (see Table A-1, Appendix A). Kinder Morgan would notify the BLM prior to initiating seeding activities.

3.7.4 Cumulative Effects

Past, present, and reasonably foreseeable future actions that have potential to spread of noxious weeds in the project area include vegetation treatment activities, road construction, grazing, recreational use, and oil and gas development. Past surface disturbance introduced at least two Colorado-listed weeds found in the project area. The extent of known noxious weed populations within the project area has not been determined. Past and current weed management activities help to slow the spread of weeds, and future projects would be required to monitor and manage weeds. For this project, weed effects would be confined to the area of disturbance (46.4 acres). Monitoring and treatment described above would further reduce the spread of noxious weeds. With proper management, noxious weed introduction from the Proposed Action would not contribute to management concerns outside of the project area. The potential for spread of noxious weeds would be present during the construction, drilling and well production period of the Proposed Action. Under the No Action Alternative on-going effects from non-native species would continue, due to vehicle travel, activities on existing infrastructure and grazing activities. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.8 Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712 as supplemented) prohibits the unregulated "take" of most native bird species except gallinaceous birds. It covers direct harm to birds rather than including harm to habitat. MBTA does not exempt unintentional take of birds. Proposals that appear to risk direct damage to birds or live eggs must show diligence in avoiding or reducing this risk.

The habitat within the proposed project area, in order of decreasing percentage of total, is a mixture of agricultural lands (mainly winter wheat), previously disturbed pipeline ROWs containing grasses and scattered shrubs, piñon-juniper woodlands, and sagebrush shrub-grasslands. Potential nesting habitat for birds exists primarily in the piñon-juniper woodlands and shrub-grasslands within the project area. To a lesser extent, reclaimed ROWs may provide nesting habitat for ground- or shrub-nesting species, while active agricultural fields would not provide nesting habitat. Native bird species protected under the Migratory Bird Treaty Act (MBTA) nesting in piñon-juniper and shrub-grassland include black-chinned hummingbird (*Archilochus alexandri*), black-throated gray warbler (*Dendroica nigrescens*), black-capped chickadee (*Poecile atricapilla*), bushtit (*Psaltriparus minimus*), house finch (*Carpodacus mexicanus*), white-breasted nuthatch (*Sitta carolinensis*), piñon jay (*Gymnorhinus cyanocephalus*), plumbeous vireo (*Vireo plumbeus*), blue-gray gnatcatcher (*Polioptila caerulea*), and mountain chickadee (*Poecile gambeli*). Ground-nesting species may include horned lark (*Eremophila alpestris*), vesper sparrow (*Poecetes gramineus*), and mourning dove (*Zenaida macroura*). Species observed during fall/winter 2011 field surveys include western meadowlark (*Sturnella neglecta*), western scrub jay (*Aphelocoma californica*), common raven (*Corvus corax*), and dark-eyed junco (*Junco hyemalis*).

The project area provides potential nesting habitat for raptor species, including red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and sharp-shinned hawk (*Accipiter striatus*). The project area also provides foraging habitat for the above-listed raptors, as well as golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), and great-horned owl (*Bubo virginianus*). Minor rocky cliffs in adjacent Yellow Jacket Canyon may provide potential nest sites for cliff nesting raptors. Colorado Parks and Wildlife have recommended buffers around nesting raptors and peregrine falcons of 0.5 miles (Klute 2009).

In 2008, the U.S. Fish and Wildlife Service (USFWS) published a Birds of Conservation Concern (BCC) list, identifying non-game migratory bird species targeted as conservation priorities but not currently federally listed as threatened or endangered (USFWS 2008). BCC species with potential to occur in the project area are golden eagle, gray vireo (*Vireo vicinior*), juniper titmouse (*Baeolophus ridgwayi*), Cassin's finch (*Carpodacus cassinii*), and piñon jay. Birds occurring in piñon-juniper woodlands and shrub-grasslands nest from mid-April to mid-July.

3.8.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, on-going effects to project area migratory birds would continue at their current levels.

3.8.2 Environmental Consequences – Alternative B (Proposed Action)

Under the Proposed Action, the project would result in a maximum disturbance of 46.4 acres of vegetation during construction, of which 4 acres of vegetation disturbance is long term. A portion of vegetation disturbance associated with the project would occur in agricultural fields that are unlikely to provide bird nesting habitat. Vegetation removal would result in a direct loss of breeding and foraging habitat for avian species associated with piñon-juniper woodlands, shrub-grasslands, and previously disturbed and re-vegetated pipeline ROWs. A maximum of 275 piñon pine and juniper trees would be removed. Vegetation clearing between April and July could destroy active nests; however, pre-construction nest clearance surveys would minimize the direct loss of active nests. The permanent loss of vegetation would be a low, long-term effect based on the presence of surrounding undisturbed habitat in the area. Due to the small acreage of habitat loss, no population level effects to BCC species with potential to occur in the project area are expected.

Construction activities could directly disturb birds, including species occupying cliff habitat adjacent to the project area, due to increased noise, night-lighting, and human activity. Potential disturbance could include causing birds to change their normal breeding, foraging, and resting behavior. Disturbance would be highest during construction activities and intermittent associated with long-term operation and maintenance of the wells. The duration of construction activities for each well pad is expected to be for a period of about 3 months, thereby limiting the severity of potential effects to a short time period for any specific area during construction.

The Proposed Action would contribute to habitat fragmentation within the Monument by adding 386 feet of new access road to well HE 6, expanding the existing two-track dirt road to well HB 6 for 2461 feet, and by increasing use of existing roads during construction and production. The analysis area, however, currently has existing multiple well pads and roads and should be considered as having existing disturbances. The addition of these wells would potentially add to the existing disturbance. There would be long-term indirect effects to area birds during operation of the wells from periodic human activity, vehicular traffic in the area, and from the conversion of habitat to industrial use. Well operation would not require onsite pump jacks but may require compressors; therefore, post-construction noise effects may occur due to operation of the well.

In summary, the Proposed Action may have short-term effects to area birds during construction and drilling, and long-term effects to area birds during operation. These potential effects would be minimized by the implementation of Design Features described below. While there may be effects to individual birds from the project, the effects are not expected to result in population level declines due to the small acreage of habitat removal and the co-location of new pipelines in existing pipeline and road ROWs.

3.8.3 Design Features

Potential effects to migratory birds caused by the removal of vegetation would be mitigated through the implementation of reclamation measures and Best Management Practices (BMPs) outlined in the Surface Use COAs (Appendix A). The COAs include the following measures that would help mitigate effects to birds:

- Construction activities would be confined to the proposed well pads, access roads, and pipeline right-of-way areas to minimize disruption to area birds.
- Cliff-nesting raptor surveys will be conducted within 0.5 mile of the proposed project area prior to construction.
- If an active raptor nest were found, a species-specific spatial buffer would be applied until the nest either successfully fledges young or fails, as determined by a biologist.
- If vegetation removal must take place during the breeding season (April 15 to July 15), a pre-construction nest clearance survey would be performed to identify any active nests. If active nests were found, vegetation removal would be postponed until after the nest either successfully fledges young or fails, as determined by a biologist.
- If onsite compressors or any other type of noise producing equipment is required for the long-term operation of the wells; mitigations may be required that would limit the ambient noise produced by this equipment. This may include shields, mufflers and any other noise suppressing equipment.
- A 0.5 mile buffer will be applied around nesting raptors and peregrine falcon nesting complexes.

3.8.4 Cumulative Effects

Past effects to migratory birds within the project area include well pad, road, and pipeline construction and operation, chaining of vegetation, and grazing activities. Current sources of effects to migratory birds within the project area include noise from existing compressors and gas wells, construction noise associated with new wells being built across the canyon, and habitat fragmentation from existing roads, pipeline ROWs, and well pads.

Future effects include mineral development activities within the Monument and on adjacent public and private lands, increasing habitat conversion to industrial uses and increasing human disturbance from road traffic. For this project, noise effects to migratory birds would be greatest during construction (less than 12 month period). Habitat fragmentation is minimized by co-locating pipelines in existing ROWs and placing well pads on previously disturbed agricultural lands. The Proposed Action, if approved, would be within the projected mineral development scenario analyzed in the Monument RMP (BLM 2010). The proposed project activities would contribute to habitat loss for migratory birds within the project area to a greater extent than

activities associated with the no action alternative. Under the No Action Alternative on-going effects to migratory birds would continue, due to travel on areas roads, mineral development and maintenance activities and grazing. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.9 Native American Religious Concerns

Tribal Consultation

The Monument consults with 25 tribes (listed below) who have traditional ties to the Monument's landscape or are culturally affiliated to the Ancestral Puebloan culture group.

1. Pueblo of Acoma
2. Pueblo of Cochiti
3. The Hopi Tribe
4. Pueblo of Isleta
5. Pueblo of Jemez
6. Jicarilla Apache Nation
7. Pueblo of Laguna
8. Pueblo of Nambe
9. The Navajo Nation
10. Northern Ute Tribe
11. Pueblo of Picuris
12. Pueblo of Pojoaque
13. Pueblo of San Felipe
14. Pueblo of San Ildefonso
15. Ohkay Owingeh
16. Pueblo of Sandia
17. Pueblo of Santa Ana
18. Pueblo of Santa Clara
19. Kewa Pueblo
20. The Southern Ute Indian Tribe
21. Pueblo of Taos
22. Pueblo of Tesuque
23. Ute Mountain Ute Tribe
24. Pueblo of Zia
25. The Zuni Tribe of the Zuni Reservation

Consultation for the Proposed Action was initiated by a letter from the BLM to the above-listed Tribes on December 16, 2011. The letter notified the Tribes about the proposal and requested identification of traditional cultural properties in the project area and requested comments regarding the proposal.

One-on-one meetings to discuss this undertaking were held between the BLM and individual tribes: as follows:

1. June 26, 2012: The Hopi Tribe
2. July 27, 2012: Pueblo of Zia

Group consultation for this project between the BLM and the following affiliated Native American tribes occurred on September 5 - 6, 2012

1. Pueblo of Acoma
2. The Hopi Tribe
3. Jicarilla Apache Nation
4. Ohkay Owingeh
5. Pueblo of San Ildefonso
6. Pueblo of Santa Ana
7. Pueblo of Santa Clara
8. The Southern Ute Indian Tribe
9. Ute Mountain Ute Tribe

Finally, the Tribes, like all members of the Public, are given opportunities to review the BLM's online NEPA Register (<http://www.co.blm.gov/nepa/sjplcnepa.htm>). The proposed project has been continuously listed on this Register since approximately December 5, 2011.

No Native American religious concerns regarding the proposed project were expressed either verbally or in writing during any of the above-listed consultations. Project Conditions of Approval which have been developed through past Tribal consultations are reiterated and have been incorporated into the current project (Appendix A).

3.10 Threatened or Endangered Species

Pursuant to the Endangered Species Act of 1973 (as amended) potential effects to threatened, endangered, proposed, and candidate species (T&E species) resulting from implementation of the Proposed Action are assessed. The BLM consults with the USFWS regarding T&E species to be considered in all ground-disturbing activities; the last date of this consultation was May 13, 2011 (USFS 2011). Thirteen T&E and candidate wildlife species were identified by the USFWS as potentially occurring on BLM lands. Two species—Gunnison sage-grouse (*Centrocercus minimus*) and Mexican spotted owl—have potential habitat within the Project Area vicinity. The remaining listed species were eliminated from further discussion since they do not have potential to be affected by the Proposed Action, as summarized in the Biological Assessment (BA) (Appendix B). Species distribution and habitat potential are based on Geographic Information System (GIS) map review, cited literature, field visits to the Project Area (November 21 and 22, 2011, and January 12, 2012), and personal communication with Monument biologist Eric Freels (pers. comm. 2012). Species descriptions, habitat requirements, and the potential for these

species to occur in the Project Area and be affected by the Proposed Action are addressed in greater detail in the BA (Appendix B).

Potential habitat for the federally threatened Mexican spotted owl was modeled using GIS in June 2008 by the BLM staff and includes the YB 6 well pad and associated pipelines. Based on a site visit by Monument biologist Eric Freels on January 10, 2012, Yellow Jacket Canyon adjacent to the project area provides marginal suitable habitat for Mexican spotted owl (Eric Freels, BLM biologist, pers. comm.). No previous surveys for Mexican spotted owl have been performed in Yellow Jacket Canyon. Past surveys conducted in other portions of the Monument have not detected Mexican spotted owls, and the closest detection occurred in Mesa Verde National Park 30 miles southeast of the project area.

The project area is mapped as historical habitat for the candidate Gunnison sage-grouse. However, the current known range of the species is located 16 miles northwest of the project area (NDIS 2012). Individuals are not known to use lands within the project area and do not range beyond their current locations (Chris Kloster, CPW biologist, pers. comm.).

The habitat in the proposed project area and vicinity was qualitatively evaluated to assess whether the Standard for Public Land Health for threatened and endangered species was being met (BLM 2009a). The project area and vicinity were determined to not meet the standard within Sandstone grazing allotment, and to meet the standard within Cahone Mesa allotment. The standard is not applicable to Hovenweep Canyon allotment.

3.10.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no effects to listed species. Existing effects would continue at current levels.

3.10.2 Environmental Consequences – Alternative B (Proposed Action)

Marginal potential nesting and roosting habitat occurs in Yellow Jacket Canyon for Mexican spotted owl. The habitat consists of warm-dry piñon-juniper woodlands, minor rock cliff bands, and a generally wide canyon within 0.5 mile of the project area. Potential foraging habitat occurs in the canyon and on the mesa top, but the use of foraging habitat would depend on the presence of nesting owls. Due to the lack of previous surveys, it is unknown whether Mexican spotted owls previously nested in the canyon.

Suitable canyon habitat can include canyon, rim, and adjacent mesa and plateau landscapes (USFWS 2011). The three proposed wells are greater than 0.5 mile from the Yellow Jacket Canyon rim. Projects located this distance from potential habitat would not be expected to cause disturbance to potentially nesting or roosting owls, if present, since noise and human presence would be far away. A buffer distance of 0.5 miles from Mexican spotted owl Protected Activity Centers (PACs) is specified in the Canyons of the Ancients National Monument Resource

Management Plan for owl habitat protection (BLM 2009a). The YB 6 well pad would permanently remove approximately 0.5 acre of vegetation, which provides cover habitat for prey species and potential owl foraging habitat. The removal of potential foraging habitat is small compared to that available adjacent to Yellow Jacket Canyon.

The proposed flowline for well pad YB 6 parallels an existing road and pipeline as well as the canyon rim for approximately 0.5 mile. If the project would occur between March 1 and August 31, noise and disturbance associated with installation of the flowline could disturb nesting owls. To avoid disturbance of potential nesting owls, USFWS recommended 1 year of protocol surveys be completed within 0.5 mile of the proposed flowline prior to beginning construction in 2012. Construction of the flowline would constitute temporary noise disturbance (lasting up to 2 months) and would not remove potential nesting habitat, but could modify foraging habitat for the owl. If an owl were detected, construction would occur outside of the March 1 to August 31 timeframe. The pipeline area would be reseeded and reclaimed; therefore, long-term effects to Mexican spotted owl foraging habitat would be minimal. Protocol Mexican spotted owl surveys conducted along the canyon rim in 2012 were negative and no owls were detected. If the YB 6 flowline or production line construction is postponed until 2013 and construction would not avoid the Mexican spotted owl breeding season, surveys would be completed in 2013 prior to construction.

Given the negative surveys in 2012, the avoidance of the breeding season if owls are detected in the future, the temporary nature of disturbance adjacent to the canyon rim, and the limited amount of habitat that would be permanently removed, the Proposed Action “May affect, not likely to adversely affect” the Mexican spotted owl.

The Dove Creek Subpopulation of Gunnison sage-grouse are known to remain in close proximity to their leks and do not range from the mapped habitat greatly. Documented leks occur 16 miles northwest of the HE 6 and HB 6 well pads. Therefore, it is unlikely that grouse would occur in the Project Area during construction activities. Given the distance of the known lek complex from the Project Area boundary, disturbance to lekking birds from noise or increased human presence would not occur. Vehicle collisions are also unlikely since trucks driving to the Project Area would use roads south of the known population. Therefore, the Proposed Action “is not likely to jeopardize the continued existence of the Gunnison sage-grouse.”

Based on the lack of habitat in the Project Area for 12 of the listed species, and prior discussions of potential effects for the Mexican spotted owl and Gunnison sage-grouse, a determination of no effect was made for 8 of the 12 threatened and endangered species (see Table 7). No effects are expected to occur to the three candidate species (wolverine (*Gulo gulo luscus*), New Mexico meadow jumping mouse (*Zapus hudsonious luteus*), and Western yellow-billed cuckoo (*Coccyzus americanus*) from the Proposed Action. The Proposed Action is not likely to jeopardize the continued existence of the proposed Gunnison sage-grouse.

Table 7. Effects Determinations for USFWS Threatened and Endangered Wildlife Species

Species	Status	Effect Determination
Mammals		
Canada lynx (<i>Lynx canadensis</i>)	Threatened	No effect
Birds		
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Threatened	No effect
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Endangered	No effect
Gunnison sage-grouse (<i>Centrocercus minimus</i>)	Proposed	Not likely to jeopardize the continued existence
Fish		
Bonytail chub (<i>Gila elegans</i>)	Endangered	No effect
Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	Endangered	No effect
Humpback chub (<i>Gila cypha</i>)	Endangered	No effect
Razorback sucker (<i>Xyrauchen texanus</i>)	Endangered	No effect
Insects		
Uncompahgre fritillary butterfly (<i>Boloria acrocneema</i>)	Endangered	No effect

3.10.3 Design Features

Construction activities would be confined to the proposed well pads, access roads, and production line routes to avoid potential effects to any listed species if they were to occur in the vicinity of the project. Kinder Morgan would contact BLM resource specialists immediately if any listed species were identified during construction or operation of the Proposed Action. Additional measures to avoid disturbance of the threatened Mexican spotted owl include the following:

- Since 2012 Mexican spotted owl surveys were negative, construction could begin before the end of the Mexican spotted owl breeding season (March 1 to August 31) in 2012.
- Complete construction of the pipeline prior to March 1, 2013. If construction extends into the 2013 breeding season, additional surveys may be warranted.
- Coordinate with BLM and USFWS biologists to determine if additional surveys are needed.
- If onsite compressors or any other type of noise producing equipment is required for the long-term operation of the wells; mitigations may be required that would limit the

ambient noise produced by this equipment. This may include shields, mufflers and any other noise suppressing equipment.

3.10.4 Cumulative Effects

There are no threatened or endangered species currently known to occur in the project area or vicinity. The Proposed Action would result in removal of potential Mexican spotted owl foraging habitat associated with well pad YB 6 and modification of potential foraging habitat associated with production lines. No Mexican spotted owls are known to occur on the Monument lands despite past surveys, including 2012 negative Project Area surveys; however not all potential habitat has been surveyed. The effect from the removal of potential habitat would depend on the future use by owls.

If Mexican spotted owls were to re-populate the Project Area, future development from mineral extraction activities within the Monument and on adjacent public and private lands would increase habitat conversion to industrial uses and increase human disturbance from construction activities, road traffic, and noise. For this project, noise effects would be greatest during construction (less than 12-month period), and future development would incrementally add to noise during construction. Noise from construction, especially nocturnal noise, could disturb regular breeding, foraging, and socializing behavior of owls. Habitat fragmentation would be minimized by co-locating pipelines in existing ROWs and placing well pads on previously disturbed agricultural lands.

The Proposed Action, if approved, would be within the projected mineral development scenario analyzed in the Monument RMP (BLM 2010). The proposed project activities would contribute to potential Mexican spotted owl foraging habitat loss within the project area to a greater extent than activities associated with the No Action Alternative. Under the No Action Alternative, on-going effects to Mexican spotted owls, if present, would continue, due to travel on area roads, mineral development, and grazing. Because the No Action Alternative would not result in any direct or indirect effects to threatened and endangered species, it would not result in an accumulation of effects.

3.11 Wastes, Hazardous, Solid or Fluid

The proposed project area and general vicinity do not contain any known hazardous or solid waste disposal areas. The hazardous materials that are subject to regulation and may be found at each well pad during drilling and completion activities may include:

- Drilling mud and cementing products that are primarily inhalation hazards.
- Fuels and lubricants (flammable and/or combustible).
- Materials that may be necessary for well completion/stimulation activities such as flammable or combustible substances and acids/gels (corrosives).

Exploration and production waste including produced water, drilling fluids, and drill cuttings would be generated during well drilling activities. Human solid and liquid wastes would be generated primarily during the well pad and pipeline construction and drilling phases of the project, and would be contained within portable facilities at each well pad or ROW. Solid waste, other than drill cuttings, generated during drilling and operation activities would be collected in a regularly maintained solid waste disposal container and disposed offsite at a permitted facility.

Kinder Morgan maintains a file, per 29 CFR 1910.1200(g), containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances utilized during the course of construction, drilling, completion, and production operations for each of the proposed wells.

3.11.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no increase in potential exposure to hazardous, solid or fluid wastes in the proposed project area.

3.11.2 Environmental Consequences – Alternative B (Proposed Action)

Under the Proposed Action, there would be potential for spills or leaks of fluid hydrocarbons, produced water, drilling and flowback fluids and solids materials, or other chemicals used during the well drilling, completion, and pipeline construction activities. Spills or leaks would have the potential to effect surface soils and storm water runoff. If spills or releases are not immediately cleaned up, there would be potential for hydrocarbons or salts to leach into the substrate, causing site degradation and potentially affecting the biological productivity of soils and/or surface water quality in the vicinity of the proposed operations.

Design Features would be implemented to reduce the potential for effects to surface soils and storm water runoff. Proposed construction and drilling activities includes measures for managing exploration and production waste material, as well as responding to spills at the well sites and pipeline construction areas. The management activities include drilling with a closed loop system that contains all liquids and solids generated during drilling activities. The entire closed loop waste handling system would be operated within a lined and bermed area to reduce the potential for uncontrolled releases. Solid drill cuttings generated during drilling activities would be stored within walled roll off dumpsters located within the bermed area on each well pad. Material within the storage roll offs would be sampled and analyzed for COGCC Exploration and Production waste stream parameters to determine waste status. If analytical test results of exploration and production solid waste material are below regulatory thresholds, the material may be disposed on-site by mixing with surface material.

The potential for release of hazardous, solid or fluid wastes would be short term during construction and drilling. There would be no permanent accumulation of solid or hazardous waste within the proposed project area; therefore, no direct or indirect effects to solid waste in the project area would occur.

3.11.3 Design Features

The following measures address potential effects to human health and the environment due to the use of hazardous materials during implementation of the Proposed Action:

- Drilling fluids and drill cuttings would be handled with a closed loop drilling system.
- All solids drill cuttings waste will be collected and stored in leak-proof roll-off containers and transported to and may be permanently disposed of at an offsite licensed commercial waste disposal facility.
- After completion of drilling activities, all solid waste present within a given work area would be collected and disposed of in a permitted facility.
- Onsite solid waste disposal facilities would be periodically emptied during drilling activities.
- Any spills or releases of potentially harmful solid or fluid product or waste material would be cleaned up and disposed in accordance with State and Federal regulations.
- All areas of disturbance including reclaimed areas of the well pads would be monitored until the area achieves “Final Stabilization” as defined in the Colorado Discharge Permit System—Construction General Permit. Final stabilization includes establishment of uniform vegetative cover with an individual plant density of at least 70 percent of pre-disturbance levels. This measure would ensure that soil biological productivity has not been affected by spills, releases, or drill cutting material.

3.12 Surface Water and Groundwater

Surface Water

The proposed project components are located to the north of Yellow Jacket Canyon, between Hovenweep Canyon on the north and Yellow Jacket Canyon on the south. Hovenweep, Negro, and Woods canyons are intermittent tributaries to Yellow Jacket Creek and eventually the San Juan River, which runs generally east to west approximately 24 miles south of the project area. Yellow Jacket Creek has perennial flows and is located approximately 0.6 mile to the south of the proposed YB 6 well pad and associated production line. Typically, the San Juan River experiences peak flows, primarily from snowmelt, between April and June (BLM 1985). Principal water uses within the San Juan River Basin include irrigation, municipal, industrial, domestic, recreational, and trans-mountain and trans-basin diversion uses.

No riparian habitats or riparian vegetation species were observed immediately adjacent to or within a 0.5-mile radius of the proposed well pads or flowline route locations. Various unnamed ephemeral drainages are located throughout the project area. The hydrologic regime in the

vicinity of the project area is such that surface water flows only on an intermittent basis in conjunction with sizable precipitation events. Thunderstorms are the primary source of intermittent flow in these ephemeral drainages, which are also fed by snowmelt. Key factors that influence the surface water quality in the project area include sparse vegetative cover, highly erosive soils, rapid runoff, existing roads, oil and gas well pads, and livestock grazing. Surface runoff from the HE 6 and HB 6 well pads would discharge into Hovenweep and Negro canyons and ultimately flow into Yellow Jacket Canyon, approximately 13 miles to the southwest (Figure 1). Surface runoff from the YB 6 well pad would discharge either directly into Yellow Jacket Creek or an unnamed tributary to Yellow Jacket Creek or Woods Canyon (Figure 1).

The proposed HA-station production line would cross Negro Canyon within an existing disturbed ROW. Field observations did not identify a defined bed-and-bank for the drainage as defined by the U.S. Army Corps of Engineers (USACE 2008). The YB production line would cross an unnamed drainage that also does not contain a defined bed-and-bank.

There is one identified spring (Miller Spring) located in the general vicinity (within 1.0 mile) of the proposed HB 6 well pad and two identified springs (Hummingbird and Submerging springs) within 1.0 mile of the proposed HE 6 well pad. No springs are within 1.0 mile of the proposed YB 6 well pad.

Total suspended solids, total dissolved solids (salinity), and heavy metal and biogenic pathogens are the water quality parameters of concern (BLM 1985) within the project area. Yellow Jacket Canyon is not listed in the CDPHE 2010 Clean Water Act Section 303(d) list of impaired waters within the State of Colorado. The proposed project area is outside of any riparian areas or 100-year floodplains. A discussion of Public Lands Health Criteria for water quality is provided in the following section.

Groundwater

The groundwater aquifer in the project area consists of the Colorado Plateau aquifers that underlie an area of approximately 110,000 square miles in western Colorado, northwestern New Mexico, northeast Arizona, and eastern Utah. Aquifers within the Colorado Plateau are generally composed of permeable sedimentary rocks that vary in thickness, lithology, and hydraulic characteristics. Within the project area, the Mesa Verde and Dakota-Glen Canyon aquifers are the uppermost water-yielding units in the Colorado Plateau aquifers. Water from the Mesa Verde aquifer is derived from the Menefee and Cliffhouse Sandstone formations; water in the Dakota-Glen Canyon aquifer is derived from the Dakota and Morrison formations (Robson and Banta 1995).

More localized and shallow groundwater resources are encountered within alluvial deposits associated with the surface water drainages within the project area. These aquifers consist of Quaternary period deposits of alluvial gravel, sand, silt, and clay or Quaternary deposits of eolian sand and silt (Robson and Banta 1995). These aquifers tend to be localized near surface water and of limited aerial extent. In general, groundwater movement is from areas of recharge to areas

of discharge (i.e., springs, seeps). Higher elevation mountainous and sloped areas provide the most important recharge areas based on the presence of outcrops of permeable geologic formations.

Four groundwater well permits were identified within a 1 mile radius of the proposed well locations, based on a search of the Colorado Water Resources Division database of water well permit applications. Two of the permits were for non-producing wells (dry holes). Two of the wells were permitted for livestock/domestic use and are reported to be 75 feet deep. The two active wells are located in the bottom of Negro Canyon approximately $\frac{3}{4}$ mile southeast of the proposed HE6 well. Specific information on groundwater use is limited within the project area, and no residential properties or windmill wells for stock watering were observed in proximity to the proposed project components.

Water quality data for groundwater in the project area is also lacking, although aquifers associated with sedimentary rocks and marine deposits are known to contain high salinity (BLM 1985) and abundant mineralization. Water quality in the deeper sedimentary aquifers may be influenced by upward movement of saline water through improperly plugged exploration holes (Robson and Banta 1995).

Water quality in the proposed project area and vicinity was qualitatively evaluated for overall health and productivity for the Standard for Public Land Health (BLM 2009a). The Cahone Mesa grazing allotment (which contains the HB 6 production line) was determined to be meeting the standard, the remaining grazing allotments that contain the other project components were determined to be not meeting the standard (Sandstone and Hovenweep Canyon allotments).

3.12.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no additional effects to project area surface water or groundwater resources. Ongoing effects to surface water from existing surface disturbance and associated erosion from precipitation runoff would continue. The existing access roads (County Roads 14 and Y) would remain in their current condition, and recreation activities including off-highway vehicle travel would continue. Ongoing erosion and sediment transport that may occur within the proposed project area would continue.

3.12.2 Environmental Consequences – Alternative B (Proposed Action)

Surface Water

There are a number of sources for potential effects to surface water quality that may occur as a result of developing the Proposed Action (Alternative B). Disturbed project area soils would be subject to erosion by wind and/or water into nearby ephemeral washes, potentially affecting localized surface water quality. The production lines would cross Negro Canyon and an unnamed drainage resulting in the possibility of discharge of sediment into the drainage during

construction and until areas of disturbance are fully reclaimed. The proposed YB 6 well pad would be constructed just uphill from an unmarked drainage as it flows through the agricultural field. This was identified in the field with BLM personnel.

Spills or releases of hazardous substances, drilling/completion/production solid and fluid products or wastes, fuels and lubricants, or other constituents utilized during access road, well pad construction, drilling and pipeline construction activities could be washed into surface drainages during storm events. The absence of actively flowing (perennial) surface waters within a 0.5-mile radius of the project elements reduces the potential for surface water quality effects to regional surface water resources. Yellow Jacket Creek is located greater than 0.5 mile south of the YB 6 production line route. During operation of the wells and gathering system, potential effects to surface water quality would include runoff from roads and potential spills from vehicle accidents.

Groundwater

Potential groundwater effects associated with CO₂ resource development include:

- Migration of gas into shallow aquifers; and
- Contamination of shallow drinking water aquifers due to surface spills and releases.

Groundwater contamination, dewatering, or gas migration could occur as the result of improperly sealed surface casings during drilling, well bore stimulation activities, production, and abandonment activities. Potential releases of naturally occurring gases to groundwater include methane, H₂S, or CO₂. Although migration of gas by diffusion or through natural fractures is possible, manmade conduits account for most of the upward migration of gas to the near surface environment.

Shallow groundwater quality could be affected by leakage of fluids from transfer and transportation of drilling fluids, additives, and fuels. Project Design Features would reduce the potential for this to occur. The two active water wells located within a one mile radius of the proposed HE6 well are far enough away that potential effects from surface spills or leaks are not likely.

3.12.3 Design Features

Project Design Features that provide for protection of surface water and groundwater resources include the following: prompt reclamation of non-used areas of surface disturbance, utilization of BMPs to minimize soil erosion and sediment transport, proper maintenance of storage tank berms, proper well drilling and completion techniques that are reviewed and approved by a BLM Petroleum Engineer, and training of project staff on spill response and reporting requirements. In addition, Kinder Morgan would prepare project-specific data sheets for each well pad and associated access routes and flowlines, and the production lines for inclusion in the Kinder Morgan RSWMP prepared in accordance with CDPHE requirements. The production waste

material for each of the proposed wells would be handled and disposed of in accordance with COGCC requirements. The proposed wells would be constructed with appropriate surface casing and cement seals of shallow formations (per BLM and COGCC requirements) to avoid contamination of shallow ground water aquifers.

3.12.4 Cumulative Effects

The proposed project area is located within the McElmo watershed (USGS Cataloguing Unit 14080202) of the San Juan River basin, which is the analysis area for cumulative effects to water resources. The analysis area includes McElmo and Yellow Jacket canyons and all tributaries. The McElmo watershed area is approximately 458,000 acres in size. A general description of cumulative effects to water resources for the Monument is provided in the RMP Final EIS (BLM 2009a). Past actions that have potential to affect surface and groundwater quality within the proposed project area include: road and pipeline construction, well pad construction, grazing and clearing of agricultural fields. Table 8 provides a summary of areas of disturbance and agricultural activities present within the analysis area.

Table 8. Existing Agricultural Activities, Roads, and Oil and Gas wells within watershed.

	Within Analysis Area	Proposed Action
Agricultural Acreage¹	103,584	0
Total length of roads (miles)²	1,420	0
Secondary & Service Roads (miles)²	236	1
COGCC Well Count³	345	3

Notes:

- 1 USGS - Southwest Regional Gap Analysis Project GIS Dataset
- 2 US Census Bureau - Topologically Integrated Geographic Encoding and Referencing Roads GIS Dataset
- 3 COGCC well data (COGCC 2012)

Future activities within the analysis are likely to include additional mineral development activities, agricultural activities, and road development. A description of reasonably foreseeable mineral development and road construction activities within the Monument and adjacent areas is provided in the Monument RMP Final EIS (BLM 2009a).

As summarized in Table 8, the proposed development activities represent an increase of less than 1% over the current total length of secondary roads and total number of well pads within the analysis area. Agricultural activities occur on slightly less than 25% of the area within the watershed. Based on the dispersed nature of the proposed mineral development activities, and the arid nature of the project area and associated water sheds, it is not anticipated that cumulative effects of past, present, and future activities within the project area would cause regulatory

thresholds to be exceeded for surface water or groundwater. Implementation of project-specific design features would confine all potential effects to surface and groundwater to within the proposed project area.

Under the No Action Alternative on-going effects to water resources would continue, due to grazing, soil erosion and storm water runoff. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.13 Access

The main access to the Monument is via US Highway 491, which runs generally southeast to northwest to the east of the Monument. From US 491, access to the Monument is via gravel and paved surface Montezuma and Dolores county roads. Within the Monument, access includes a combination of county roads and un-maintained two-track BLM system roads. The road network provides access for recreational and educational uses within the Monument; access to range allotments; and access to oil, natural gas, and mineral development areas.

Access to the proposed YB 6 well pad is via US Highway 491 and then county roads Y, 15, U and 14. The proposed well pad is accessed through an un-maintained dirt two-track road along the edge of a fallow agricultural field. Access to the proposed HB 6 and HE 6 well pads is via US Highway 491 and county roads 8, Z, 11, and Y. The proposed HB 6 well pad would be accessed via an existing un-maintained dirt two-track road. As described in the Proposed Action (Section 2), the well pad construction, well drilling, and pipeline construction activities would require approximately 600 vehicle trips to the project area per well.

3.13.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, the current levels of traffic would continue, and the existing transportation network would remain in place with the current improvement levels. There would be no change in access to the areas, and ongoing effects to area roads from existing vehicle travel would continue. The existing oil and gas access road would remain open and would continue to provide public access to the area.

3.13.2 Environmental Consequences – Alternative B (Proposed Action)

Implementation of the Proposed Action would cause direct effects to the existing transportation network through increased wear on area roads. The majority of wear on area roads would occur primarily during construction and well drilling (within the first 12 months of project activities). No changes in traffic patterns or level of service for area roads would occur as a result of the Proposed Action. If the wells are productive, the wells and pipelines would require monthly inspection, which would be completed during the ongoing inspection program conducted by Kinder Morgan for producing CO₂ wells within and outside of the Monument.

3.13.3 Design Features

All vehicle travel to and from the proposed well pads would be limited to the approved access roads for each location. The access roads would be constructed to BLM oil and gas exploration “Gold Book” standards (BLM 2007). The roads would be maintained to the BLM “Gold Book” standards.

3.13.4 Cumulative Effects

There are currently 196 miles of roads within the Monument for access to oil and gas sites (BLM 2009a). The Monument Reasonable Foreseeable Development (RFD) document (BLM 2005) estimates that future oil and gas development activities within the Monument would require approximately 67 miles of additional roads over the 20-year period from 2005 to 2025. The proposed access road constructed to HE 6 (386 feet) would be included within the 67 miles of new oil and gas access roads that would be constructed within the Monument. The length of new roads represents 0.15% of the reasonable foreseeable oil and gas access roads within the Monument. Implementation of the Proposed Action would cause short-term increases in traffic during construction and well drilling activities; however, the increase in traffic would not cause effects to the level of service on area roads. If future development activities were to cause exceedance of access road level of service, then road improvements would be implemented to provide safe and effective access to the Monument. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.14 Geology and Mineral

The Monument is located within the Colorado Plateau physiographic unit. Surface geologic material within the proposed project area is typical for the Monument. The uppermost geologic strata exposed in the canyon walls for the three proposed well pads are the sandstone outcrops and surface material derived of the Dakota and Burro Canyon formations, which are of cretaceous age. Below the Dakota Sandstone layer are various sandstone and shale layers associated with the Morrison formation of Jurassic Age. Unconsolidated canyon bottom material consists of modern alluvium material generated in the Quaternary age. There are some large Quaternary-age landslides in the canyons adjacent to sections of the proposed flowlines and production lines. The canyon bottoms are a jumble of Dakota and Burro Canyon rubble, which should outcrop at the top of the canyons. Since the flowlines and productions lines would be constructed in existing ROWs that have persisted for decades, no Geologic Hazard Survey is required for this project (James Blair, BLM Geologist, pers. comm.).

Mineral resources within this section of the Monument are primarily CO₂ deposits associated with the McElmo Dome formation. The McElmo Dome is described as the largest currently producing CO₂ deposit in the world (Paulson and Baker 2006). Oil and natural gas resources area also present within the Monument, but production is currently in decline (BLM 2009a).

3.14.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, farming activities in the project area would continue to contribute erosion of surface soils. Grazing effects that would affect soils would also continue.

3.14.2 Environmental Consequences – Alternative B (Proposed Action)

The proposed development activities would provide for production of CO₂ resources from subsurface geologic formations. The proposed development would reduce the amount of mineral resources present within the developed formation. It is difficult to predict the amount of mineral resources that would be produced and what volume would remain after wells are no longer productive. A summary of geologic resources and mineral development activities is provided in the RFD document (BLM 2005).

No mitigation measure for effects to geology and mineral resources are necessary.

3.14.3 Cumulative Effects

The area of analysis for cumulative effects to mineral resources is the same area analyzed in the Monument RFD document (BLM 2005) and Monument Final EIS (BLM 2009a). Cumulative effects associated with mineral resources include the removal of the resource associated with the mineral development activities. The reduction in mineral resources associated with development activities within the Monument has been quantified in the document RFD document (BLM 2005). The McElmo Dome Unit is estimated to have sufficient CO₂ resources to provide 50 years of production with increases in production rates (BLM 2005, page 28). The Proposed Action is considered part of the RFD scenario analyzed by the BLM Fluids Mineral staff and the Monument RMP (BLM 2010).

A review of COGCC records (COGCC 2012) within the project area was made to quantify existing oil and gas disturbance within a 1-mile and 5-mile radius of the proposed project area. The summary of 1- and 5-mile radius area provides a nearby (1 mile) and general vicinity (5 mile) summary of the density of mineral development activities.

Existing or previous oil and gas development located within a 1-mile radius of the proposed project area consists of fifteen permitted locations (seven within a mile of the proposed HB 6 and HE 6 well pads and eight within a mile of the proposed YB 6 well pad). Within a 5-mile radius of the proposed project area, there are 146 permitted well pad locations. The area searched within a 1-mile radius is 5,700 acres. The area searched within a 5-mile radius is 99,000 acres. Based on 4 acres of disturbance per well pad, the percent of affected land from well pads is 1.1% and 0.5% within a 1-mile and 5-mile radius respectively. The additional 3 wells would put the area of disturbance percentage at 1.4% within a 1-mile radius. The addition of 3 wells to the area of disturbance within a 5-mile radius would be less than 0.1% increase in the area disturbed by well pads.

The proposed mineral resource development activities would combine with past, present, and anticipated future removals to reduce the amount of mineral resources present within the target formations.

Under the No Action Alternative on-going development of mineral resources would continue at current levels. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.15 Health and Safety

There are seven active CO₂ wells within 1 mile of the proposed HB 6 and HE 6 well pads and eight active CO₂ well pads within 1 mile of the proposed YB 6 well pad. The primary health and safety concerns within the proposed project area include: vehicle travel on existing access roads and operation of existing utilities. A description of access routes to each of the proposed well sites is provided in Section 3.13. Existing CO₂ development flowlines and production lines are the only utilities present within one mile of the proposed well sites:

3.15.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no increase in project area health and safety hazards. Ongoing sources of health and safety concerns (travel on gravel roads and operation of existing utilities) would continue at current levels.

3.15.2 Environmental Consequences – Alternative B (Proposed Action)

Implementation of the Proposed Action would result in an increase in occupational health and safety hazards to operators during the construction, drilling, and operation of the Proposed Action. There would also be slight potential for effects to the general public. Health and safety hazards associated with drilling of the proposed wells include: H₂S gas releases, noise exposure, high-pressure liquid hazards, physical hazards associated with work in the vicinity of moving objects, and chemical hazards. Releases of H₂S would occur while drilling through shale formations that contain high concentrations of the gas. H₂S is a potentially lethal gas with an Immediately Dangerous to Life or Health (IDLH) concentration of 100 parts per million (NIOSH 2012).

Existing utility infrastructure present within the project area represents health hazards for construction activities. Damage to any of these facilities during project construction, operations, and maintenance represents health and safety risks to workers and to the general public.

Indirect effects to health and safety may occur due to an increase in traffic that may cause an increase in vehicle accidents during the well pad construction, well drilling, and pipeline construction period.

3.15.3 Cumulative Effects

Cumulative effects to health and safety would include worker safety effects associated with well pad construction and well drilling activities, and public health and safety effects associated with increased traffic on area roads. The geographic area of analysis is the Monument, and the timeframe for analysis is the past 10 years and development activities 10 years into the future. Implementation of the Proposed Action would represent a continuation of current levels of development associated with on-going mineral development activities within the Monument. On-going well pad construction activities and well drilling activities contribute effects to worker health and safety, and the Proposed Action would contribute to these effects. Travel on roads within the Monument represents a potential risk for worker safety and the general public, and the Proposed Action would contribute to these risks with a short-term increase in traffic (associated with construction and well drilling activities).

Under the No Action Alternative on-going effects to health and safety would continue at current levels. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.16 Law Enforcement

Law enforcement activities within the Monument include enforcement of Colorado and Federal rules and regulations regarding criminal actions, protection of terrestrial and aquatic wildlife, and protection of archaeological and cultural resources. Law enforcement activities are carried out by several agencies that work and support each other through cooperative agreements and memorandums of understanding. The nearest BLM law enforcement officers are stationed at the Anasazi Heritage Center.

3.16.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, ongoing law enforcement activities would not change. Random patrols through the Monument would continue, and response to reports of criminal activities would continue.

3.16.2 Environmental Consequences – Alternative B (Proposed Action)

Implementation of the Proposed Action has the potential to affect law enforcement activities indirectly due to increases in traffic to the project area, which could increase the potential for traffic accidents on roads within the Monument.

The greatest increase in potential traffic accidents would be short-term during the construction and well drilling phase of the project (first 12 months of project activities). Based on project vehicles being operated in compliance with existing laws, the Proposed Action would not cause any direct increase in law enforcement requirements.

3.17 Noise

The Proposed Action is located in a remote area with limited access and moderate activities related to oil and gas development. No background noise studies have been conducted for the project area; however, various natural and human generated sounds are produced in the project area. Current ambient noise levels are estimated to be consistent with rural areas ranging between 35 decibels (dBA) (night time noise levels) to 70 dBA (maximum permissible oil and gas operation noise level in remote locations; COGCC 2009).

Sounds naturally occurring in the project area are associated with wildlife and weather. Human-generated noise is created from access to the area for recreational use, and nearby agricultural activities. Ambient sound levels in the project area vary greatly, depending on proximity to existing facilities, roadways, or other noise sources. The sound levels also fluctuate with variations in weather conditions including temperature, wind and humidity, and the general topography of the area. Active and fallow agricultural fields surround the project area. Occasional jet airplanes fly over the project area during the day. Scattered CO₂ wells and infrastructure including compressor stations produce noise levels associated with oil and gas operations. A compressor station is located 1.5 miles southeast of the proposed HE 6 well head. Gravel and dirt roads near the project area receive light residential, oil and gas, recreational, agricultural, and vegetation management vehicle traffic (approximately 10 to 30 vehicles per day). Traffic levels depend on the time of day, day of the week, and the time of the year; winter months receive less traffic.

Noise-sensitive receptors in the project area include wildlife, recreational users, and single-family residences. See Section 3.23 for a full description of wildlife species found in the project area. Rural residential land use occurs to the north and east of the project area.

The proposed project area falls within the COGCC light industrial standard as no structures or designated activity areas occur in proximity to the project area. This standard designates allowable noise levels for oil and gas operations; in light industrial areas the noise levels permitted may range from 70 dBA during the daytime (7:00 am to 7:00 pm) and 65 dBA during the nighttime (7:00 pm to 7:00 am) (COGCC 2009).

3.17.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no increase in noise from proposed project-related activities. Noise levels would remain at current levels generated from human activities and natural sounds.

3.17.2 Environmental Consequences – Alternative B (Proposed Action)

Noise effects were evaluated by comparing anticipated noise levels generated from the Proposed Action with current noise levels in the project area and distances from sensitive noise receptors.

Measurements of ambient noise levels for the Project Area are not available, but it is assumed to range from between 35 to 70 dBA.

During construction of the Proposed Action Alternative, there would be a short-term increase in project area ambient noise levels due to the operation of heavy equipment. Construction noise would range from 80 to 93 dBA during the operation of a grader, 80 to 85 dBA using a bulldozer, and 83 to 94 dBA using a truck (EPA 1974). Drilling rig noise levels [115 dBA at the source and 74 dBA at 200 feet (USGS 1981)] would be expected to exceed other heavy equipment on location. Drilling noise would occur continuously for 24 hours per day for 1 to 2 months. Noise effects are expected to decrease during long-term operation and maintenance, and would be dependent on the type and size of compressor or pumping equipment installed at the well (if any) to increase production of CO₂. Noise effects during operation of the well would be limited to vehicular access and maintenance activities.

An increase in noise may indirectly affect wildlife in the area. Bald eagles are very sensitive to human-generated noise during the breeding season (USFWS 2007). See Sections 3.23 and 3.20 for a discussion on noise effects to wildlife and BLM Sensitive Status Species.

3.17.3 Design Features

The Proposed Action would comply with the COGCC maximum permissible noise levels for a remote (light industrial) area during construction, well drilling, and operation of the wells (65 dBA to 70 dBA).

3.17.4 Cumulative Effects

An increase in ambient noise levels has occurred in the vicinity of the Project Area due to previous oil and gas development, travel on areas roads, and agricultural activities. Implementation of the Proposed Action, in conjunction with other past, present and reasonably foreseeable activities within the Analysis Area, would cause an increase in noise during the construction and drilling phases of the project (approximately 12 months). The Proposed Action would not cause noticeable changes in noise levels in the long term. The increased noise levels would be greater than those associated with the No Action Alternative. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.18 Socioeconomic Values

Effects to the human environment are measured in terms of the social and economic characteristics of the area where the Proposed Action is to take place. Economic effects are generally expressed as changes to population, employment, income, government revenue, and property value. Social effects are expressed as changes to community infrastructure, such as access to social services. The Proposed Action is to take place in Montezuma County, Colorado.

Population

In 2010, the population of Montezuma County was 25,535 individuals, a 7% increase over the 2000 population (US Census Bureau 2010; Montezuma County CEDS Update 2011). The county's population is expected to increase over the next 20 years by about 48% to 37,600 individuals by 2030. Population has increased by about 1% per year between 2000 and 2010. Table 9 gives population estimates for the county and the state from 1990 to 2030. Nearly two-thirds of Montezuma County residents are located in unincorporated areas, one-third in the City of Cortez, and the remainder in the towns of Mancos and Dolores (DOLA 2011).

Table 9. Population Estimates for the Affected Area.

County/State	1990	2000	2010	2020	2030
Montezuma County	18,672	23,852	25,535	31,200	37,600
Colorado	3,294,394	4,338,801	5,024,078	6,000,000	7,010,000

Source: US Census Bureau 2010 and DOLA 2011.

Employment

In 2011, Montezuma County had an estimated 12,000 jobs, with an unemployment rate of almost 10% (DOLA 2011). The unemployment rate has increased since the beginning of the current economic recession in 2008, when it was about 5% (Walker 2008). There were about 400 fewer jobs in the county in 2011 than in 2000. Seventy-five percent of the Montezuma workforce resides within the county, while 25% reside outside the county. About two-thirds of Montezuma residents are employed within the county (Montezuma County CEDS Update 2011). Table 10 details the main employment sectors within the county as of 2009.

Table 10. Employment sectors and numbers and percentages of jobs in Montezuma County in 2009.

Employment Sector (2009)	Number of Jobs	Percent of County Jobs	Income(in Millions)	Percent of Total County Income
Services	4,088	34	\$121,202	27
Government	3,012	25	\$131,206	29
Wholesale and Retail Trade	1,663	14	\$56,444	13
Construction	997	8	\$49,145	11
Agriculture	684	6	\$14,389	3
Finance, Insurance, and Real Estate	612	5	\$20,772	5
Manufacturing	406	3	\$17,007	4
Mining and Utilities	270	2	\$23,098	5
Transportation and Warehousing	203	2	\$9,220	2
Information	110	1	\$4,171	1
Total	12,045	100	\$446,654	100

Source: Montezuma County CEDS Update 2011.

Income

The median household income (MHI) in Montezuma County in 2010 was about \$44,000, (US Census Bureau 2010). This is below the MHI for the state of Colorado (\$56,000) and the nation (\$51,000) in 2010. Between 2005 and 2010, Montezuma County’s poverty rate was 17%, compared to about 13% in Colorado and 14% in the nation as a whole (DOLA 2011; US Census Bureau 2010). A living wage in Montezuma County is between \$10.41 and \$10.92 per hour for a single person; between \$21.35 and \$22.80 per hour for a single parent with one child; and between \$29.48 and \$30.63 per hour for a family of four.

Government Revenues and Expenditures

The proposed wells will be installed on land with private surface rights and BLM mineral rights. Therefore, a small positive effect to Federal, state, and county governments may result from the Proposed Action. A 12.5% royalty from the production of CO2 from the Proposed Action is split approximately in half between the Federal government and the state of Colorado (Congressional Budget Office 2000). In addition, the state will receive a flat severance tax plus a percentage of the production income, less 87.5% of the taxes paid to local and county government (Colorado Department of Revenue 2011).

In 2011, total revenues paid to Montezuma County were estimated at about \$31 million and expenditures at about \$33 million. About 45% of county tax revenue comes from oil and gas

extraction, the bulk of which is revenue from CO₂ wells (Montezuma County CEDS Update 2011). In 2010, tax revenues to the county and local government for CO₂ production totaled about \$12 million, by far the greatest revenue source for Montezuma County and its municipal governments. Revenues from CO₂ in 2011 are expected to exceed those of 2010 (Montezuma County Assessor 2010). Schools are the greatest government expenditure, followed by county government, special tax districts (which include fire protection, sanitation, and school districts), and city governments.

Housing and Property Value

In 2010, Montezuma County had about 11,000 total households, and 12,000 housing units. About 13% of housing units were vacant. Owner-occupied housing units totaled almost 8,000, while renter-occupied units totaled about 3,000 (DOLA 2011). The Montezuma County Assessor estimated that the median price for a single-family home in 2010 was \$160,000 (Montezuma County CEDS Update 2011). The total value of property in the county in 2010 is estimated to be about \$540,000,000 (Montezuma County Assessor 2010).

3.18.1 Environmental Consequences – Alternative A (No Action)

There would be no change in socioeconomic effects for the No Action Alternative as social and economic conditions in the affected area (Montezuma County) would remain the same as baseline conditions.

3.18.2 Environmental Consequences – Alternative B (Proposed Action)

The construction phase of the project may bring a small number of workers from outside of the county for a short time but is not predicted to alter the population demographics of the county over the long term. Two new full-time jobs would be created by the Proposed Action.

The Proposed Action would have a small and positive effect on employment in Montezuma County. It would result in approximately 30 temporary jobs during the construction phase and could increase the likelihood of more permanent jobs to support the maintenance and development of the Proposed Action.

The Proposed Action could have a small positive and long-term effect on income for those who own the surface rights on which the wells will be located, through surface use payments. In addition, the wages for those employed temporarily and long-term are likely to exceed the living wage minimum for the county.

The projected production revenue for the Proposed Action is \$43 million. An estimated \$1.6 million in tax revenue will be paid to the Federal government in royalty payments, \$1.9 million to the state of Colorado in severance taxes and royalties, and \$940 thousand to Montezuma County in property/ad valorem taxes.

The Proposed Action could have both negative and positive effects on the county and local government revenue and expenditures. The income created for both Kinder Morgan and the property owners would be taxable, and would increase government revenue, as discussed above. However, the demand on county infrastructure and government services may outpace the revenue produced by the Proposed Action, thus stressing the local government's resources in the short term (AGCN 2008). In addition, workers who move to the county may require government services, such as schools, medical services, elder care, and general assistance. However, due to the temporary nature of the work and the low number of employees involved in the construction of the project, education and other government services are not likely to be affected.

The Proposed Action is likely to have very little effect on housing demand, as the small number of workers from outside the county would be temporary. The project, however, may have an effect on property value. While coal-bed methane development in the adjacent La Plata County, Colorado, was demonstrated to negatively affect property values, it is not clear if CO₂ development would have a similar effect in Montezuma County (BBC Research and Consulting 2001). The footprint of the project installations is substantially smaller than coal-bed methane development installments, thus disturbing less land. The small surface use payment to landowners may increase property value.

3.18.3 Cumulative Effects

A description of cumulative effects to socioeconomics for the Monument is provided in the RMP Final EIS (BLM 2009a). The area of analysis for cumulative effects is Montezuma County, CO because the majority of direct and indirect effects would occur within the county. The Proposed Action would have small and beneficial socioeconomic effects in Montezuma County. These include increased tax revenue to the Federal, state, and local governments. Nearly half of the Montezuma County's revenue comes from CO₂ extraction. The Proposed Action would contribute to and help maintain this revenue stream. The jobs that would be created from the Proposed Action are likely to have a higher wage than what is considered livable for the county. In addition, income to surface and mineral rights owners would increase income, while the effect on property values is uncertain. There would be no change in current employment levels, tax revenue, and mineral rights income for the no action alternative, and no contribution to cumulative effects.

3.19 Soils

Surficial soils within the Proposed Action are primarily associated with the Dakota Sandstone and Burro Canyon geologic formations. Soil parent materials are predominantly eolian material and sources from sandstone and shale.

The proposed project area soils are generally composed of yellowish red loam to fine sandy loam. There are nine soil types mapped for the project area (NRCS 2012; Table 11). Dominant

soil types include the Wetherill Loam and Pulpit and Cahona-Pulpit Complex. Soil depths vary with distance from the rock outcrop areas (canyon edges), with thicker soil layers present in the middle of the mesa areas. The shallowest soils in the project area are located on the proposed YB 6 well pad. Three of the nine soil types have a severe erosion potential (Table 11). None of the project activities would occur on slopes greater than 30%. Additional specific soil characteristics are provided in the report *Soil Survey of Cortez, Parts of Dolores and Montezuma Counties* prepared by the Natural Resource Conservation Service (NRCS 2001).

Table 11. Soil types for the project area, including location and erosion hazard.

Soil Type	Location	Erosion Hazard
Barx-Gapmesa complex, 2 to 6% slopes	Portions of the YB 6 Production Line	Moderate
Cahona-Pulpit complex, 3 to 9% slopes	Portions of the HA and YB Production Lines; YB 6 well pad	Moderate
Gladel-Pulpit complex, 3 to 9% slopes	Portions of the HA, HB, and YB Production Lines and the HB 6 and YB 6 Flowlines	Moderate
Pulpit loam, 6 to 12% slopes	Portions of the YB 6 Flowline and YB Production Line	Severe
Romberg-Crosscan-Rock outcrop complex, 25 to 80% slopes	Portions of the HA Production Line	Severe
Romberg-Crosscan complex, 6 to 25% slopes	Portions of the HA Production Line and the HB 6 Flowline	Moderate
Wetherill loam, 1 to 3% slopes	Portion of the HA Production Line; HE 6 well pad	Slight
Wetherill loam, 3 to 6% slopes	Portions of the HB, HA, and YB Production lines and the HB 6, HE 6, and YB 6 Flowlines; the HB 6 well pad	Moderate
Wetherill loam, 6 to 12% slopes	Portions of the HA and YB Production Lines and the HB 6 Flowline	Severe

Source: NRCS 2011.

The soils in the proposed project area and vicinity were qualitatively evaluated for overall health and productivity for the Standard for Public Land Health upland soils (BLM 2009a). The project area and vicinity were determined to not meet the standard.

3.19.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, development, grazing and recreation activities in the project area would continue to contribute positive and negative effects to surface soils.

3.19.2 Environmental Consequences – Alternative B (Proposed Action)

The Proposed Action would result in temporary displacement, compaction, and mixing of soils in the project area. Accidental spills or releases of potentially harmful product or waste materials could result in soil contamination requiring remediation. Reduced capacity for plant growth due to removal and/or disturbance of the soil would be an additional direct effect. Due to the susceptibility of the project area soils to wind and water erosion, construction activities may indirectly cause loss of some upper soil layers.

Direct effects to project area soils due to well pad clearing, and access road and pipeline construction would be confined to within the project area (46.4 acres). Topsoil would be segregated and utilized for interim reclamation within a short-term (less than 1 year) disturbance area (approximately 42.4 acres). Project Design Features would be implemented during the operation and maintenance phase of the Proposed Action, and would provide soil stabilization and reclamation of unused areas, reducing the amount of soil disturbance long term.

3.19.3 Design Features

Design Features included in the project COAs (Appendix A) for construction (access roads, well pads and pipelines) and operation of the well pad and access roads include stockpiling topsoil and prompt reclamation of non-used areas of the well pads, access roads, and pipeline routes. Reclamation activities would include reseeding unused areas with a weed-free, BLM-approved seed mix to stabilize soils and to prevent erosion. Kinder Morgan would develop a project-specific data sheets for each well pad as part of their RSWMP that identifies BMPs that would be implemented to reduce erosion and prevent a discharge as mandated by the CDPHE.

Additional COAs that would reduce effects to soils include the following:

- Construction activities would not be conducted during extended wet periods.
- Stormwater controls will be utilized to minimize offsite migration of disturbed soils.
- Vehicle and pedestrian traffic would be restricted to the well pads, access roads, and pipeline routes.

3.19.4 Cumulative Effects

Large scale vegetation treatment, road and pipeline construction, farming and grazing in the project area are the main past activities that would have affected project area soils. Current activities that may affect soils include mineral development activities, grazing activities, and formal and informal recreation activities. These activities also represent the primary activities that would potentially affect soils in the future. The no action alternative would represent a continuation of effects to soils at their current levels. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.20 Sensitive Species

There are 12 BLM sensitive species with potential to occur in the proposed project area. The list includes BLM sensitive species compiled from the Colorado BLM State Director's Sensitive Species List (BLM 2009b), Information Bulletin No. CO-2000-14, Information Bulletin No. CO-2010-007, and consultation with the BLM Wildlife Biologist and Botanist.

Of the 12 listed sensitive fauna that were considered in this EA, potential habitat exists within or adjacent to the project area for eight species: peregrine falcon (*Falco peregrinus anatum*), American bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), Townsend's big-eared bat (*Corynorhinus townsendii*), spotted bat (*Euderma maculatum*), Allen's (Mexican) big-eared bat (*Idionycteris phyllotis*), fringed myotis (*Myotis thysanodes*), and big free-tailed bat (*Nyctinomops macrotis*). In addition, the Monument provides potential habitat for golden eagle (*Aquila chrysaetos*) and Mesa Verde nightsnake (*Hypsiglena torquata loreala*), two species specifically mentioned in the Monument RMP (BLM 2010). Golden eagles are also listed as a BCC by the USFWS. A summary of the sensitive species considered in this EA, their habitat requirements, and Colorado Natural Heritage Program status are provided in Table 12.

The cliffs adjacent to the project area along the western half of the proposed YB 6 flowline drop into Yellow Jacket Canyon to the south. These cliffs do not provide ledges suitable for peregrine falcons and golden eagles to nest on. No cliff dwelling raptor nests were identified within 0.5 mile of the project area in 2012; the only raptor seen during surveys was red-tailed hawk. The canyon bottom in Yellow Jacket Canyon as well as the open habitats in and surrounding the project area provide good foraging habitat for raptor species.

The project area and vicinity do not provide suitable nesting substrate for bald eagles and ferruginous hawks. However these species are known to winter in the region and may utilize the project area and vicinity for foraging.

The cliffs adjacent to the project area along the western half of the proposed YB 6 flowline provide foraging/roosting habitat for five bat species: Townsend's big-eared bat, spotted bat, Allen's (Mexican) big-eared bat, fringed myotis, and big free-tailed bat (Adams 2003). The project area's piñon-juniper woodlands provide foraging habitat for all of these bat species. Water, a limiting factor for bat populations in arid habitats, is available in stock ponds, springs, and seasonal streams in the vicinity of the project area. The rocky cliffs associated with Negro, Hovenweep, and Yellow Jacket canyons provide suitable roost sites for spotted bats and big free-tailed bats. However, there is no known potential breeding habitat (mines, caves) for the remaining bat species in the vicinity of the project area.

Table 12. BLM sensitive species with potential to occur within the Tres Rios Field Office management area and/or the proposed project area.

Common Name	Scientific Name	CNHP Status ¹	Habitat	Potential to Occur in Project Area (PA)
MAMMALS				
Allen's big-eared bat	<i>Idionycteris phyllotis</i>	No CNHP status	Roosts are associated with mines/caves. Known to forage in piñon-juniper woodlands.	May forage in piñon-juniper habitat adjacent to the project area; no mines or caves in the PA or vicinity.
Big free-tailed bat	<i>Nyctinomops macrotis</i>	S1	Rocky cliffs with crevices and fissures required for roosting.	May forage or roost in the rocky cliffs in the vicinity of the PA.
Spotted bat	<i>Euderma maculatum</i>	S2	Cliff dwellers with diurnal roosts in cracks and crevices of canyons and cliffs. Known to forage in piñon-juniper woodlands.	May forage in piñon-juniper habitat adjacent to the project area; no mines or caves in the PA or vicinity.
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	S2	Dependent on availability of abandoned or inactive mines.	May forage in piñon-juniper habitat adjacent to the project area; no mines or caves in the PA or vicinity.
Fringed myotis	<i>Myotis thysanodes</i>	S3	Breeds in caves and forages in piñon-juniper woodlands.	May use cliffs in the vicinity of the PA for roost sites; no caves in the PA or vicinity.
BIRDS				
Peregrine falcon	<i>Falco peregrinus anatum</i>	S3B	Prefers open country and high vertical cliff areas for nesting (>200 feet).	Marginal potential nesting habitat on cliffs in the vicinity of the PA.
American Bald Eagle	<i>Haliaeetus leucocephalus</i>	S1B, S3N	Nest in forested areas adjacent to large bodies of water. Winters regionally in proximity to water as well as areas with readily available resources (i.e., prairie dogs, rabbits, carrion).	No potential nesting substrate located within the PA or vicinity. May utilize the project area for winter foraging.
Ferruginous hawk	<i>Buteo regalis</i>	S3B, S4N	Flat or rolling terrain in grasslands, shrub-steppes, and deserts; badlands. Prefers elevated nest sites (e.g., buttes, utility poles, trees) and on the ground.	No potential nesting substrate located within the PA or vicinity. May utilize the project area for winter foraging.

Common Name	Scientific Name	CNHP Status ¹	Habitat	Potential to Occur in Project Area (PA)
REPTILES and AMPHIBIANS				
Long nose leopard lizard	<i>Gambelia wislizenii</i>	S1	Generally below 5,200 feet in extreme western Colorado associated with desert shrub.	Potential habitat for long nose leopard lizard does not exist within the PA.
Desert spiny lizard	<i>Sceloporus magister</i>	S2	Inhabits arid and semiarid regions, from plains to lower mountain slopes including desert shrubland and woodland, shrubby areas along arroyos and playa edges, and cottonwood/willow zones along rivers.	Potential habitat for desert spiny lizard does not exist within the PA.
PLANTS				
Jones' bluestar	<i>Amsonia jonesii</i>	S1	Runoff-fed draws on sandstone in piñon-juniper and desert scrub habitats (3,900-7,000 feet).	PA is in piñon-juniper habitat within the known elevational range for this species. No individuals observed during biological surveys.
Naturita milkvetch	<i>Astragalus naturitensis</i>	S2,S3	Shallow pockets of soil on sandstone mesas, ledges, crevices and slopes in piñon-juniper woodlands (5,000-7,000 feet).	PA is in piñon-juniper habitat within the known elevational range for this species. No individuals observed during biological surveys .

Note:

¹ Colorado Natural Heritage Program (CNHP) status: S1-Critically Imperiled, S2-Imperiled, S3-Vulnerable, S4-Apparently Secure, B-Breeding population, Monument, N-Non breeding, proclamation species.

Sources: Colorado BLM State Directors' Sensitive Species List, BLM Information Bulletin No. CO-2000-14 (BLM 2009b) including CNHP-listed species (August 2006)

Although it is not listed by BLM as sensitive, the Mesa Verde nightsnake is cited as a unique herpetological resource in the Monument RMP (BLM 2010). Hammerson (1999) identifies this species as more common than is currently known, and that its habitat is not currently threatened. Mesa Verde nightsnake prefers rocky slopes and canyons, habitat components that are absent from project area (Hammerson 1999). Therefore it is not discussed further in this document.

No BLM-listed sensitive flora species considered in this EA have the potential to occur in the proposed project area.

3.20.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, on-going effects to BLM sensitive species would continue at their current levels.

3.20.2 Environmental Consequences – Alternative B (Proposed Action)

The proposed project area provides potential habitat for five BLM sensitive bat species, which may utilize the project area and vicinity for foraging/roosting habitat. Under the Proposed Action, no potential roost sites would be directly affected by project construction. Potential indirect effects to these species would include noise and human disturbance associated with well construction and operation, which could affect adjacent roosting habitat. Foraging bats may be displaced from and avoid preferred foraging areas due to noise disturbance since activities at the well pad sites during construction would be constant, day and night. Once construction was completed, nocturnal noise associated with the wells would cease and would not be expected to displace individual bats long term.

Clearing and revegetation of the proposed project area will change the vegetation density and composition, which could affect the prey base for raptor species. Clearing may actually provide additional foraging opportunities for raptors, particularly after the sites have been re-vegetated following interim reclamation and can provide some cover habitat for birds and small mammals. Raptors may be directly affected by increased noise and human presence during construction. The long-term effects during operation of the wells and production lines would occur from periodic human activity and vehicular traffic in the area.

The proposed development could affect the two sensitive herptofaunal species, the long nosed leopard lizard and the desert spiny lizard. The long-term operation of the proposed wells, particularly the vehicular traffic associated with this operation, could cause incidental deaths and provide movement barriers for these species.

No effects to BLM sensitive plants would occur since none are present within the construction areas.

3.20.3 Design Features

Construction activities would be confined to the proposed well pads, access roads, and production line routes to avoid potential effects to any sensitive species if they were to occur in the vicinity of the project. Kinder Morgan would contact BLM resource specialists immediately if any listed species were observed during construction or operation of the Proposed Action. Additional measures to avoid disturbance of raptor species include the following:

- In 2012, cliff-nesting raptor surveys were conducted within 0.5 mile of the proposed project area prior to construction. No raptor nests were identified.

- If an active raptor nest were identified within 0.5 mile prior to construction, a species-specific spatial buffer would be applied until the nest either successfully fledges young or fails, as determined by a biologist.
- If onsite compressors or any other type of noise producing equipment is required for the long-term operation of the wells; mitigations may be required that would limit the ambient noise produced by this equipment. This may include shields, mufflers and any other noise suppressing equipment.
- A 0.5 mile buffer will be applied around nesting raptors and peregrine falcon nesting complexes.
- A 0.5 mile buffer for bald and golden eagle roosts or nest sites will be applied.

3.20.4 Cumulative Effects

A description of cumulative effects to sensitive species for the Monument is provided in the RMP Final EIS (BLM 2009a). Disturbance to BLM sensitive species habitat in the project area has occurred in the past includes existing roads, existing agriculture and grazing, and previously disturbed habitat from existing CO₂ infrastructure. Grazing affects the woodland understory, which may have affected potential habitat for sensitive plant species or destroyed individuals. Approximately 28 acres of the Proposed Action would overlap existing disturbance (developed agricultural areas and previously disturbed ROW areas). Future development from mineral extraction activities within the Monument and on adjacent public and private lands would increase habitat conversion to industrial uses and increase human disturbance from road traffic, thereby increasing cumulative effects to sensitive species. The current three proposed well pads do not contain critical habitat for any listed species and would not be expected to alter their protection status when combined with other reasonably foreseeable future projects. While there may be direct and indirect effects to individuals located within the proposed project area, the Proposed Action would not lead to a trend toward listing these species. Because the No Action Alternative would not result in any direct or indirect effects, it would not result in an accumulation of effects.

3.21 Vegetation

The proposed project activities would be located primarily in three habitat types: piñon-juniper woodland habitat adjacent to existing pipeline ROWs, disturbed/reseeded scrub habitat associated with existing pipeline ROW disturbance, and fallow agricultural fields.

Sections of the proposed project area located in piñon-juniper woodland habitat include: the southwest corner of the proposed HE 6 well pad as well as the HE 6 access road and approximately 2,000 feet of the proposed HB 6 pipeline ROW. Though these areas are separate, they contain similar species composition and density. Understory vegetative cover was

estimated to be 15% in the piñon-juniper woodland habitat, dominant species include big sagebrush (*Artemisia tridentata*), broom snakeweed (*Gutierrezia sarothrae*), crested wheatgrass (*Agropyron cristatum*), Indian ricegrass (*Achnatherum hymenoides*), and cheatgrass. Canopy cover was estimated at 30 to 35%. Sections of the proposed project area located in disturbed/reseeded scrub habitat include: the YB 6 pipeline ROW, the HE 6 pipeline ROW, and the production line associated with the HE 6 and HB 6 well pads. As with the piñon-juniper woodland habitat, all sections of disturbed/reseeded scrub habitat contain similar species composition and density. Understory vegetative cover was estimated to be between 40 to 60%. Dominant species include rubber rabbitbrush (*Ericameria nauseosa*), western wheatgrass (*Pascopyrum smithii*), crested wheatgrass, tansy mustard (*Descurainia pinnata*), hoary tansyaster (*Machaeranthera canescens*), and cheatgrass. There are no trees located within the disturbed/reseeded portions of the Proposed Action.

The HE 6 well pad is located in mature scrub/grassland bordering piñon-juniper woodland and may have been previously used for agriculture activities. Understory vegetative cover was estimated to be between 40 to 60%. Dominant species include big sagebrush, crested wheatgrass, and broom snakeweed.

The HB 6 well pad, approximately 1,000 feet of the HE 6 access and pipeline ROW, and YB 6 well pad and access road are located in winter wheat (*Triticum* sp.) fields. Understory vegetative cover was estimated to be between 45 to 75%. Dominant species include Russian thistle (*Salsola tragus*), western wheatgrass, and wild sunflower (*Helianthella quinquenervis*). Because the field survey was conducted outside of the normal growing season for many herbaceous plant species, there are likely other species that inhabit the project area.

The vegetation (healthy plant and animal communities) in the proposed project area and vicinity were evaluated for overall health and productivity for the Standard for Public Land Health (BLM 2009a). The project area and vicinity (Cahone Mesa, Hovenweep Canyon and Sandstone grazing allotments) were determined to not meet the standard. The project area does not contain riparian vegetation, and therefore the Standard for Public Land Health riparian systems does not apply.

3.21.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no effects to vegetation from the project. Ongoing effects to vegetation would continue at their current levels.

3.21.2 Environmental Consequences – Alternative B (Proposed Action)

The Proposed Action would result in the disturbance to or removal of 46.4 acres of vegetation during construction activities. The vegetation type would consist, primarily, of disturbed/reseeded scrub and existing agricultural habitat. A maximum of 275 trees would be removed within the proposed project area. The long-term vegetation loss would be about 4 acres. Disturbed areas would also be at risk for establishment of invasive or noxious plant species,

which would displace and/or prevent establishment of native species. The Proposed Action utilizes existing ROWs as much as possible with the result that 28 acres of disturbance are within previously disturbed areas (60% of the overall project footprint).

3.21.3 Design Features

Kinder Morgan would be responsible for interim reclamation of unused portions of the well pads, flow lines and production line routes. Interim reclamation activities would include: spreading the large woody material removed during drilling; reseeding with a BLM-approved seed mix (Appendix A) on public lands and appropriate seed mix on private lands; conducting noxious weed management for the duration of the operation and reclamation activities; and conducting final reclamation after the project is completed. Project-specific Design Features for vegetation include the requirement that Kinder Morgan annually inspect the project area for a minimum of 3 years after construction to monitor for the presence of noxious/invasive species. Noxious weeds would be controlled using materials and methods approved in advance by the BLM.

3.21.4 Cumulative Effects

Vegetation clearing in the past has occurred in the project area related to agricultural activities, well development, access road building, and pipeline construction. Vegetation has also been altered by the introduction and spread of noxious weeds due to ground-disturbing activities. The understory has been altered by past grazing activities and chaining at the HE 6 well pad site. Weed monitoring and treatment for this project would reduce the potential for spread of noxious weeds, and re-seeding would promote the re-growth of native vegetation. Implementation of the Proposed Action, in conjunction with other past and reasonably foreseeable activities within the proposed project area, would not cause noticeable changes in vegetation patterns or any loss of species diversity. The No Action Alternative would have less contribution to cumulative effects to vegetation within the proposed project area. In terms of vegetation patterns or loss of species diversity, the two alternatives would not have a measurable difference in contributions to cumulative effects.

3.22 Visual Resources

The proposed project area contains broad, level mesa tablelands intersected by deep canyons and numerous smaller draws. Viewsheds within the Project Area are dominated in the foreground (0 to 0.5 mile) and middleground (0.5 to 3 to 5 miles) by mature piñon-juniper woodland and desert scrub shrublands interspersed with agricultural fields on private lands. The rolling topography periodically provides background views (3 to 5 miles to 15 miles) south to Sleeping Ute Mountain, northwest to the Abajo Mountains, and east to the La Plata Mountains. Overall, existing conditions in the Project Area are moderately natural.

Visual disturbances currently exist in foreground and middleground views along public travel corridors. These disturbances include gravel roadways; CO₂ well pads; reclaimed utility and pipeline ROWs; collection/compressor stations consisting of buildings, storage tanks, and overhead lighting; and cultivated fields. Overhead power lines including a 115-kV transmission line are also present in foreground and middleground views. The Yellow Jacket compressor station, a large industrial facility, is located on private lands immediately adjacent to Monument lands on Montezuma County Road 14. It contributes short-duration foreground views that contrast with the natural surroundings.

The proposed project area is located within 3 to 5 miles of areas noted for high scenic quality and visual sensitivity within the Monument, as described in the Monument’s RMP EIS (BLM 2009a): Hovenweep Observation 4, Sand Canyon Pueblo, Painted Hand Pueblo, and Lowry Pueblo. Visual resource management (VRM) classes for the Monument were developed as part of the Monument’s 2010 RMP (BLM 2010). Table 13 describes the VRM Class objectives.

Table 13. VRM Class Objectives

VRM Class	Visual Resource Objective	Change Allowed (Relative Level)	Relationship to the Casual Observer
Class I	Preserve the existing character of the landscape. Manage for natural ecological change.	Very Low	Activities should not be visible and must not attract attention.
Class II	Retain the existing character of the landscape.	Low	Activities may be visible, but should not attract attention.
Class III	Partially retain the existing character of the landscape.	Moderate	Activities may attract attention, but should not dominate the view.
Class IV	Provide for management activities that require major modification of the existing character of the landscape.	High	Activities may attract attention, may dominate the view , but are still mitigated.

* From BLM Manual H-8410-1 (BLM 2012).

The portion of the Monument affected by the Proposed Action has been mapped as VRM Classes II, III, or IV. Where intensive existing and future potential energy and fluid minerals development is high, including along County Road Y, lands are designated as VRM Class IV. VRM Class III areas/corridors are where moderate levels of energy development currently exist and are expected to increase, such as the terminus of County Road 14. Only a portion of the YB production line within an existing ROW is managed as VRM Class II (BLM 2009a). The three well pads would be constructed on private lands outside of the VRM designation system.

Viewers within the Project Area consist of CO₂ industry-related users, recreational users, and private landowners. Existing recreational visitation to the Project Area within the Monument boundary is low due to dead-end county roads and to minimal recreational or interpretive site development (e.g., trail heads) along these roads. Only one designated recreational site, the County Road U Rock Climbing Site, is accessed through the Project Area. Visitation to the proposed action areas would likely continue to be low into the foreseeable future.

The Monument's RMP (BLM 2010) states as an objective for visual resources that activities within the Monument will be managed according to VRM Class objectives; to that end, the BLM's visual resource contrast rating system will be used as a guide in analyzing proposed visual effects and in designing projects to mitigate effects and conform to the assigned VRM Class objective (Table 13). Though the BLM does not have the authority to enforce VRM Class objectives for project activities occurring on private lands, activities on private lands have been included in the analysis for consistency with the remainder of the project.

To establish existing scenic conditions and evaluate potential visual effects of the proposed activities within the Monument, Key Observation Points (KOPs) were located by Ecosphere staff on publically accessible travel corridors on the Monument. Three KOPs were located along County Road Y; one KOP was located on an existing, unnamed access road just west of County Road Y, and one KOP was located on County Road 14 (Figures 5 and 6). Visual contrast rating studies were completed for each KOP. Specific KOP information is part of the Project Record and is on file at the BLM Tres Rios Field Office.

Figure 5. Key Observation Points near the HB6 and HE6 wells.

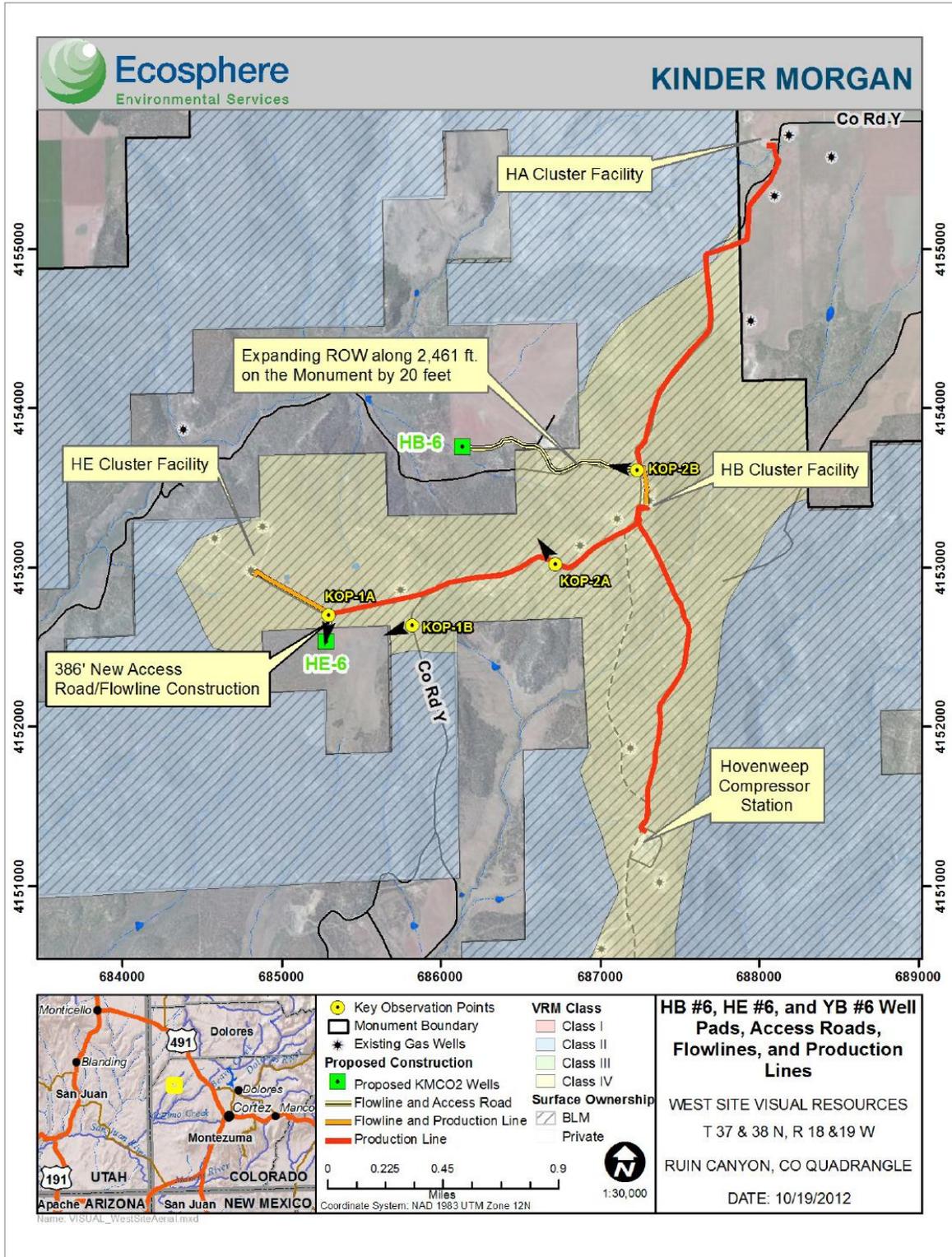
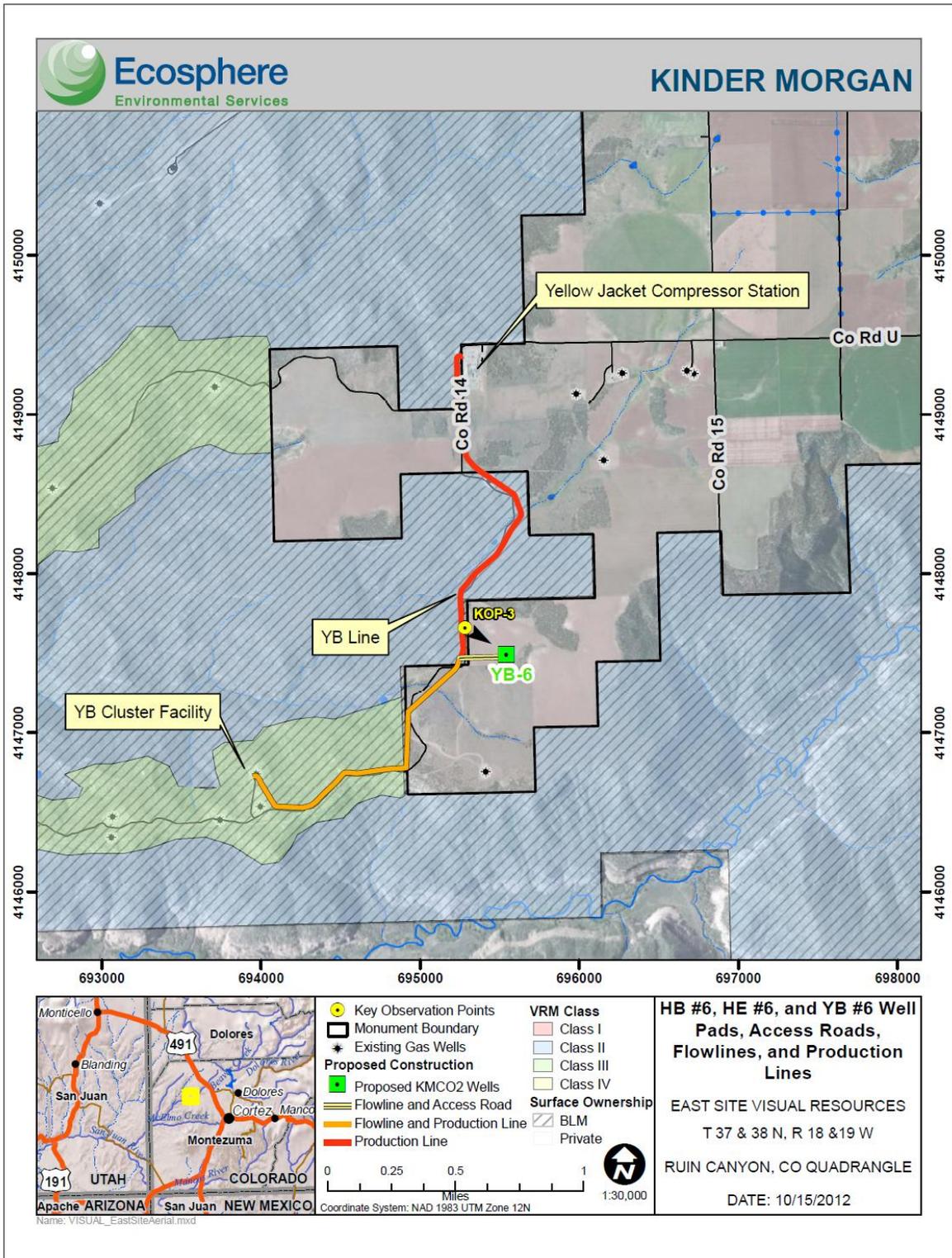


Figure 6. Key Observation Points near the YB6 well.



3.22.1 Environmental Consequences – Alternative A (No Action)

Should the Proposed Action not be approved, no new CO₂ wells, access roads, or pipelines would be approved. Therefore, no new direct, indirect, or cumulative effects to visual resources within the Project Area as a result of the Proposed Action would occur. Existing visual disturbances within the Project Area as described under Affected Environment would remain.

3.22.2 Environmental Consequences – Alternative B (Proposed Action)

All three proposed well pads would be constructed on private lands. Drill rigs, trailer and equipment storage, and vehicle use would occur at all well pad locations during drilling activities. The 132-foot high drill rig derricks and nighttime lighting on the derricks would be visible above surrounding vegetation for several weeks during well drilling activities. From the scenic viewpoints at Sand Canyon Pueblo, Hovenweep Observation 4, and Lowry Pueblo, drill rig towers may be visible during the drilling of the wells.

Completed well pads and their associated low-profile infrastructure would not be visible from KOPs or other points along publically accessible travel corridors or from scenic view points on Monument lands for two of the three proposed well pads (HB 6 and HE 6) due to surrounding mature piñon-juniper woodlands and topography. No long-term visual effects are expected for these well pads. VRM Class IV objectives for foreground views to well pads HB 6 and HE 6 would be met in the short and long term.

Proposed well pad YB 6 is located within a cultivated agricultural field adjacent to County Road 14. Drilling, production, and maintenance activities on YB 6 would be readily visible from the identified KOP on the county road and various other points along the county road, but not from the identified scenic view points. Changes to existing landform, vegetation, and structures from project activities would result in a weak to moderate degree of contrast in form, line, texture, and color.

Monument lands surrounding the YB 6 well pad location have a Class II VRM rating. Since the county road lies at the edge of the Monument boundary and the well pad is on adjacent private property, no Federal authority exists to implement Federal VRM Class management objectives for foreground views to the well pad. Visual design recommendations are provided in Section 3.22.3.

The proposed access road and pipeline ROW for well pad HE 6 is located on Monument lands and lies within a VRM Class IV rating unit. The proposed access road would be screened from the public travel corridor along County Road Y by existing dense, mature piñon-juniper vegetation, and by topography.

After revegetation of pipeline routes is completed, conditions would be the same as pre-project conditions, resulting in no long-term effects, and existing VRM objectives for these areas would continue to be met.

A new 20-foot wide pipeline ROW would be created along the existing access road to well pad HB 6 as it crosses Monument lands. The ROW lies within a VRM Class IV rating unit. Mature piñon and juniper trees and sage/rabbitbrush scrub vegetation would be cleared in the 20-foot wide ROW prior to pipeline construction, and the ROW would be revegetated post-construction. Disturbance associated with construction of this new pipeline/ROW would be visible in the foreground scenery in the short term as viewed by travelers on County Road Y. Mature trees removed during construction would not be naturally replaced and grow to a size to match the current vegetation forms for many years; however, re-vegetation activities completed for the pipeline would visually reflect surrounding sage/rabbitbrush scrub vegetation within 10 years. Effects to visual resources from HB 6 pipeline/ROW construction activities would be long term.

Implementation of the Design Features committed to by the applicant and the measures outlined in the COAs (Appendix A) should result in project activities occurring on Monument lands meeting VRM Class objectives in the short term (within 1 year or after drilling is completed) and in the long term (5 to 20 years) following reclamation. The BLM does not have the authority to require that mitigation measures be implemented for visual effects on private lands; however, implementation of the recommended Design Features and the COAs would also result in project activities on private lands adjacent to the Monument (i.e., the three proposed well pads) meeting VRM Class objectives.

3.22.3 Design Features

- Reclamation operations should start immediately after well drilling or after completion operations cease and should be completed as soon as weather conditions allow.
- Interim reclamation of construction or drilling areas visible from public roads should take priority and should be implemented at the completion of development activities.
- Night lighting at drill sites should comply with the Monument's RMP (BLM 2010), current Federal agency guidelines, local government guidelines, and the International Dark-Sky Association (IDA) guidelines throughout the duration of the project.
- All surface equipment constructed or installed at HB 6 and HE 6, including pipe guards and permanent structures (onsite for 6 months or longer), should be painted a flat, non-reflective earth-tone color from the BLM's Standard Environmental Color Chart CC-001 (June 2008) that best matches the surrounding environment, typically Shale Green (Munsell 5Y 4/2).
- All surface equipment constructed or installed at the YB 6 wellhead should be painted with the flat, non-reflective earth-tone color Sudan Brown (Munsell 2.5Y 4/2) from the BLM's Standard Environmental Color Chart CC-001 (June 2008) to minimize contrast with the existing environment.

3.22.4 Cumulative Effects

A description of cumulative effects to visual resources for the Monument is provided in the RMP Final EIS (BLM 2009a). Existing disturbances have contributed to the current VRM Class II, III, and IV ratings for the Project Area. Current activities that affect visual resources within the Monument include emissions from coal fired power plants, well pad, access road and pipeline construction associated with mineral development activities and agricultural and residential development activities on private lands. A total of 21,624 acres of cumulative disturbance are estimated to occur within the Monument due to past, present and projected futures activities (including mineral development activities) (BLM 2009a). With adherence to Design Features and COA measures outlined in Appendix A, the Proposed Action with past, present, and reasonably foreseeable future actions would have potential to affect visual resources in the Project Area in the long term (15 – 20 years or more).

These effects would result in a reduction in visual quality and integrity. No Federal authority exists to implement Federal VRM Class management objectives for project activities on private lands, including the YB 6 well pad; but with application of recommended project Design Features and COA measures outlined in Appendix A, existing VRM Class designations for all portions of the project would be met. The No Action Alternative would result in the same long-term effects to visual resources due to ongoing mineral development and other activities within the Monument.

3.23 Wildlife, Aquatic and Terrestrial

No perennial water sources are located within the proposed project area or within a 0.5-mile radius of any project elements. The closest perennial water source is Yellow Jacket Creek, located approximately 0.6 miles south of the proposed project area. Therefore no aquatic wildlife species are present within the analysis area for the Proposed Action.

The proposed project area is composed of a patchwork of agricultural, disturbed/reseeded scrub and piñon-juniper woodland habitat, and provides cover and forage for a wide range of terrestrial wildlife.

The mixed habitat within the project area is used by big game including mule deer and elk. Mule deer are year-round residents in the project area, and both deer and elk are known to occur as year-round residents in the Monument due to the proximity to developed agricultural fields. The proposed project area is within winter range for deer and elk; however, it is not considered critical winter range (Brian Magee, pers. comm., 2011).

Terrestrial and aquatic wildlife in the Monument were qualitatively evaluated for overall health and productivity for the Standard for Public Land Health (BLM 2009a). The project area and vicinity were determined to not be meeting the standard.

3.23.1 Environmental Consequences – Alternative A (No Action)

Under the No Action Alternative, there would be no effects to wildlife from the project activities; ongoing effects to wildlife would continue at their current levels.

3.23.2 Environmental Consequences – Alternative B (Proposed Action)

The Proposed Action would remove a maximum of 46.4 acres of piñon-juniper woodlands, agricultural fields, and disturbed/reseeded scrub habitat that could be utilized by a variety of wildlife. Vegetation removal would result in habitat loss and fragmentation. During construction activities, there would be short-term effects to area wildlife as a result of human and vehicular activity, and the associated noise. Wildlife would be temporarily displaced by construction activities, although after construction is complete, wildlife could return to the area.

The proposed project area provides forage for big game species, mostly mule deer and some elk, and proposed project activities would mean a loss of forage for these animals. Understory species such as mountain mahogany, antelope bitterbrush, and serviceberry that are found within the woodland portions of the project area are an important food source for deer and elk. Mule deer and elk may also be affected by a temporary increase in vehicle traffic during construction, resulting in a temporary disruption of foraging, displacement of big game from and around disturbed areas, and possibly some mortality from vehicle collisions. On a small-scale, literature has shown that ungulates predictably avoid areas during active exploration and drilling, moving to denser cover and areas farther from human activity (Hebblewhite 2008). Disturbance may result in increased energy expenditure by big game animals. While individual deer and elk may be affected by the Proposed Action, population-level effects to big game herds are not expected.

Vegetation removal would result in a loss of habitat for a variety of shrub and tree-nesting birds protected under the MBTA. These effects are described in Section 3.8.

3.23.3 Design Features

Design Features for the Proposed Action include the requirement that construction activities would be confined to the proposed well pads, access road, and production line routes to minimize disruption to wildlife. Because the project does not occur in winter range, production areas or migration corridors for mule deer and elk as mapped by the Colorado Division of Wildlife; no annual timing limitation would be applied to the proposed project activities.

3.23.4 Cumulative Effects

The removal or modification of 46.4 acres of mostly previously disturbed/reseeded wildlife habitat would contribute to the habitat fragmentation that exists throughout the area from existing roads, agricultural fields, production lines, and well pads. Approximately 28 acres would overlap existing disturbance. Future development of additional gas wells on the Monument will

incrementally increase vehicle traffic during construction, increase the development of new roads and pipelines, and add human disturbance to the area. These mineral developments may result in temporary disruption of wildlife foraging, breeding, or resting behavior and long-term effects to distribution of animals and reduction of effective habitat for species. The Proposed Action is part of the mineral development activities analyzed in the Monument RMP EIS (BLM 2009a), which includes analysis of cumulative effect to wildlife species on the Monument. The No Action Alternative would result in the same long-term effects to wildlife, due to ongoing mineral development activities within the Monument.

3.24 Residual Impacts

3.24.1 Irreversible Commitments

Irreversible commitments are those that generally cannot be reversed, such as the extinction of a species or the extraction of a mineral. If the Proposed Action is approved and the wells are determined to be productive, the CO₂ gas would be extracted. The CO₂ generated from the project would be transported to out-of-state markets. Because the CO₂ would not regenerate, the extraction of the CO₂ would be an irreversible commitment.

If the proposed wells, pipelines, and access roads are approved, approximately 4 acres of long-term disturbance would remain after interim reclamation activities have been completed. The 4 acres of disturbance would be unavailable for forage production, vegetation, and wildlife habitat for the length of the Proposed Action (estimated 20 to 30 years) and therefore be irretrievable for as long as the development remains. The 4 acres would remain in use by Kinder Morgan until the CO₂ wells are deemed unproductive. At that time, the wells would be properly plugged and abandoned per BLM and COGCC requirements, and final reclamation of surface disturbance would be performed. Final reclamation would restore the areas of disturbance to pre-disturbance conditions. In some cases, final reclamation has resulted in restoring sites to conditions that are an improvement over site conditions that existed before disturbance. This has been primarily due to weed treatments and seeding with native grasses.

4. CONSULTATION AND COORDINATION

The BLM staff listed in Table 14 participated in the project onsite, reviewed, and/or wrote portions of this Environmental Assessment.

Table 3. BLM Participants in preparation of EA.

Name	Office/Agency	Title
Jeff Christenson	BLM	Outdoor Recreation Planner
Eric Freels	BLM	Wildlife Biologist
Robert Garrigues	BLM	Natural Resource Specialist
Gina Jones	BLM	NEPA Specialist
Ryan Joyner	BLM	Physical Scientist
Pam Leschak	BLM	Geologist
Cara MacMillan	US Forest Service	Ecologist
Vince MacMillan	BLM	Archaeologist
Tracy Perfors	BLM	Natural Resource Specialist
Tina Transtrom	BLM	NEPA Specialist
Jonina Vanderbilt	US Forest ServiceService	Hydrologist

The following organizations and individuals were contacted and/or consulted during preparation of this document.

- Bob Clayton and Coy Bryant – Kinder Morgan CO₂ Company.
- USFWS (Leslie Elwood) regarding listed flora and fauna.
- BLM State Director’s Office – List of BLM Sensitive Species.
- Native American Tribes included in the tribal consultation.
- Colorado State Historic Preservation Officer

4.1 List of Preparers

The following contributors, with Ecosphere Environmental Services, prepared the document as a third-party NEPA contractor.

Matthew Smith – Ecologist

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Aimee Way – Ornithologist

Heidi Hansen – Wildlife Biologist

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Keith Fox – Regulatory Specialist

Jerry Fetterman – Archaeologist, Woods Canyon Archaeological Consultants

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APPENDIX A

BLM Surface Use Conditions of Approval

Surface Use Conditions of Approval

Kinder Morgan CO₂ Company, LP (Kinder Morgan)

HB 6, HE 6, YB 6 well pads, associated roads, flowlines, and
production pipelines

Montezuma County, Colorado

The following Conditions of Approval (COA) take precedence over any or all terms and conditions set forth in the Applications for Permits to Drill (APD). Kinder Morgan and its contractors should refer to these COAs and the APD package for specific information associated with construction, drilling, production, and reclamation.

Exceptions or waivers from these COA are only granted with written permission from the BLM Authorized Officer.

The following COA are required on BLM and private lands. However, some COA may be waived by the private landowner if their written request for a waiver is approved by the BLM and the COGCC.

These COAs apply to all aspects of the project

1. The operator or operator's contractor will contact the BLM Authorized Officer (Tracy Perfors 970-882-6856) at least seven (7) days before beginning any surface-disturbing activities and at least seven (7) days before beginning any reclamation.
2. Before beginning any work, it is the responsibility of the operator to inform all employees, contractors, and subcontractors of applicable cultural resource laws and regulations as well as the project-specific measures for protecting cultural resources. Disturbance to, defacement of, or collection or removal of archaeological, historical, or sacred material is prohibited by law. Disclosure or release of information regarding the nature and location of archaeological, historic, or sacred sites, without written approval by the Bureau of Land Management (BLM) is prohibited by law
3. Disclosure or release of information regarding the nature and location of archaeological, historic, or sacred sites, without written approval by the BLM, is prohibited under provisions of the Archaeological Resources Protection Act. Cultural resource consultants and other permittees of the BLM are allowed to use this information during the course of the project for site protection purposes only. Unauthorized use or distribution of this information (which includes site location information present in cultural resource reports) is a violation of Federal statute.

4. If cultural resources or human remains, funerary items, sacred objects, or objects of cultural patrimony are discovered during construction, activity in the vicinity of the resource will cease, the resource will be protected, and the Canyons of the Ancients National Monument Archaeologist will be notified immediately at 970-882-5614 and the following procedures will be carried out. The operator shall take any measures requested by the BLM to protect the resources until they can be evaluated and treated. The discovered resources will be documented and evaluated by a permitted archaeologist. The permitted archaeologist, in consultation with the BLM archaeologist, will make a determination of the nature and significance of the discovery, and will determine the appropriate method of treatment for it. Avoidance is the preferable treatment. However, if the resources cannot be avoided, the appropriate treatment method will be determined, and the permitted archaeologist will prepare any and all necessary treatment plans. These plans will be reviewed and approved by the BLM. Treatment activities will be conducted after all necessary consultations have been completed as required by Section 106 of the National Historic Preservation Act, the Native American Graves Protection and Repatriation Act, and the Archaeological Resources Protection Act. The BLM will be responsible for conducting all necessary consultations. Construction within the area of the discovery will be allowed to proceed after the appropriate treatment has been completed.
5. All work, staging, and parking of equipment will be confined to the well pads, roads and pipeline ROW. No pullouts or off-road parking will be allowed unless specifically authorized. "Keep vehicles on the road surface" signs must be installed by the operator to assist with compliance, as needed. No shortcutting by any motor vehicles operated by employees or contractors is permitted on roads not identified as access routes in the APD. Vehicular access to the pads will be strictly limited to authorized vehicles only; these vehicles are restricted to use on the drill pad only; no off-pad or off-road parking.
6. Throughout the lifetime of the project, trash and debris will be collected from the location and the surrounding area and removed to an approved sanitary landfill. During construction and drilling, the operator will collect trash and debris on a regular schedule of at least once per week from the project area. This trash can be stored in an appropriate on-site trash bin that will prevent loss due to wind and which will be periodically hauled to a permitted land fill or disposal site.
7. Heavy equipment will be pressure-washed at an offsite location prior to entering the site. This is a preventive measure for reducing noxious weed infestation at the drilling sites. If equipment is moved directly from site to site while on this Project, then pressure washing between sites is not required. However, if equipment is removed from a site, used elsewhere, then brought back to the project area, pressure washing is required before the equipment can be used in the project area. This pertains to heavy equipment such as bulldozers, backhoes, the drilling rig, etc. Pickup trucks and passenger vehicles do not require pressure washing prior to entering these sites.
8. The integrity of any fence and associated cattle guard must not be compromised during the construction, production, or reclamation phase of the project. All cattle guards, gates, and fence brace panels should be well constructed and regularly maintained. Toxins, such

as ethylene glycol, should be kept off the ground where livestock can reach them. The operator is responsible for noting these problems in the field and correcting them before the function of fences/cattle guards/gates is comprised. Once notified by the BLM that a problem exists and that the BLM attributes it to the operator's activities, the operator has 24 hours to correct fence/cattle guard/gate problems resulting from their activities.

9. Storm water controls will be implemented, inspected, and maintained for the well pads, roads, flowlines and production lines for the life of the project. They should be sized for a 25-year storm. Any unsatisfactory storm water controls (by evidence of wind or water erosion or cutting, or sedimentation transported off the project area) will be replaced or upgraded as needed. All storm water controls needed during the construction phase of this project must be installed before ground disturbance begins.
10. The operator will hire a storm water specialist with proof of training in storm water control, such as the CDOT as an Erosion Control Supervisor certification, to design the storm water control systems, supervise the installation/construction of storm water control features and, to ensure adequate storm water management.
11. No fill will be placed in ephemeral drainages without adequate storm water controls to assure that sediment will not be transported into the drainage.
12. The access roads and well pads will be adequately surfaced and shall be wetted down and compacted where needed to avoid dust and loss of soil through wind or water erosion.
13. All surface production equipment constructed or installed at HB 6 and HE 6, including pipe guards and permanent structures (onsite for 6 months or longer), should be painted with the flat, non-reflective earth-tone color Shale Green (Munsell 5Y 4/2) from the BLM's Standard Environmental Color Chart CC-001 (June 2008) to minimize contrast with the existing environment.
14. All surface production equipment constructed or installed at the YB 6 wellhead should be painted with the flat, non-reflective earth-tone color Sudan Brown (Munsell 2.5Y 4/2) from the BLM's Standard Environmental Color Chart CC-001 (June 2008) to minimize contrast with the existing environment.
15. All production equipment located within the Monument shall be equipped with hospital type mufflers. Regardless of whether the operation is at the construction, drilling, or production phase, if the BLM determines that noise has become a nuisance, additional muffling techniques will be applied to achieve adequate noise reduction and acceptable noise levels.
16. The access roads shall be maintained reasonably smooth and free of ruts in excess of 3 to 4 inches, soft spots, chuckholes, rocks, slides, and washboards. The BLM, San Juan Resource Area road specifications, professional engineer-prepared design standards, and "Gold Book" shall be followed for specifications on road design and culvert installation.

A regular maintenance program shall include blading, ditching, sign replacement, surfacing, culvert maintenance and maintenance of storm water features. The operator is required to correct maintenance deficiencies when documented and directed by the Authorized Officer. All vehicles servicing the well are restricted to use of the approved access road and well pad.

17. Spills and leaks will be cleaned up immediately, and contaminated soils will be removed to a permitted disposal site. BLM spill reporting procedures will be followed.

The following COAs apply to construction and drilling

18. A copy of these Conditions of Approval and the operator's Surface Use Plan of Operations must be located at the well pad during construction, drilling, and completion activities.
19. Temporary fences will be erected, either by or under the direction of a permitted archaeologist, adjacent to the cultural resource sites specified in the project cultural resource report prior to the start of construction activities. Sites determined "eligible" or "need data" located 10 meters (30 feet) or less from construction would have temporary barrier fences erected at the edge of the authorized construction area nearest to the site boundary. Site monitoring would be completed a minimum of three times during implementation: 1) during initial ground disturbance, 2) periodically during active work, and 3) a final check after construction is completed. Monitoring results will be submitted in writing upon completion of each phase (initial, periodic, and final).
20. Sites determined as "not eligible" for the National Registry of Historic Places located 10 meters or less from construction would be monitored once during initial ground disturbance. Monitoring results will be submitted in writing upon completion of each phase (initial, periodic, and final).
21. Operator will hire cultural resource monitors to ensure that construction activities are confined within fenced and flagged areas. No equipment or construction would be allowed beyond the fence anytime during construction or subsequent operations. Kinder Morgan has the ultimate responsibility for ensuring construction activities are confined within fenced and flagged areas.
22. For construction of the proposed pipeline and main access road through site 5MT6358: Vegetation would be cleared by hand for the pipeline ROW. The existing road and the pipeline ROW would be covered with geo-textile fabric to protect cultural deposits below the existing road and in the pipeline ROW. A 12-inch thick bed of gravel would be placed on top of the fabric. All pipeline construction would occur above the geo-textile fabric and gravel. The pipeline would be placed on concrete thrust blocks and suspended above ground. To protect the site, periodic inspection of the thrust blocks would be conducted to insure that the blocks remain on top of the gravel.

23. All soil removal operations and trenching for the well pads, pipelines, and building of access roads would be monitored by a permitted archaeologist for subsurface cultural resources.
24. For any well pad locations with any slope across the pad area, an “eyebrow ditch” shall be installed above the locations on the uphill side. The intent of the eyebrow ditch is to intercept surface water flows and disperse the water to either side of the location. The ends of the ditch or “daylight” ends should be placed in native soils, within undisturbed areas. Any natural moisture will be diverted off of the pads and away from the location. The well pads would be designed in such a manner as not to allow runoff water to enter the pads.
25. All components of the closed loop drilling system, and all non-fresh water tanks (including hose and manifold connections) shall be located within impermeable, lined (with at least 30 mil liner) areas capable of containing 120% the storage capacity of the largest container in the area. Absorbent pads or impermeable liners or spill guard systems must be placed under all drilling equipment engines. The liner should be visually inspected and hydrostatically tested prior to installation on location. Any equipment placed on the liner shall be placed on traction mats/pads protecting the liner surface. A two-foot freeboard shall be maintained in all fluid tanks and containers used in drilling, completing, and testing the well.”
26. All non-fresh water storage tanks, including roll-off cuttings storage tanks, must be pre-cleaned, certified to be leak-proof, and hydrostatically tested to 85% of the total tank volume prior to arrival on location, installation, and utilization. In addition, all hose connections, flowlines and manifolds must be inspected and tested to be leak-free prior to delivery.
27. Degreasing of machinery or equipment is not allowed on location.
28. All solids drill cuttings waste shall be collected and stored in leak-proof roll-off containers and transported to and disposed of at an offsite licensed commercial waste disposal facility. No waste material other than drill cuttings are allowed to be stored in the roll-off cuttings storage containers.
29. After completion of drilling activities, all solid waste materials (such as trash) would be collected and disposed of in a permitted facility. Onsite solid waste (trash) disposal facilities would be periodically emptied during drilling activities.
30. Construction and drilling activities will not be conducted when vehicles and/or construction equipment will leave excessive ruts and damage to roads associated with the Project. If vehicles and/or construction equipment create surface ruts in roads in excess of 4 inches in depth, for a length of at least 10 feet, soil conditions are too wet to adequately

support equipment. Construction and drilling activities will not be allowed until soil conditions improve.

31. If any construction is scheduled to occur during the raptor breeding season, described between April 15 and August 1, nest searches for raptors prior to any ground disturbance are required where nest habitat occurs in the Proposed Action. If active nests were found, vegetation removal would be postponed until after the nest either successfully fledges young or fails, as determined by a biologist. With the approval of the Authorized Officer, a biological monitor (BLM or BLM-approved contractor) may be present during construction to avoid nest destruction/disturbance. In the event a raptor nest is identified, the BLM has identified the following (BLM, 1991):
 - A. Raptors, including golden eagle, all accipiters, buteos, owls and falcons except kestrels, (raptors that are listed and protected by the ESA are addressed separately): No Surface Occupancy (NSO) within one half-mile radius of nest site. Exception: The NSO area may be altered depending on the active status of the nest site or the geographical relationship of topographic barriers and vegetation screening to the nest site.
 - B. Timing restriction from February 1 to August 15 applies to one half-mile buffer around the nest site. Exception: During years when a nest site is unoccupied by or after May 15, the seasonal limitation may be suspended. Nest activity may be verified by inventorying the site at one-week intervals for a period of three weeks (i.e., three visits). Surveys must be done during the year of construction by a qualified biologist and accepted and documented by BLM staff. It may also be suspended once the young have fledged and dispersed from the nest.
 - C. Cliff-nesting raptor surveys will be conducted on cliffs within 0.5 mile of the proposed project area prior to construction. If an active raptor nest were found, a species-specific spatial buffer would be applied until the nest either successfully fledges young or fails, as determined by a BLM biologist.
32. If any construction is scheduled to occur during the migratory bird breeding season (between May 15 through July 15) and in accordance with the Migratory Bird Treaty Act, nest searches for migratory bird prior to any ground disturbance are required where nesting habitat occurs in the Proposed Action. If active nests were found, vegetation removal would be postponed until after the nest either successfully fledges young or fails, as determined by a biologist. With the approval of the Authorized Officer, a biological monitor (BLM or BLM-approved contractor) may be present during construction to avoid nest destruction/disturbance. Construction outside of the breeding season does not require surveys.
33. In the event a bald eagle roost or nest is observed in the Proposed Action area, the Authorized Officer, Tracy Perfors (970-882-6856) should be contacted immediately. The BLM has identified the following restrictions (BLM, 1991):
 - A. Bald eagle NSO within one half-mile radius of roost or nest site. Exception: The NSO applies to the essential features of the winter roost site complex. The NSO area may

- be altered depending on the active status of the roost or the geographical relationship of topographic barriers and vegetation screening. There are no exceptions for nest sites.
- B. Timing restriction from December 15 to June 15 for nesting habitat. Exception: During years when a nest site is unoccupied by or after May 15, the timing limitation may be suspended. It may also be suspended once the young have fledged and dispersed from the nest.
 - C. Timing restriction from November 16 to April 15 for bald eagle winter roost site. Exception: If there is a partial or complete visual screening of the area of activity, the primary zone round the roost site may be reduced to one half-mile. Other recommendations and impacts would be considered for bald eagles as a result of an exception request.
34. Mexican spotted owl surveys will be performed prior to pipeline construction within 0.5 mile from the Yellow Jacket Canyon rim. 2012 Mexican spotted owl surveys were negative, however if construction will take place into the breeding season or any year (March 1 to August 31), additional surveys may be warranted. Kinder Morgan must coordinate with BLM and USFWS biologists to determine if additional surveys are needed.
35. All brush, limbs, crushed stumps, and other woody material will be stockpiled separately from the topsoil, within the authorized area of disturbance. Stockpiled vegetative material will not be covered by well pad fill slopes or otherwise buried under spoils from well pad construction. The stripped vegetation shall not be removed from the location (it will be used later for reclamation).
36. The top six-inches of topsoil will be stripped and stockpiled within the authorized area of disturbance for use in reclamation. To preserve topsoil health and viability, the topsoil stockpile should, preferably, be distributed in low berms around the sides of the well pad. These berms can be used to form the storm-water-controlling eye-brow ditches required in COA, 23, above. Topsoil storage piles shall not be more than 3-feet high (deep). If the topsoil stockpile is not used within 6 months, it will be seeded to ensure topsoil integrity and prevent erosion.
37. Water withdrawals from surface waters require notification to the State of Colorado by the company and the water rights holder if using a private water right that is not decreed for industrial use. The Colorado Division of Water Resources (WRD) requests notification 2 weeks prior to the beginning of surface waters withdrawals to determine if there is a call on or below the withdrawal point. Regardless of when or how fresh water is used, the WRD will be notified and allowed to respond before water is withdrawn from any surface waters in Colorado. The contact office for Southwestern Colorado is the Division of Water Resources in Durango, Colorado (970-247-1845), and for the Water Commissioner for the Dolores River is 970-565-0694. After the drilling operations are completed, a final estimate of the volume of water used for all activities should be submitted in writing to the State of Colorado. If required by WRD, the operator must

apply and obtain water rights prior to water withdrawals. The operator will comply with all state and local water laws and regulations.

38. The maximum combined width for all road and pipeline right-of-ways is 50 feet total.

These COAs apply to Reclamation

39. During interim reclamation, those portions of the road/pipeline ROW deemed unnecessary for production shall be shaped to conform to the natural terrain. 100-percent of the topsoil stockpiled during construction should be spread back over the re-contoured, interim reclamation areas, and the area reseeded. The brush, limbs, crushed stumps and other woody material stockpiled during construction, if any, should be spread back over reclaimed areas and associated pipelines after seeding. This reclamation shall begin within 6 months of completion of the pipeline construction
40. During interim reclamation, those portions of the well pads deemed unnecessary for production shall be shaped to conform to the natural terrain, using 100-percent of the stockpiled topsoil, and should be reseeded, leaving only a small teardrop for access to the wellhead during operations, and the area reseeded. The brush, limbs, crushed stumps and other woody material stockpiled during construction, if any, should be spread back over reclaimed areas after seeding. Interim reclamation shall begin within 6 months of testing and completion of the wells, regardless of the timing of putting the well into production. Notify Surface Managing Agency representative (Tracy Perfors at 970 882-6856) seven (7) days prior to seeding so that they may be present to witness reseeded activities.
41. The seed mixture shown in Table A-1 shall be used for reseeded during reclamation, unless another seed mixture is specified in a landowner Surface Use Agreement for private land sections of the project area. The woody materials stockpiled during construction are to be spread evenly back over the reclaimed and seeded areas.

Table A-1 -- Seed Mix – Piñon-Juniper Area.

Project Seed Mix			
Common Name	Species Name	Variety	PLS lbs/ac*
Sand Dropseed	<i>Sporobolus cryptandrus</i>	VNS	0.05
Galleta	<i>Hilaria jamesii</i>	Viva, florets	1.6
Big Sagebrush	<i>Artemisia tridentata</i>	VNS	0.1
Winterfat	<i>Krasheninnikovia lanata</i>	VNS	0.25
Four-wing Saltbrush	<i>Atriplex canescens</i>	VNS	0.25
Indian Ricegrass	<i>Achnatherum hymenoides</i>	Paloma	2.5
Blue Grama	<i>Chondrosom gracile</i>	Alma	0.3
Squirreltail	<i>Elymus elymoides</i>	Tusas	1.4
Muttongrass	<i>Poa fendleriana</i>	CO Source ID	0.1
Total			6.6

Key: ft² = square feet; VNS = variety not stated, get most local variety available.

*This reflects the drilled seeding rate of 40 PLS /ft², it needs to be doubled if broadcast.

42. If the seed is broadcast, application rates will be twice the drilled rate, and some means such as a rake or harrow will be used to incorporate the seed into the soil. Certified weed-free mulch may be required on locations with an inadequate supply of removed vegetation.
43. The seed mixture used must be **certified** weed free. There shall be **NO** primary or secondary noxious weeds in the seed mixture. Seed labels from each bag shall be available for inspection while seeding is being accomplished. The seeding contractor shall keep a record of the dates seeding was accomplished for each site and shall send that information along with the seed labels from each bag to the Authorized Officer.
44. If necessary, a fence shall be installed around the perimeter of the area undergoing reclamation. The fence shall be maintained in a manner to prevent cattle from entering

the area and shall follow wildlife-friendly guidelines from Colorado Parks and Wildlife (<http://wildlife.state.co.us/SiteCollectionDocuments/DOW/LandWater/PrivateLandPrograms/FencingWithWildlifeInMind.pdf>). The fence shall be maintained in place for a minimum of 3 years, and will be removed by the Operator when so instructed by BLM.

45. The Permit Holder (Holder) shall be responsible for control of all State listed noxious weed species on all disturbed areas. The Holder is responsible for consultation with the Authorized Officer and local authorities for acceptable weed control methods and shall comply with the following:
 - a) Use of pesticides shall comply with all applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides, the Holder shall obtain approval from the Authorized Officer of a Pesticide Use Proposal showing the type and quantity of material to be used, pests to be controlled, method of application, locations of storage and disposal of containers, and any other information deemed necessary by the Authorized Officer.
 - b) All pesticide applicators must hold a valid Colorado Qualified Supervisor license or Certified Operator license, and the license must be valid for the applicable pesticide application category. **For all areas treated, Pesticide Application Records (BLM Form 3-3-94) must be submitted to the BLM Tres Rios Field Office by November 1 of each year.** Pesticide Application Records must be completed no later than 14 days following the pesticide application and must be maintained for 10 years.
46. Upon final reclamation, all compacted areas and areas devoid of vegetation on location shall be ripped, along the contour, to a minimum of 6 inches in depth before the re-spread of topsoil and subsequent reseeding according to the seed mix in Table A-1. All access roads will be shaped to conform to the natural terrain and left as rough as possible to deter vehicle travel. Access will be ripped, along the contour when possible, to a minimum depth of 6 inches, water barred, and reseeded according to the seed mix in Table A-1. All erosion problems created by the development must be corrected prior to acceptance of release. Water bars should be spaced as shown in Table A-2 along the fall line of the slope.

Table A-2 – Water Bar Spacing Interval

Slope (%)	Spacing Interval (feet)
Less than 2%	200
2 to 4%	100
4 to 5%	75
5 to 10%	50
10 to 15%	30

47. Reclamation (whether interim or final) will be considered successful when the desired vegetative species are established at 70% cover or higher, as compared to reference sites with undisturbed vegetation. In addition, erosion must be controlled, weeds considered a minimal threat, there must be evidence of vegetation reproduction, either spreading by rhizomatous species or seed production, and it is deemed likely that ground cover will return to a desirable condition. The operator will be required to continue re-vegetation efforts, at the direction of BLM, until these standards are met.

APPENDIX B
Biological Assessment

Biological Assessment

Proposed Kinder Morgan HB 6, HE 6, and YB 6 Well Pads, Associated Flowlines, and Production Pipelines

Prepared For:
Canyons of the Ancients National Monument
and
Bureau of Land Management – Tres Rios District

Prepared By:



September 2012

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LIST OF ACRONYMS AND ABBREVIATIONS

APD	Application for Permit to Drill
BA	Biological Assessment
BLM	Bureau of Land Management
bbl	barrel
CFR	Code of Federal Regulations
CO ₂	carbon dioxide
COA	Condition of Approval
COGCC	Colorado Oil and Gas Conservation Commission
CPW	Colorado Parks and Wildlife
EA	Environmental Assessment
EMU	Ecological Management Units
ESA	Endangered Species Act
FEL	from east of line
FNL	from north of line
FSL	from south of line
FWL	from west of line
GIS	Geographic Information System
ha	hectare
km	kilometer
PAC	Protected Activity Center
ROW	right-of-way
SJNF	San Juan National Forest
U.S.C.	United States Code
UIC	underground injection control
USFWS	U.S. Fish and Wildlife Service

1. INTRODUCTION

This Biological Assessment (BA) was prepared to review, analyze, and document the potential effects on U.S. Fish and Wildlife Service (USFWS) listed endangered, threatened, proposed, or candidate species and their critical habitats that could result from the proposed HB 6, HE 6, and YB 6 well pads and associated flowlines and production lines (proposed project). This document complies with the Endangered Species Act (ESA) of 1973, 16 U.S.C. 1531 et seq., by disclosing the status of USFWS listed species in the project area.

2. PROPOSED ACTION

Kinder Morgan CO₂ Company, LP (Kinder Morgan) is planning to continue development of the McElmo Dome Unit by drilling three new carbon dioxide (CO₂) source wells and installing additional CO₂ collection and transportation pipelines for development of mineral resources. The full project description is available in EA Section 2.3.

3. EXISTING HABITAT

The action area is located in the eastern portion of the Monument on both public and private lands. The proposed project occurs on two mesa tops adjacent to Yellow Jacket Canyon to the south and Hovenweep Canyon to the north. The elevation for the proposed project ranges from approximately 6,300 to 6,700 feet. In order of decreasing percentage of total vegetation, the action area contains a mixture of agricultural lands, mainly winter wheat (*Triticum aestivum*), previously disturbed pipeline ROWs containing grasses and scattered shrubs, piñon-juniper (*Pinus edulis* - *Juniperus scopulorum*) woodlands, and sagebrush (*Artemisia tridentata*) shrub-grasslands.

Yellow Jacket Canyon is a wide canyon several hundred feet deep with minor cliff bands at the rim and slickrock cliffs near the bottom. The slopes are warm, dry, and wooded primarily with piñon-juniper trees. The flowline for proposed YB 6 well occurs parallel to the canyon rim and an existing access road for about 0.5 miles. Hovenweep Canyon is shallower with less vertical drop than Yellow Jacket Canyon. Yellow Jacket Creek has perennial flows and is located approximately 0.6 miles south of the proposed YB 6 well pad.

4. SPECIES CONSIDERED

4.1 USFWS Listed Species

The BLM consults with the USFWS annually to update listed species to address for projects; the latest consultation was on May 13, 2011, for wildlife and September 14, 2011, for plants (USFWS 2011a, BLM 2011). The USFWS lists 18 threatened, endangered, proposed, or candidate species with potential to occur on public lands managed by the BLM Tres Rios Field Office. These species are listed in Table 1 and include three mammals, four birds, four fish, one insect, and six plants. Two species—Mexican spotted owl (*Strix occidentalis lucida*) and Gunnison sage-grouse (*Centrocercus minimus*) — may have potential habitat within the action area and are discussed in detail. The remaining 16 listed species were eliminated from further discussion due to lack of suitable habitat in the proposed project area or their known range being located outside of the proposed project area, as listed in Table 1. Species distribution and habitat potential were based on review of maps generated in Geographic Information System (GIS) and scientific literature, as well as field visits to the action area (November 21 and 22, 2011, and January 12, 2012) and personal communication (Eric Freels, Monument biologist, personal communication 2012). Species in bold (Table 1) have potential to occur in the action area and are discussed in Sections 4.2.1 and 4.2.2 of this document.

Table 1. USFWS listed and candidate species for the BLM Tres Rios Field Office in Montezuma County, Colorado

Species	Status	Habitat Description	Potential to Occur in the Action Area
Mammals			
Canada lynx (<i>Lynx canadensis</i>)	Threatened	High elevation (8,000 to 11,500 feet in the southern Rocky Mountains), mesic spruce-fir and mixed-conifer forests, especially mixed with aspen; high composition of downed trees; north- to northeast-facing slopes.	No suitable habitat occurs in the action area. The primary forests in the action area are xeric piñon-juniper woodlands.
New Mexico meadow jumping mouse (<i>Zapus hudsonious luteus</i>)	Candidate	Herbaceous wetlands, especially dominated by sedges. The mouse appears to only utilize two riparian community types: (1) persistent emergent herbaceous wetlands (i.e., beaked sedge and reed canarygrass alliances), and (2) scrub-shrub wetlands (i.e., riparian	No riparian or wetland habitat occurs in the action area.

Species	Status	Habitat Description	Potential to Occur in the Action Area
		areas along perennial streams that are composed of willows and alders).	
North American wolverine (<i>Gulo gulo luscus</i>)	Candidate	Occurs within alpine, boreal, and arctic habitats; in the southern portion of its range (including Colorado) occurs in high-elevation alpine environments.	No suitable habitat is present; the action area does not contain high-elevation alpine environments.
Birds			
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Threatened	Nests in caves, cliffs, or trees in steep-walled canyons with distinct cliff bands and vegetated benches.	Yellow Jacket Canyon adjacent to the action area contains marginal suitable nesting and roosting habitat.
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Endangered	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	No riparian or wetland habitat occurs in the action area.
Western yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Candidate	Breeds in mature cottonwood gallery forests with dense understory vegetation.	No riparian or wetland habitat occurs in the action area.
Gunnison sage-grouse (<i>Centrocercus minimus</i>)	Candidate	Breeding leks are located in small openings adjacent to sagebrush; Nesting-sagebrush shrublands with substantial forb and grass understory; Summer-Fall-agricultural fields; Winter-drainages and slopes with exposed sagebrush.	Colorado Parks and Wildlife (CPW) has mapped Gunnison sage-grouse historical habitat in the action area. Known production area boundaries occur 14 miles north of the proposed project northwestern boundary, and this is termed the Dove Creek Subpopulation.
Fish			
Bonytail chub (<i>Gila elegans</i>)	Endangered	Pools and eddies of large mainstem rivers; tributaries of the Colorado and San Juan Rivers.	Occur in the mainstem Colorado River over 100 miles northwest of the action area.

Species	Status	Habitat Description	Potential to Occur in the Action Area
		May be affected by water depletions from the Dolores River Drainage.	Surface water withdrawals for project activities would occur from a water source in the Dolores River drainage (Dolores Water Conservancy District) that has consulted with the USFWS.
Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	Endangered	Large rivers with strong currents, deep pools, and quiet backwaters; tributaries of the Colorado and San Juan Rivers. May be affected by water depletions from the San Juan River and Dolores River Drainages.	Occur in the San Juan River drainage approximately 30 miles southwest of the action area. Surface water withdrawals for project activities would occur from a water source in the Dolores River drainage (Dolores Water Conservancy District) that has consulted with the USFWS.
Humpback chub (<i>Gila cypha</i>)	Endangered	In the upper Colorado River Drainage, their habitat is deep, swift riverine areas. May be affected by water depletions from the Dolores River Drainage.	Occur in the mainstem Colorado River over 100 miles northwest of the action area. Surface water withdrawals for project activities would occur from a water source in the Dolores River drainage (Dolores Water Conservancy District) that has consulted with the USFWS.
Razorback sucker (<i>Xyrauchen texanus</i>)	Endangered	Medium to large rivers with silty to rocky substrates. Prefers strong currents and deep pools. May be affected by water depletions from the San Juan River and Dolores River Drainages.	Occur in the San Juan River drainage approximately 30 miles southwest of the action area. Surface water withdrawals for project activities would occur from a water source in the Dolores River drainage (Dolores Water Conservancy District) that has consulted with the USFWS.
Insects			
Uncompahgre	Endangered	Alpine environments above 12,000	The proposed project is below

Species	Status	Habitat Description	Potential to Occur in the Action Area
fritillary butterfly (<i>Boloria acrocne</i>)		feet elevation; host plant is snow willow.	12,000 feet and does not occur in alpine habitat.
Plants			
Mesa Verde cactus (<i>Sclerocactus mesae-verdae</i>)	Threatened	Shale or adobe clay badlands of the Mancos and Fruitland formations, 4,000 to 5,000 feet.	The proposed project does not contain Mancos or Fruitland formations.
Mancos milkvetch (<i>Astragalus humillimus</i>)	Endangered	Exfoliating Point Lookout Sandstone formation of the Mesa Verde Group, 5,000 to 6,500 feet.	The proposed project does not contain Point Lookout Sandstone formations.
Twisted milkvetch (<i>Astragalus tortipes</i>)	Candidate	Gravels derived from a volcanic intrusion into Mancos Shale, 5,700 feet.	The proposed project does not contain gravels derived from volcanic intrusions into Mancos Shale.
Knowlton's cactus (<i>Pediocactus knowltonii</i>)	Endangered	Alluvial deposits forming rolling gravelly hills in piñon-juniper and sagebrush types, 6,400 feet.	The proposed project does not contain alluvial deposits.
Pagosa Skyrocket (<i>Ipomopsis polyantha</i> var. <i>polyantha</i>)	Endangered	Mancos shale; barren shrublands; around 7,000 feet.	The proposed project is approximately 90 miles outside of the known range of the species and does not contain Mancos Shale outcrops.
Schmoll milkvetch (<i>Astragalus schmolliae</i>)	Candidate	Thin, wind-deposited, sandy/gravelly soil on mesa-top and mesa terraces at elevations of 6,790 to 6,988 feet. Grows in openings among the piñon and juniper, indicating that it may need some type of disturbance to establish itself. Known only from the Mesa Verde area (P. Lyon, pers. comm. 2011).	The proposed project is approximately 40 miles outside of the known range of the species.

Sources: USFWS 1995, 2002, 2007, 2011a, 2011b, and 2011c; BLM 2009b.

4.2 USFWS Listed Species Warranting Detailed Evaluation

Two federally listed wildlife species were analyzed based on potential habitat in the action area: the threatened Mexican spotted owl and the candidate Gunnison sage-grouse. Detailed consideration of these species is provided below.

4.2.1 Mexican Spotted Owl

Status: Threatened

Distribution and Habitat: The Mexican spotted owl inhabits coniferous mixed woodlands in isolated mountain ranges and canyonlands of the southwestern United States (USFWS 1995). It has the largest range of the three spotted owl subspecies, extending north from Mexico through the mountains of Arizona, New Mexico, and west Texas into the canyons of Utah and western Colorado. The Mexican spotted owl's range is fragmented, occupying isolated mountains and canyonlands, and the historic and current ranges are expected to be similar. During surveys prior to the publication of the Mexican Spotted Owl Recovery Plan (1990-1993), 758 owl territories in the United States were identified (USFWS 1995). An estimated 91 percent of these territories occurred on U.S. Forest Service (USFS) land. A reliable current estimate of the number of owls within the entire range is not available (USFWS 2001). The 2011 Draft Revision to the Recovery Plan identifies 10 Ecological Management Units (EMUs), five of which occur in the United States. The western portion of the SJNF occurs within the Colorado Plateau EMU (USFWS 2011d).

The Mexican spotted owl usually nests in Douglas-fir (*Pseudotsuga menziesii*), but in the northern part of its range in Utah and in southwestern Colorado, many nests are on rock ledges or in caves in steep canyons. Most breeding Mexican spotted owls inhabit mixed conifer forests in the southern Rocky Mountains. Suitable habitat contains complex forest structure in rocky canyons with uneven-aged mature to old growth forest stands with high canopy closure (Ganey and Balda 1989). Movement patterns are highly variable, with some individuals remaining in the same home range year-round, while others move a great distance to lower elevation sites for the winter. Dispersing juveniles can occur in a wide variety of habitats, including mixed conifer forests, piñon-juniper woodlands, and riparian areas surrounded by grasslands (USFWS 2001). Mexican spotted owls apparently prefer canyon terrain in southwestern Colorado, like that in and around Mesa Verde National Park where Mexican spotted owls have occurred previously (USFWS 2011d). Rocky-canyon habitats that can support roosting, nesting, and hunting activities are often associated with complex vertical and horizontal landscape structure, complex geomorphology, and canyon-forming geologic substrates. Near the proposed action, potential owl habitat is limited to the rocky-canyon habitat type.

Mexican spotted owl habitat is limited by the availability of nesting and roosting habitat (Ganey and Balda 1994). Territories consist of a core of mature or late successional mixed conifer forest or steep, narrow, rocky canyons for nesting and roosting. These tree stands are on steep, north-

facing slopes with complex structures including high densities of snag and downed wood, as well as very high canopy closures (USFWS 1995, 2001). Ganey and Balda (1994) found average canopy closures to be 79.1 percent. Seamans and Gutierrez (1995) found average canopy closures to be 75.6 percent. Ganey and Balda (1989) found an average of 995 acres (402 hectares [ha]) of old growth forest within an average home range of 2,092 acres (847 ha). Zwank et al. (1994) found core areas of nesting and roosting habitat to be 468 acres (187 ha). The USFWS Mexican Spotted Owl Recovery Plan (1995) uses 100 acres (43 ha) as minimum patch size for nesting and roosting habitat within a minimum 600-acre Protected Activity Center (PAC).

The closest past detections of owls are about 30 miles southeast of the proposed project at Mesa Verde National Park. Breeding in Mesa Verde was confirmed in the 1990s. The last owls observed in the park occurred in 2006, although no nesting was confirmed at that time. No owls have been detected since 2006 and it is possible that they moved to adjacent tribal lands (George San Miguel, Mesa Verde National Park natural resource manager, pers. comm. 2011). Aside from detections at Mesa Verde National Park, past surveys conducted in southwestern Colorado have not identified other Mexican spotted owl locations.

Potential Habitat within the Action Area: Yellow Jacket Canyon within 0.5 miles of the action area is relatively open and wide, ranging from 0.7 to 1.0 mile wide from rim to rim. The canyon walls southeast of the proposed project are north- to northwest-facing; however, because of the width and lack of steepness in this portion of the canyon, the northern slopes appear to get more sunlight and do not appear to create the cool microclimates preferred by Mexican spotted owls. Three drainages feed into the canyon within 0.5 miles of the proposed project; two of them are south facing and warm/dry and the third one occurs on the east side of the canyon, but does not appear steep and narrow. None of these provides cool microclimates, making them marginal potential roosting or nesting habitat. Closer to the bottom of the canyon, the walls contain slickrock extending for more than 0.6 miles along parallel sides of the canyon. Based on visual scanning, these rock areas appear relatively smooth and do not provide complex structure (e.g., sufficient ledges, crevices, and caves providing cool microclimates) that would constitute potential nesting and roosting habitat for Mexican spotted owl. Smaller rock bands occur closer to the top of the canyon rim, but these tend to be discontinuous, less than 50 feet high, and mostly warm/dry. Overall, Yellow Jacket Canyon within 0.5 miles of the proposed project generally lacks habitat characteristics key to good quality Mexican spotted owl breeding habitat: it lacks extensive steep-walled, vertical cliffs with complex structure (ledges, crevices, and caves) as well as a narrow, deep main or side canyon that could provide cool, moist, microclimates used for thermoregulation of nesting and roosting. The piñon -juniper woodlands at the top of the canyon rim provide good foraging habitat for owls, with lots of downed trees and rocky knolls where small mammals and potential prey could live. Foraging is possible if owls occur in the area.

Direct and Indirect Effects: The three proposed wells are greater than 0.5 miles from the Yellow Jacket Canyon rim. Projects located greater than 0.5 miles from potential habitat in

canyons would not require mitigation to protect potential habitat (BLM 2009a). However, the proposed flowline for well pad YB 6 parallels an existing road and pipeline ROW as well as the canyon rim for approximately 0.5 miles. Noise and human disturbance associated with installation of the flowline could disturb potentially nesting owls if the project were planned during the breeding season (March 1 to August 31). To avoid disturbance of potential nesting owls, USFWS recommended 1 year of protocol surveys be completed within 0.5 miles of the proposed flowline prior to beginning construction in 2012 (Leslie Ellwood, USFWS biologist, pers. comm. 2011). Construction of the flowline would constitute temporary noise disturbance (lasting up to 2 months) and would not remove potential nesting or foraging habitat for the owl. If an owl were detected, construction would occur outside of the March 1 to August 31 timeframe. The ROW would be reseeded and reclaimed after it was installed; therefore, no long-term impacts to Mexican spotted owl habitat are expected. If the project is postponed until 2013 and construction would not avoid the Mexican spotted owl breeding season, the BLM and USFWS would be contacted to determine whether additional surveys were required prior to construction.

Yellow Jacket Canyon adjacent to the action area contains marginal nesting and roosting habitat for Mexican spotted owl. Since limited data exist about the potential habitat and occurrence of Mexican spotted owls in southwest Colorado, and the habitat in southwest Colorado is unique, breeding surveys were conducted during spring 2012 (Eric Freels, Monument biologist, pers. comm. 2012). Past surveys on the Monument have not detected owls, yet Yellow Jacket Canyon was not surveyed previously. Surveys were conducted to rule out species' presence in 2012. No Mexican spotted owl (or any other owl species) was detected during 2012 protocol surveys. No potential nesting or roosting habitat for Mexican spotted owl would be removed by the proposed action.

Experiments conducted on Mexican spotted owl to determine the effects of noise showed an inverse relationship between flush response and distance from chainsaw noise; as stimulus distance decreased, flush frequency increased, regardless of stimulus type or season (nesting or non-nesting) (Delaney et al. 1999). In the same study, Delaney et al. found that Mexican spotted owl responses to chainsaws (comparable to drilling noise) were higher and 1.3 to 2.2 times longer than response to helicopters; yet regardless of the noise stimulus (helicopter or chainsaw), a distance of 105 meters did not cause Mexican spotted owl to flush. At a distance of 105 meters, no owl flushes were observed, and owls returned to pre-disturbance behavior within 10 to 15 minutes (Delaney et al. 1999). However, data on the potential effects of more frequent noise, disturbance during early courtship and incubation, or disturbance under different nesting conditions is lacking.

4.2.2 Gunnison Sage-Grouse

Status: Candidate

Distribution and Habitat: Gunnison sage-grouse is a candidate species, and the USFWS is scheduled to make a listing decision whether the species will be proposed threatened in 2012. Gunnison sage-grouse is also a BLM sensitive species.

Gunnison sage-grouse breeding habitat consists of lek sites located in small openings adjacent to sagebrush shrublands. Nesting habitat occurs adjacent to leks and is characterized as sagebrush shrublands with a substantial forb and grass understory. Brood-rearing habitat includes agricultural fields and wet areas with substantial forbs for young birds to feed on. Winter habitat contains drainages and slopes with exposed sagebrush (GUSG Rangewide Steering Committee 2005).

The total population of Gunnison sage-grouse is estimated to be approximately 5,000 birds. The Gunnison Basin is the only stable population with an estimated 3,000 birds (GUSG Rangewide Steering Committee 2005). The Dove Creek population occurs on BLM, state, and private lands north and west of the proposed project boundary. Based on conversations with Chris Kloster, Colorado Parks and Wildlife (CPW) wildlife biologist, this population is extremely compressed; the birds use the habitat for overall range, winter range, and production range and do not move between seasons. The overall habitat mapped by CPW near Dove Creek is approximately 15,000 acres, mostly on private land, and moves between four lek areas from year to year. The male lek count for 2011 was 12 birds. CPW augmented the Dove Creek population (relocated birds from the Gunnison Basin) over the past 2 years.

The action area is mapped as historical habitat for the candidate Gunnison sage-grouse. However, the current known range of the species is located 14 miles northwest of the action area (NDIS 2012). Individuals are not known to use lands within the action area and do not range beyond their current locations (Chris Kloster, CPW wildlife biologist, pers. comm. 2011).

Direct and Indirect Effects: The Dove Creek Subpopulation of Gunnison sage-grouse is known to remain in proximity to their leks and do not tend to move from the mapped habitat (Chris Kloster, CPW wildlife biologist, pers. comm. 2011). Documented leks occur 14 miles northwest of the HE 6 and HB 6 well pads. Given the distance of the lek complex from the action area boundary, it is unlikely grouse would occur in the action area during construction activities. Consequently, disturbance to lekking birds from noise or increased human presence would not occur. Vehicle collisions are also unlikely since trucks driving to the action area would use roads south of the known population. Therefore, the proposed project is not expected to affect Gunnison sage-grouse.

Based on the lack of habitat in the action area for 11 of the listed species, and prior discussions of potential effects for the Mexican spotted owl and Gunnison sage-grouse, a determination of no effect was made for all threatened and endangered species (Table 5). No impacts are expected to the six candidate species; Gunnison sage-grouse, wolverine (*Gulo gulo luscus*), New Mexico meadow jumping mouse (*Zapus hudsonious luteus*), western yellow-billed cuckoo (*Coccyzus*

americanus), twisted milkvetch (*Astragalus tortipes*), and Schmoll milkvetch (*Astragalus schmolliae*) from the proposed project.

5. EFFECTS ANALYSIS

5.1 USFWS Listed Species – Effects Summary

Based on the lack of habitat in the action area a determination of **no effect** was made for 11 of the 12 threatened and endangered species with potential to occur on public lands managed by the BLM Tres Rios Field Office (Table 2). A determination of **may affect, not likely to adversely affect** was made for the threatened Mexican spotted owl since potential habitat exists, modification of potential foraging habitat would occur, and it is unknown whether the species occurs in the PA. No negative effects are expected for the four candidate species based on lack of habitat or lack of species' occurrence in the action area. Rationales for these determinations are provided in Section 4.1 and 4.2.

Table 2. Summary of determinations for USFWS threatened and endangered species

Species	Status	Effect Determination
Mammals		
Canada lynx (<i>Lynx canadensis</i>)	Threatened	No effect
Birds		
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Threatened	May affect, not likely to adversely affect
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Endangered	No effect
Fish		
Bonytail chub (<i>Gila elegans</i>)	Endangered	No effect
Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	Endangered	No effect
Humpback chub (<i>Gila cypha</i>)	Endangered	No effect
Razorback sucker (<i>Xyrauchen texanus</i>)	Endangered	No effect
Insects		
Uncompahgre fritillary butterfly (<i>Boloria acrocneuma</i>)	Endangered	No effect
Plants		

Mesa Verde cactus (<i>Sclerocactus mesae-verdae</i>)	Threatened	No effect
Mancos milkvetch (<i>Astragalus humillimus</i>)	Endangered	No effect
Knowlton's cactus (<i>Pediocactus knowltonii</i>)	Endangered	No effect
Pagosa Skyrocket (<i>Ipomopsis polyantha</i> var. <i>polyantha</i>)	Endangered	No effect

6. DESIGN CRITERIA, MITIGATION, AND AVOIDANCE MEASURES

The following avoidance and mitigation measures were developed during proposed project planning and agency consultation to help reduce and/or eliminate any effects on listed species or impacts on BLM sensitive species:

- 2012 protocol Mexican spotted owl surveys conducted within 0.5 miles of the proposed project were negative.
- Since surveys were negative, construction could begin before the end of the Mexican spotted owl breeding season (March 1 to August 31) in 2012.
- Complete construction of the pipeline prior to March 1, 2013. If construction extends into the 2013 breeding season, additional surveys may be warranted.
- Coordinate with BLM and USFWS biologists to determine if additional surveys are needed.

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