

**U.S. Department of the Interior
Bureau of Land Management
White River Field Office
220 E Market St
Meeker, CO 81641**

ENVIRONMENTAL ASSESSMENT

NUMBER: DOI-BLM-CO-110-2010-0200-EA

CASEFILE/PROJECT NUMBER: COC 74469 (off-unit main access roads)
COC 74470 (gas pipeline)
COC 74470-01 (temporary use areas)
COC 74471 (produced water pipeline)
COC 74753 (combined liquids pipeline)

PROJECT NAME: North Hatch Gulch Project

LEGAL DESCRIPTION: Sixth Principal Meridian, Colorado

T. 1S, R. 97W

Sec. 26 SW $\frac{1}{4}$ SW $\frac{1}{4}$;
Sec. 27 W $\frac{1}{2}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ SW $\frac{1}{4}$;
Sec. 28 SE $\frac{1}{4}$, SW $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$;
Sec. 33 NW $\frac{1}{4}$ NE $\frac{1}{4}$;
Sec. 34 N $\frac{1}{2}$ NE $\frac{1}{4}$;
Sec. 35 NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$;
Sec 36 N $\frac{1}{2}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$.

T. 2S, R. 96W

Sec. 6 S $\frac{1}{2}$ SW $\frac{1}{4}$.
Sec. 7 NW $\frac{1}{4}$ NW $\frac{1}{4}$.

T. 2S, R 97W

Sec. 1 NW $\frac{1}{4}$, SE $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$;
Sec. 2 NE $\frac{1}{4}$ NE $\frac{1}{4}$;
Sec. 12 NE $\frac{1}{4}$ NE $\frac{1}{4}$.

APPLICANT: Exxon Mobil Corporation

PURPOSE & NEED FOR THE ACTION: The purpose and need for the Proposed Action is to develop natural gas resources within the Piceance Creek Unit and Freedom Unit. The need for the action is established by national mineral leasing policies and the regulations by which they are enforced that recognize the right of Federal oil and gas lessees to develop Federal mineral resources so long as undue and unnecessary environment degradation does not occur.

Decision to be Made: The BLM will decide whether or not to approve the construction, operation, drilling, and maintenance of the proposed FRU 197-28B, PCU 197-27B, PCU 197-35B, PCU 197-35A, PCU 197-37C, and PCU 297-1A well pad locations and the drilling of up to 20 natural gas wells from each of those locations. The BLM will also decide whether or not to approve the associated infrastructure including pipelines and road infrastructure. Finally, if the BLM does approve all or a portion of the Proposed Action, the BLM will decide upon any required terms and conditions needed to minimize impacts to other resources.

SCOPING, PUBLIC INVOLVEMENT, AND ISSUES:

Scoping: Scoping was the primary mechanism used by the BLM to initially identify issues. Internal scoping was initiated when the project was presented to the White River Field Office (WRFO) interdisciplinary team on 2/24/2010. External scoping was conducted by posting this project on the White River Field Office's (WRFO's) on-line National Environmental Policy Act (NEPA) register on June 15, 2010. As of 05/24/2012 no public comments or inquiries have been received.

Issues: Internal scoping determined the following issues of concern:

- Impacts to air quality and air quality related values;
- Impacts to soils and soil productivity from construction and removal of topsoil and soil loss;
- Effects which may result from use or storage of hazardous materials;
- Potential for impacts to surface or ground water;
- Possible impacts to special status plant species associated with the thirteen mile tongue of the Green River formation;
- Construction impacts to area vegetation and possible spread of invasive species;
- Possible effects on big game species and migratory birds;
- Potential impacts to visual resources;
- Potential for impacts to forest management, increase in possibility of wildfires, and impacts to rangeland use;
- Disruption of rock formations potentially containing fossils of scientific importance; and
- Impacts to recreation opportunities and access to the vicinity of the proposed project.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES:

Background/Introduction:

The North Hatch Gulch Project (NHGP) proposed by Exxon Mobil Corporation, XTO Oil Corporation, a subsidiary of Exxon Mobil Corporation, and XTO Energy Inc., a subsidiary of Exxon Mobil Corporation (collectively "XTO") would develop 2,400 subsurface acres through the drilling of 120 wells from 6 wellpads and result in 33.1 acres of surface disturbance over its life. XTO has submitted (April 8, 2010) two Right-of-Way (ROW) applications to the Bureau of Land Management (BLM) and a Sundry Notice for planned expansion of operations on its Piceance Creek and Freedom federal units by construction of the North Hatch Gulch Gathering System and North Hatch Gulch Roads network. The granting of the two ROWs and approval of the Sundry Notice would allow siting of all or parts of XTO's pipelines and roads on public lands administered by the BLM. On-site inspections of the proposed pipeline route and main access roads were conducted in the spring of 2010. XTO would submit Applications for Permit to Drill (APDs), including site-specific Surface Use Plans of Operations (SUPOs), for each of the wells, and BLM's approval of the APDs would also authorize construction and operation of

associated access roads and flowlines. In support of the APD process, on-site inspections were completed for three of the six proposed wellpads in the spring of 2010. On-sites were completed for the remaining three wellpads in summer of 2010. Changes and mitigations discussed during the on-site inspections have been incorporated into the design of the proposed Project.

Prior NEPA

XTO's Piceance Creek Unit (PCU) was formed in 1940 and has been in continuous production from the Wasatch Formation since the 1950s. Subsequently, XTO began producing from the Mesaverde Formation beginning in the late 1990s. The Freedom Unit was approved in 2005 and produces from the Mesaverde Formation. Mesaverde wells up to early 2007 were initially authorized through individual NEPA documents, but BLM approvals of APDs since 2007 have been tiered to the Piceance Development Project (PDP) Environmental Assessment (EA).

Piceance Development Project: In 2005, XTO proposed its PDP, which the BLM White River Field Office (WRFO) analyzed through an EA and subsequently approved on April 23, 2007 in a FONSI/Decision Record (CO-110-2005-219-EA). The approved development program consists of the production of natural gas from up to 120 wellpads, each with up to nine wellbores, for a total of up to 1,080 wells within the Piceance Creek and Freedom Units. Twenty wellpads were identified and approved in the PDP EA and approximately 90 wellpads have yet to be proposed. The NHGP wellpads comprise a portion of the facilities programmatically approved by the PDP EA's FONSI/Decision Record. Upon BLM approval of the six wellpads proposed for NHGP, 84 wellpads of the original 120 PDP wellpads would remain. The PDP's approved action included analysis of future trunk lines, but decisions on individual gathering pipelines as well as flowlines from the wellpads to the trunk pipelines were deferred for subsequent APDs and ROW grants obtained through independent applications and associated NEPA approvals. The NHGP EA will be tiered to the PDP EA.

Hatch Gulch Pipeline: XTO's Hatch Gulch Pipeline Project, a recently constructed gas gathering and liquids pipeline system, falls within a portion of the area that was analyzed in the PDP EA. A stand-alone EA was prepared for that project and the FONSI/Decision Record was signed on September 14, 2009 (CO-110-2008-097-EA). The analysis addressed the proposed construction and operation of a gas gathering pipeline, combined liquids pipelines, and a produced water distribution/disposal (PWDD) pipeline. The proposed North Hatch Gulch proposal would tie in to the existing Hatch Gulch Pipeline Project; both of which are wholly located within the PDP project area (PDPA).

Other Agreements:

Wildlife Mitigation Plan: In May 2008, XTO, BLM, and the Colorado Parks and Wildlife (CPW) initiated in discussions regarding future development plans in the Piceance Basin, potential mitigations to reduce environmental impacts to wildlife, and strategies to obtain approval of year-round and continuous activities. The objective of the discussions was to develop a Wildlife Mitigation Plan (WMP) for XTO's leases. A WMP is one method approved by the Colorado Oil and Gas Conservation Commission (COGCC), under recent rule changes, to facilitate APD approvals by avoiding the need for individual well or wellpad consultations with CPW for development in sensitive wildlife areas. The proposed WMP was intended to apply to

CPW's administration of wildlife on approximately 150,000 acres of XTO leases, largely on federal surface, within the Piceance Basin.

A final WMP was approved and signed by representatives of XTO and CPW in August 2010, but is effective as of July 1, 2010. A copy of the Plan has been included as Appendix A to this EA. The Plan indicates specific mitigations and Best Management Practices (BMPs) which XTO will use in its development activities within the covered leasehold. An important feature of the Plan is CPW's present support of XTO's year-round and continuous activities within XTO's 150,000-acre leasehold. XTO will meet with CPW on at least an annual basis to review the effectiveness of applied mitigation measures, revise these measures as necessary to ensure their efficiency, consistent with the principles of adaptive management, and provide an updated three-year development plan to CPW.

Although the BLM is not a signatory to the Plan, its absence does not preclude BLM from considering the Plan's mitigation measures in its decisions on proposals submitted by XTO.

Wildlife Research Cooperative Agreement: Effective May 1, 2010, a cooperative agreement among CPW, Colorado State University, and XTO was executed to jointly research:

1. The potential effects of hydrocarbon development and extraction on wildlife and their supporting habitat, and
2. The most efficient mitigation measures to reduce identified impacts on wildlife and associated habitat.

The cooperative agreement among the three parties sets forth a process for the two main objectives above that consists of the following key components:

- Defining the roles and responsibilities of each party;
- Identifying ongoing studies being conducted by the parties;
- Defining the process by which studies will be proposed, approved, and funded pursuant to the cooperative agreement; and
- Providing a framework for sharing of information among parties.

XTO's sponsorship of ongoing and future studies under this cooperative agreement will produce a better understanding of oil and gas production potential effects on wildlife, particularly big game, and the development of effective mitigation measures that can minimize the effects of oil and gas activity on wildlife and their habitats in Piceance Basin. A copy of the agreement is included as Appendix B.

Proposed Action: The Proposed Action for the NHGP consists of the construction, operation, and maintenance of equipment and facilities that would support the production, transportation, and sale of natural gas and associated liquids from up to 120 natural gas wells in a project area contained within portions of XTO's Piceance Creek Unit (PCU) and Freedom Unit (FRU) federal exploration units (Figure 1). The NHGP proposal would develop 2,400 subsurface acres (20 acre downhole spacing) from six wellpads resulting in an initial 192.5 acres of surface disturbance from pipeline, access road, and wellpad construction and a subsequent life-of-project surface disturbance of 33.1 acres following interim reclamation. Life-of-project is defined as the disturbance remaining after interim reclamation.

XTO's lease rights within the Piceance Development Project Area (PDPA) allow for drilling, extracting, removal, and marketing of oil and natural gas products. These lease rights include building and maintenance of necessary improvements, subject to renewal or extension of leases in accordance with the appropriate authority. XTO plans to produce natural gas from the NHGP area, which is located entirely within the PDPA, over the next 30 years. The construction and operation of the NHGP gas gathering system, access roads, and associated wellpads are required to accommodate planned increases in natural gas production and constitute the Proposed Action. The Proposed Action is specifically designed around the concept of year-round and continuous activities, and it is currently anticipated that construction activities would begin no earlier than six months after the receipt of project approval.

Year-round and Continuous Operations:

XTO defines "year-round and continuous activity" to mean uninterrupted, year-round construction and installation of roads, wellpads, pipelines, and related facilities; drilling and completing of wells; and conducting ongoing production operations and interim reclamation. A part of the Proposed Action includes the concentration of the surface locations of 20, closely-spaced wells onto a single wellpad ("clustered drilling"), which would effectively drain natural gas from an area of approximately 400 subsurface acres using advanced directional drilling and completion technologies. For this project, six wellpads would drain an area of 2,400 acres, within the 29,680-acre area of the Piceance Development Project.

For a development scenario restricting development to one surface pad for every 400 acres to be economically viable, the use of clustered drilling for the NHGP requires that operations be conducted continuously, without interruptions, until all of the development activities on a pad are completed. In addition, planning and budgeting requirements mandate that XTO be assured that year-round and continuous clustered drilling will be permitted prior to the construction of each wellpad and initial rig move-in. Six wellpads and up to 120 wells are proposed and drilling operations would utilize up to three drill rigs operating concurrently. The immediate vicinity of the various components of the Proposed Action, including the NHGP pipeline and gathering lines, access roads, wellpads, and other associated facilities such as pig launcher and receiver, constitute the project area.

The entire project area is mapped as severe winter range for mule deer by the CPW. The White River Resource Area Approved Resource Management Plan (RMP) (1997) applies a seasonal timing limitation, stipulation TL-08, to federal oil and gas leases in areas mapped as big game severe winter range. The stipulation prohibits development activity between December 1 and April 30 annually. The RMP also allows the granting of exceptions, modifications, or waivers to this stipulation by the Area Manager based upon defined approval criteria.

A critical component of the Proposed Action is XTO's request for the granting of a modification to TL-08 within a buffer area of 50 meters around all proposed surface disturbance. Within this defined disturbance area of the affected leasehold, approximately 490 acres, the stipulation would no longer apply for the life of the lease. In areas of the leases outside of the defined disturbance area, approximately 93 percent of the affected 6,977-acre affected leasehold, the stipulation restrictions would remain in force. Granting of a modification, rather than yearly exceptions to the stipulation, would be consistent with the planning required to support clustered drilling.

XTO's proposed year-round and continuous drilling and operations program offers significant environmental and efficiency benefits over seasonal operations. Authorization of year-round and continuous drilling and construction would minimize the duration of operations. Assuming each well takes an average of 30 days to drill, each proposed 20-well pad can be drilled and completed in approximately 20 months using year-round and continuous operations. XTO may use more than 1 rig, perhaps as many as 3 rigs, to develop North Hatch Gulch in order to shorten the duration of drilling. For example, 2 rigs would complete all 120 wells in 60 months and 3 rigs would require 40 months.

Components of the Proposed Action:

The Proposed Action consists of three basic components:

1. NHGP Gathering System - Construction in one season, and year-round and continuous operation and maintenance of natural gas, combined liquids (condensate and water), PWDD system pipelines and associated above ground facilities (which include pig launcher and receiver sites) within a utility corridor ROW;
2. NHGP Main Access Roads (three segments) - Construction in one season of each road segment, and year-round maintenance of three segments of all-weather, double-lane access road, the Southern Access Road (Sundry Notice application), the Northern Access Road (ROW and Sundry Notice application); and a Pig Receiver Access Road (ROW application); and
3. Six wellpads, roads, flowlines and new associated facilities (APD applications) - Year-round and continuous operations would include construction and maintenance of six wellpads, roads, and flowlines (outside the big game severe winter range stipulation period where feasible). Drilling, completion, installation of facilities within existing disturbed areas, rig and equipment moves, maintenance, and production of up to 120 natural gas wells would occur year-round and continuously over multiple years. XTO proposes to directionally drill approximately 20 wellbores from each of the six wellpads. Each wellpad would include an access road connecting from the NHGP roads network; and natural gas, associated liquids, and PWDD pipelines ("flowlines") connecting the wellpads and individual wells to the North Hatch Gulch Gathering System pipelines.

The proposed gas gathering, combined liquids, and PWDD pipeline systems, road network, and wells would facilitate production of natural gas and produced liquids within XTO's 29,680 acre Piceance Development Project Area (PDPA). Methods of design; construction; drilling; completion; production, including water use and produced water management; abandonment; equipment use; and personnel training requirements would employ measures consistent with conditions of approval prescribed in the PDP EA and the standards employed by XTO United States Production (USP) in the Piceance Basin.

Except for a small portion on CPW and private lands, the NHGP is entirely located on BLM-administered federal lands. All of the proposed pipelines and associated facilities would be located on BLM-administered federal lands. With respect to proposed roads, all except approximately 1,323 feet of proposed pipeline ROW access road are on BLM surface. This

1,323-foot section, beginning at Rio Blanco County Road 5, would be located on lands owned by CPW. Approximately 145 feet of the Pig Receiver Access Road immediately adjacent to County Road 5 is located on private surface. The entire NHGP is wholly contained within the 2007 PDP EA analysis area.

NHGP Gathering System

The NHGP Gathering System, installed and operated within a utility corridor (Figure 1), would provide linear ROW for the construction, operation, and maintenance of natural gas, combined liquids and PWDD pipelines, and associated above ground pipeline facilities. The proposed utility corridor would consist of:

1. The proposed NHGP Gathering System utility corridor would run between previously approved well location PCU 197-36A (Sec 36, T1S, R97W) and a tie-in to the Hatch Gulch Pipeline corridor in the NWNE Sec 33, T1S, R97W in the Freedom Unit. The ROW width for the proposed NHGP corridor route would be 100 feet. The ROW route would parallel existing, mainly unimproved, roads for approximately 1/4 of its length. The remaining approximately 3/4 of the route would be cross-country. Two temporary use areas (TUAs) for staging equipment/materials would be located on proposed wellpad locations along the utility corridor's proposed route as shown on Figure 1; and
2. Pig launcher and receiver sites – The proposed above ground pig launcher site would be located completely within the utility corridor ROW and adjacent to the PCU 197-36A wellpad (Figure 1). The proposed above ground pig receiver site would be located completely within the NHGP utility corridor at the pipelines' tie-ins with the Hatch Gulch pipelines (NWNW of Section 33, T1S, R97W) (Figure 1).

Design: Pipelines would be installed in a single trench within the gas-gathering utility corridor and wellpad flowline corridors (Figure 2). Within the NHGP gas-gathering utility corridor, a 24-inch steel gas-gathering pipeline, two 6-inch Fiberspar combined liquids pipelines, and a single 6-inch Fiberspar PWDD pipeline would be installed within the trench. Because production from FRU 197-28B would cross federal unit lines, a separate 6-inch Fiberspar combined liquids pipeline would be installed from the FRU 197-28B wellpad in the flowline and gas-gathering utility corridors to the intercept with the existing Hatch Gulch Freedom Unit pipeline tie in. The width of the trench within the NHGP gas-gathering utility corridor would be 9 feet 6 inches, with the exception of that portion of the utility corridor between FRU 197-28B and the tie in with the Hatch Gulch Pipeline corridor. Trench width for this segment would be 11 feet.

The NHGP pipelines would connect into existing tie-in valves and tie-in points on the Hatch Gulch pipelines in the NWNE of Section 33 T1S, R97W. The existing Hatch Gulch Pipelines connect to natural gas, combined liquids, and PWDD trunk pipelines in the Piceance Creek valley near the mouth of Hatch Gulch at an existing tie-in location.

The permanent ROW for the NHGP utility corridor would be 50 feet wide. The work area widths for construction within the proposed utility corridor are sufficient to accommodate the turning radius of a semi-tractor and trailer during pipe stringing operations.

The proposed pipelines in the utility corridor would have a minimum clearance of 1 foot from each other and would be laid under foreign pipelines, if possible. Pipelines would be buried so as to provide a minimum of 4 feet of cover between the surface and the top of the pipe.

The length of the proposed NHGP Gathering System corridor is approximately 21,522 feet (4.1 miles) with a construction ROW width of 100 feet and would result in approximately 49.4 acres of surface disturbance (Table 3). Post-construction, the permanent ROW width would be 50 feet and the entire disturbed area of 49.4 acres would be stabilized and reclaimed.

Construction and Reclamation: Prior to implementing pipeline construction activities within the utility corridor, XTO staked and participated in on-site inspections of the location of the proposed pipelines and flagged or otherwise identified locations of existing pipelines, cables, or other buried utilities. Following staking of pipeline centerlines and ROW, standard construction practices would be used for pipeline installations including clearance of vegetation; grading/leveling of topography; trenching; stringing (welding steel pipe and unrolling Fiberspar pipe), laying in and burial of the pipelines; testing, and reclamation. Primary equipment to be used would include two backhoes, two wheel loaders, three dozers, three side-boom tractors, two water trucks, three dump trucks, and two reel trucks and trailers for the Fiberspar pipelines. Equipment would be trucked to and off-loaded at the PCU 197-36A location adjacent to the beginning of the proposed pipeline corridor.

Construction and reclamation, including reseeding, of the proposed NHGP Gathering System utility corridor as a single spread, is expected to take approximately 16 weeks. The pipeline contractor's work force is estimated to be approximately 110 workers, as indicated in the ROW application. Personnel would be temporarily housed at area hotels and motels, plus travel trailers would be brought in by some to provide housing. Pipeline construction equipment would be transported to the pipeline utility corridor by approximately 15 tractor trailers or heavy trucks. An average of approximately 74 vehicle trips in and out of the pipeline construction zone would be anticipated on a daily basis for the projected 16 weeks of pipeline construction, including reclamation. Vehicle types would range from the predominant pick-up truck to several heavier dump and water trucks.

Clearing and Soil Salvage: Trees and vegetation in the pipeline corridor would be cleared from the 100-foot wide ROW. Prior to road construction, selected trees would be cut and stockpiled along the edge of the road ROW for use in final reclamation as required by the BLM (Appendix C). Remaining trees would be felled and cut into four-foot lengths, down to four inches in diameter and placed along the ROW's edge of disturbance. Tree limbs and woody brush, smaller than 4 inches in diameter, would be chipped and spread as mulch along the ROW. Remaining vegetation would be cleared and topsoil salvaged as required by the BLM (Appendix C). Topsoil would be rolled to one side of the trench, typically the working side, and into a linear storage berm. Spoil from trench excavation would be placed into a separate linear berm for storage, typically on the opposite side of the trench and on the edge of the ROW to keep the two soil materials separate from each other.

Blading, Trenching, Stringing, Welding, and Laying-in: Following trenching, stringing or unrolling, and welding (steel pipe), the pipelines would be laid into their trenches and would be padded with 6 inches of ¾-inch minus materials derived on-site or brought in from outside sources using a padding machine. In addition, the pipelines would be shaded with 24 inches of

¾-inch minus shading materials. Spoil would be placed in the trench to within 1 ½ feet of the trench top, and compacted with two passes from a rubber-tired tractor. The remaining spoil would be added to the trench, followed by a single wheel compaction. Topsoil would then be placed over the disturbed surface and compacted in a similar manner. The backfill and compaction process would create a minimal crown above the natural grade that upon completion would not pose a barrier or diversion to runoff flowing downslope across the ROWs.

Staging Areas: Primary equipment staging areas would be located on XTO fee property with the exception of the two TUAs to be used as temporary lay-down and staging areas for pipeline construction. The two TUAs would be sited along the proposed utility corridor to support pipeline construction and would be connected to the corridor by short access roads (Figure 1). The 300 ft x 300 ft TUAs would be sited at and within the proposed disturbance areas for the proposed PCU 197-35A and the FRU 197-28B wellpads.

Interim reclamation measures would be applied, as necessary, to those portions of the TUAs and access roads disturbed by clearing and/or blading following completion of pipeline construction within the utility corridor and prior to subsequent re-disturbance during construction of the future wellpads. Although future disturbance of the two proposed TUAs would be anticipated (future wellpad locations), interim reclamation measures for the TUAs and access roads would be applied as directed by the BLM to stabilize soil materials and to prevent accelerated erosion and possible loss of disturbed soils, unless use of the wellpads and TUA access roads for drilling were planned in the near future. Any additional temporary work areas needed for pipeline repairs would be reclaimed using final reclamation measures after the completion of repairs.

Pig Launchers and Receivers: The installation of pig launchers and receivers, including the construction work area for pipeline tie-ins into the Hatch Gulch pipelines, would require an area of approximately 100 ft x 300 ft (0.7 acre for each) and would be contained within the NHGP Gathering System utility construction ROW. Post-construction surface equipment would include three sets of pig launchers and receivers at separate locations, one launcher and receiver for the gas line and one for each of the two combined liquids lines. Access to the pig launcher and receiver sites would be controlled by a common locked chain link fence with barbed wire on top.

The pig launcher site would be located within the utility corridor and adjacent to the previously approved PCU 197-36A wellpad site (Section 36, T1S, R97W). The pig receiver site would be located within the utility corridor near the tie-in of the NHGP pipelines into the Hatch Gulch pipelines (Section 33, T1S, R97W). Post-construction, life-of-project surface disturbances for the pig launcher site and pig receiver site would be approximately 100 ft x 200 ft (0.5 acre) and 100 ft x 300 ft (0.7 acre), respectively (Table 3).

Reclamation: Contouring, soil stabilization and preparation, and reseeding would proceed according to site-specific conditions and in compliance with XTO-committed reclamation measures in the applicant-committed design features (ACDFs) and with BLM requirements for interim reclamation (pigging sites only) and for final reclamation of pipelines and TUAs, including TUA access roads as necessary, and pigging sites following facilities decommissioning (Appendix C). At final reclamation, selected trees salvaged and stockpiled along the edge of the ROW would be redistributed across the ROW after reseeding, in accordance with direction from the BLM Authorized Officer. Final reclamation measures would be applied to pipeline ROW,

TUAs, including TUA roads, and pigging sites as directed by the BLM to stabilize soil materials and to minimize erosion in compliance with BLM reclamation requirements (Appendix C).

Operations: The 50-foot wide permanent ROW would accommodate routine operations and maintenance activities, e.g., cathodic protection and leak surveys, drip maintenance, and smart pigging for periodic line assessments for the natural gas, combined liquids, and PWDD pipelines. A smart pig collects data as it traverses inside the lines; data collected includes wall thickness and any anomalies, such as loss of wall thickness due to corrosion, weld seams, dents, etc. Should future line repairs be necessary, additional temporary work area(s) could be required depending on the scope of repairs.

Pigging operations for all pertinent pipelines would be conducted monthly to remove liquids from topographically low points in pipelines. Recovered liquids would be sent down the Hatch Gulch Pipelines to the existing NHGP separator. This would be a closed system except for emergency relief valves. In the event of a relief valve release, the gas would be vented to the atmosphere and a small amount of liquids (less than two barrels) would be caught in precast concrete sumps at the receivers, collected in approved containers, and transported for proper treatment.

Approximately six personnel would be involved in long-term pipeline operations. Approximately three vehicles would be used to access pigging receivers and to check the utility corridor from the main access roads on a weekly basis for the life-of-project.

Methods of design, construction, testing and maintenance, and equipment and personnel requirements for the proposed pipelines within the utility corridor would employ measures consistent with those described and approved for pipeline installation in the PDP EA.

Water Use: The fresh water used for the NHGP would be obtained from one of two sources:

- The LOV Ranch fresh water pond, located in NE SW Section 9, T2S, R97W. The pond is approximately 4.6 acres in extent and can contain up to 29.81 ac-ft of fresh water.
- The B&M fresh water pond, located in SE NW Section 26, T2S, R97W. The pond is approximately 7.6 acres in extent and can contain up to 56.5 ac-ft of fresh water. There is also a 12,000 bbl tank located near XTO's office complex adjacent to County Road 5 which stores water from the B&M pond.

Both ponds are located within the Piceance Creek valley, approximately three and five miles south of the project area, respectively. The source of water for both ponds is adjudicated water withdrawn from Piceance Creek. XTO may also use water from other sources as to which it has appropriate water rights.

All pipelines would be hydrostatically tested to validate line integrity. The estimated volume of fresh water required for hydrostatic testing of the main pipeline is approximately 12,050 bbls (1.55 ac-ft), assuming the entire pipeline is filled at one time. Test water would be reused for subsequent testing of the smaller pipelines. After testing, test water would be discharged into tanks normally used for hydraulic fracture fluid storage, for disposal at a yet-to-be determined facility licensed to receive such waste. Fresh water requirements for construction dust suppression use have been estimated in the PDP EA, to which this EA tiers. For a short-term

surface disturbance of 53.6 acres (utility corridor plus TUAs), dust suppression usage is estimated at approximately 10,900 bbls (1.40 ac-ft.) (BLM 2007).

NHGP Main Access Roads:

The primary roads used by XTO to access the proposed Project facilities would be Colorado State Highways (CO) 13 and 64, and Rio Blanco County Roads (CR) 5, 76, and 3. Project travel would be limited to these existing paved and improved gravel roads. XTO proposes to construct new main access roads to support the NHGP across public lands in accordance with BLM Manual 9113 and standards for Local class roads indicated in *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book)* (BLM \ and USFS 2007). All roads on federal land would be constructed to BLM Local Road standards, 18 feet wide, all weather, and double lane. Surface disturbance would be contained within the ROW. Any roads located on private lands would be constructed in accordance with surface use agreements between the private landowner and XTO. Roads would be designed to minimize disturbance and built and maintained to provide safe operating conditions for the specific purpose of natural gas field development. Use of unimproved roads by XTO would not be authorized.

Design: Southern Access Road: The first main access road, noted as the Southern Access Road, would begin at the proposed PCU 296-6A wellpad location in the SESW of Section 6, T2S, R96W and follow an existing road to the southwest where the existing road continues west along the section lines between Sections 6 and 7, T2S, R96W and between Section 1, T2S, R97W and Section 12, T2S, R97W (Figure 1). From the section line, the proposed route would extend northwest to well location PCU 297-1A and end at the intercept with the utility corridor and the PCU 197-35C wellpad (Figure 1). Note that access to the PCU 197-35A wellpad would be achieved using a wellpad access road constructed at the same time as the wellpad and would connect to, but not be a part of, the Southern Access Road.

Northern Access Road: The second main access road, noted as the Northern Access Road, would begin at CR-5 (north half of S28, T15N, R97W) and end at PCU 197-35B. The Northern Access Road initially follows an existing two-track from the intersection with CR-5, for approximately 1.3 miles, including 1,323 feet on CPW surface, and transitions to a cross-country route further east (Figure 1). The remainder of the route on BLM-administered lands, approximately 6,585 feet (1.3 miles), to the road terminus at the NHGP Pipeline ROW, would require construction of new road.

Pig Receiver Access Road: The third main access road, the Pig Receiver Access Road (2,818 feet or 0.5 mile), would be constructed from CR-5 (beginning in southwest Section 28, T15N, R97W) along the existing Hatch Gulch Pipeline ROW to the pig receiver facility to allow required periodic access (Figure 1). This road would avoid construction of a road off the bluffs north of Hatch Gulch and down steep slopes. All except the first 145 feet connecting to CR-5, located on private surface, would be constructed on BLM surface.

Main Access Roads: Development of the proposed main access roads on federal lands would require new construction or reconstruction of existing two-tracks for a total construction length of approximately 24,275 feet (4.6 miles) and a construction ROW width of 40 feet. The Southern Access Road would total approximately 12,677 feet (2.4 miles); the Northern Access

Road would total approximately 7,908 feet (1.5 miles), and the pig receiver road approximately 2,818 feet (0.5 mile). All roads are proposed to comply with BLM road construction standards and guidelines presented in the *Gold Book*.

Additional Roads: New roads would also be needed between each wellpad and either the Northern or Southern Access Roads (see section below detailing well permitting). There would be no main road constructed between the termini of the Northern and Southern access roads to avoid a continuous, through road.

Construction: Main road construction would utilize approximately 15 vehicles, including dozers, graders, dump trucks, and pickups. Approximately 15 roundtrips per day would occur for the duration of main access road construction. The construction crew would consist of approximately 25 workers and main access roads construction would take approximately six weeks. Construction crew accommodations would be the same as those previously described for pipeline construction workers. Methods of design, construction measures including dust control and maintenance of the proposed Project roads, and construction equipment and personnel requirements would be consistent with those described for road construction and maintenance in the PDP EA.

Prior to road construction, selected trees would be cut and stockpiled along the edge of road ROW for use in final reclamation as required by the BLM (Appendix C). Remaining trees would be felled and cut into four-foot lengths, down to four inches in diameter and placed along the ROW's edge of disturbance. Tree limbs and woody brush, smaller than 4 inches in diameter, would be chipped and spread as mulch along the ROW. Remaining vegetation would be cleared and topsoil salvaged as required by the BLM (Appendix C).

Roads would be crowned, ditched, properly drained, and surfaced with commercially obtained Class 1 (2.5 inches) road base material appropriate to BLM standards to ensure safe, year-round all weather access. Road grade would be constructed by excavating borrow ditches along the upper sides of the ROW and crowning the rough grade or by balanced cut/fill operations within the ROW. The rough grade fill material would be treated with supplemental fresh water and compacted to achieve optimum density. Coated metal corrugated pipe culverts would be installed as necessary for drainage and would be sized in conformance with *Gold Book* standards. Crushed road base gravel would be imported, spread and compacted to a minimum of six inches in depth over the travel surface. Consistent with BLM's interim reclamation requirements, topsoil would be spread back over the road cut and fill and ditch slopes, stabilized as needed, and reseeded after final grading and compacting the road travel surface (Appendix C).

The roads would be maintained as necessary to provide all-weather access. Aggregate surfacing would be supplemented as necessary based upon loss and wear. Signage will be installed in conformance with BLM standards for Local Class roads. Initial inspection for erosion control and maintenance would be performed as specified in the Storm Water Management Plan. Subsequent inspections would be performed on a semi-annual basis (spring/ fall). Culverts and turnouts would be installed where necessary in accordance with the final design drawings.

Reclamation: The initial disturbance of 22.5 acres resulting from main, TUA access, and pig receiver access road construction would be reduced to 10.0 acres after stabilization and interim reclamation of those portions of the construction ROW outside the travel surface. Post-

construction roads would utilize an 18-foot wide travel surface for the life of the Project and would be stabilized and reclaimed when the road is no longer needed (Appendix C).

Topsoil on new road ROWs would be salvaged, spread on the backslope of the borrow ditch within the ROW, and seeded to minimize soil erosion and borrow ditch sedimentation. Windrows of topsoil would not be left above the borrow ditch. Available topsoil (up to eight inches) would be stripped from all road corridors prior to commencement of construction activities and stockpiled. For interim reclamation, topsoil would be redistributed along the edges of disturbed areas following completion of road construction and reseeded using the BLM-authorized seed mix, and also on backslope areas of the borrow ditch. Topsoiled borrow ditches would be reseeded after road construction as part of interim reclamation measures.

As part of final reclamation of roads to be decommissioned at close of project operations, topsoil would be re-salvaged and stockpiled temporarily along the edge of ROW while road travel surface, ditch, and cut and fill slopes are recontoured. Topsoil would be re-spread over the entire disturbed ROW and reseeded using methods and seed mixes as described in Appendix C. Salvaged trees and any rocks that were encountered and salvaged prior to construction would be scattered over the ROW after reseeded. Table 3 details estimated disturbances due to access roads, pipelines, wellpads, and wells.

Water Use: During construction, fresh water would be obtained from the Love Ranch FW pond and the B&M pond. XTO may also use water from sources as to which it has the appropriate water rights. The fresh water would be used to mitigate dust emissions. Fresh water requirements for construction dust suppression use have been estimated in the PDP EA, to which this EA tiers. For a surface disturbance of 22.5 acres, dust suppression usage is estimated at approximately 5,100 bbls (0.66 ac-ft.) (BLM 2007).

Natural Gas Drilling:

Drilling associated with the NHGP is proposed to be implemented on a year-round and continuous basis utilizing up to three rigs. If approved, the Project would result in the construction of:

1. Six wellpads and the drilling, completion and production of up to 120 wells, all of which are located on federal surface and mineral estate along the proposed NHGP Gathering System and NHGP main access roads network (Figure 1);
2. Wellpad access roads connecting each of the six wellpads to one of the main access roads; and
3. A network of natural gas, combined liquids, and PWDD flowlines connecting each of the six wellpads and their associated wells to the main NHGP utility corridor.

Design: Wellpads constructed for the NHGP would be similar to, but somewhat larger than those approved in the FONSI/DR for the PDP EA (BLM 2007). The short-term size of the active wellpad would be approximately 6.2 acres rather than 5.9 acres actually built for nearby pads constructed under the approval of the PDP EA (a 5 percent increase). Total surface disturbance, including cuts, fills, and soil storage, would be an average of approximately 14.4 acres per wellpad, rather than the average 10.1 acres per pad for nearby pads constructed under the PDP

EA (a 43 percent increase in acreage) in response to an increase in wells per pad from 10 to 20. Each wellpad, the number of wells to be drilled, and the wellpad location are identified in Table 1 below:

Table 1. Wellpad list.

Wellpad Name	Proposed Wells	Location
FRU 197-28B	20	NESE Sec 28 T1S R97W
PCU 197-27B	20	NWSE Sec 27 T1S R97W
PCU 197-35B*	20	NWNW Sec 35, T1S R97W
PCU 197-35A*	20	NWSE Sec 35, T1S, R97W
PCU 197-35C*	20	SESE Sec 35, T1S, R97W
PCU 297-1A*	20	NESW Sec 1, T2S, R97W
Total Wells	120	

* Wellpad onsited in 2010.

Proposed down-hole spacing is one well per 20 acres for all wells, or 400 acres of subsurface development from each wellpad. Development using wellpads supporting 20 individual wells would result in a wellpad density of about 1.6 wellpads per square mile. A conceptual map of the NHGP downhole development is indicated in Figure 3. The locations for the six wellpads have been approved based on completed onsites for the locations.

Construction and Reclamation: The six wellpads would each be constructed to provide room for the drilling and production of up to 20 natural gas wells. Short-term surface disturbance associated with wellpad construction would be approximately 13 to 17 acres per pad, including cuts and fills and spoil storage, and approximately 6.2 acres per pad, not including cut, fill, and spoil storage. Cuts and fills would be balanced to the extent feasible.

Wellpads: Wellpad construction would use a crew size of approximately eight workers. Construction equipment would consist of dozers, loaders, dump trucks, backhoes, and pickup trucks. Each wellpad would require approximately 28 days to construct. An estimated 10 vehicle roundtrips would occur daily for the 28 days of construction.

Wellpads would be generally rectangular with an average active surface area of about 6.2 acres. Total disturbed acreage, including cuts and fills and spoil storage would vary depending on topography, but would average about 14.4 acres per pad. Prior to wellpad construction, selected trees would be cut and stockpiled along the edge of the wellsites for use in final reclamation as required by the BLM (Appendix C). Remaining trees would be felled and cut into four-foot lengths, down to four inches in diameter and placed along the wellsite's edge of disturbance. Tree limbs and woody brush, smaller than four inches in diameter, would be chipped and spread as mulch along the ROW. Remaining vegetation would be cleared and topsoil salvaged as required by the BLM (Appendix C). Topsoil to a depth of approximately eight inches would be salvaged and stored separately from fill and other materials. The wellpad would be leveled and excess subsoil/substrate remaining, following topsoil removal, would be separately stockpiled. Materials removed in the construction of a reserve pit and a separate fresh water pit would be stored in a subsoil/substrate stockpile.

Two rectangular pits would be constructed. One would contain freshwater, the other would be a two-part reserve pit with circulation and settling chambers. Pit capacities may vary among wellpads, but would be sufficient to accommodate the needs of the particular wells. The reserve pit would be lined with a liner of minimum 24 mm thickness to protect ground water resources. Following drilling and completion activities, the liners would be removed prior to infilling the pit. The pits would be fenced on three sides during the drilling phase and the entire active wellpad area would be fenced following drilling and completion of the wells. A flare pit would be constructed adjacent to the reserve pit and would be located more than 100 feet from the wellheads.

Following drilling a well, the mud typically would be used on a subsequent well, often following reconditioning. Mud that could no longer be sufficiently reconditioned to be effective in drilling would be hauled to an approved disposal facility.

Cuttings may be stored in one or more lined trenches during drilling operations. Following completion of drilling, the cuttings would be sampled for analyte concentrations of concern as indicated in COGCC Table 910-1. Cuttings with sampled analyte concentrations above the concern values would be managed with COGCC-approved methods. Cuttings and other solid wastes with measured contaminant levels within Table 910-1 standards would be buried in the trenches and pits following removal of trench and pit liners for approved offsite disposal. Specifications of pit sizes and capacities and cuttings trenches would be included in the particular wellpad APDs.

After all 20 wells are placed on production, each wellpad would proceed to interim reclamation, leaving approximately three acres which would remain to safely support production operations for the life of the well(s). These three remaining acres would undergo final reclamation when the wells are plugged and abandoned.

The construction of the six wellpads would result in an initial disturbance of 86.2 acres on federal lands (Table 3). Interim reclamation of wellpads after wells are placed on production would result in life-of-project disturbance of approximately 18 acres.

Wellpad Access Roads: Development of the six wellpads would require the construction or reconstruction of approximately 9,391 feet (1.8 miles) of access roads on federal lands. The wellpad access roads would be constructed and maintained to the same standards, BLM Local Road, as the previously described main access roads. Wellpad access road construction would use crews of approximately 15 workers and 10 vehicles with 10 roundtrips per day of construction. The length of individual access roads would vary from approximately 100 to 5,600 feet. Duration of construction would be proportional to the length of the roads. Construction equipment and practices would be the same as those described for main access roads. Practices for pre-construction clearing of vegetation and topsoil salvage to meet BLM interim reclamation requirements (Appendix C) would be the same as those described previously for main access roads.

The initial disturbance of 8.6 acres resulting from wellpad access road construction would be reduced to 3.9 acres after stabilization and interim reclamation of those portions of the construction ROW outside the graveled running surface. Post-construction wellpad access roads

would utilize an 18-foot wide gravel running surface for the life of the project and would be stabilized and reclaimed when the road is no longer needed.

Flowlines: Tributary flowline corridors would connect the six proposed wellpads to the proposed North Hatch Gulch Gathering System utility corridor (Figure 1). Steel natural gas flowlines of 6 or 8 inch outside diameter would tie individual wellpads into the 24 inch diameter pipeline in the gas gathering utility corridor. Flexsteel flowlines would be run within the flowline corridors for the combined liquids and the PWDD lines. Constituents and parameters for pipeline placement within the flowlines corridors would be similar to those for the utility corridor pipelines with the exception of smaller diameter gas lines and a narrower trench resulting in a total width of spaced trenching of approximately eight feet (Figure 2). The flowlines from all six wellpads would connect into the North Hatch Gulch Gathering System pipelines. Flowline construction would generally occur at the same time as construction of the wellpad and access road.

Because production from FRU 197-28B would cross federal unit lines, a separate 4 inch combined liquids pipeline would be laid in the combined-liquids and PWDD trench from the FRU 197-28B wellpad to the intercept with the North Hatch Gulch pipelines.

Flowline installation would use a crew size of approximately 10 workers. Construction equipment would consist of the same types of equipment indicated above for the main gathering system pipelines. Flowline lengths between the wellpads and the main gathering pipeline system would vary from approximately 100 to 5,500 feet. Construction duration would be proportional to the length of the individual flowline corridors. An estimated 10 vehicle roundtrips would occur daily for the duration of wellpad flowline construction.

Practices for pre-construction clearing of vegetation and topsoil salvage to meet BLM final reclamation requirements (Appendix C) would be the same as those described previously for the NHGP Gathering System.

The total length of the proposed flowlines between the 6 wellpads and intercepts with the proposed gas gathering system pipelines is approximately 10,471 (2.0 miles) with a construction ROW width of 90 feet. Disturbance for the construction ROW is estimated at 21.6 acres. Post-construction, all 21.6 acres of disturbed areas would be stabilized and reclaimed.

Reclamation: As part of final reclamation, topsoil replaced under interim reclamation on wellpads and those access roads to be decommissioned at close of project operations, would be resalvaged and stockpiled temporarily along the edge of wellsites or access roads while graveled surfaces of wellpads and/or road travel ways are removed, while wellpad reserve and fresh water pits are decommissioned, and while stockpiled materials including fill materials are worked to restore contours (Appendix C). Topsoil would be re-salvaged from ditches and cut and fill slopes prior to re-contouring the access road. After re-contouring both wellsites and access roads, topsoil would be respread over the entire disturbed ROW and reseeded as described in Appendix D. Salvaged trees and any rocks that were encountered and salvaged prior to construction would be scattered over the reclaimed wellsites and access road corridor after reseeded. Table 3 details estimated disturbances due to wellpads, access roads, and flowlines.

Well Drilling and Completion: As described in the PDP EA, XTO's pad drilling approach would utilize skid-mounted rigs that are capable of sliding laterally to efficiently drill a number of wells in a row, called a "batch." (See Figure 4 for a typical drill site layout). In contrast to conventional practice, batch drilling of multiple wells on one wellpad eliminates rig mobilizations between wells and significantly reduces truck traffic. After the drill rig moves off a wellpad, the wells are "batch completed" in a similar manner. The well bores are completed sequentially and tied into production. Current plans envision two rows of wells on each pad with 10 wells in each row, which would require 1 rigup and 1 rigdown under year round continuous activity. Batch drilling and completions are made possible by the extensive use of directional drilling techniques to reach bottom hole locations at distances from the wellpad, for the NHGP allowing a surface pad density of one pad for every 400 acres. In addition to reducing impacts to various resources, batch drilling and completions reduce the amount of time required to drill and complete all the wells on each pad. With current technology, XTO expects to batch drill and complete up to 10 wells (one row of wells) at one time. In addition to reducing impacts to surface resources, batch drilling and completions reduce the amount of time required to drill and complete all the wells on each pad (see Attachment 1).

Well control systems would be designed to meet the conditions likely to be encountered in the area and would be in conformance with Federal Onshore Order No. 2 and State of Colorado requirements. Surface and other casings would be set with cement to prevent migration of borehole fluids and contamination of any fresh water aquifers penetrated by the borehole and to isolate potentially productive hydrocarbon zones. The well would be drilled with a combination of various drilling fluids to maintain borehole pressures and mud weight would be monitored to ensure proper weighting of the drilling fluid for anticipated borehole pressures. Detailed drilling plans would form a part of the drilling permit for each well and are not repeated here. Prior to obtaining a drilling permit, a BLM petroleum engineer would review each application to confirm that the proposed drilling operation complies with existing regulations and that the well can be drilled and completed with minimal risk.

Hydraulic stimulation (fracturing) completion operations would be conducted in conformance with BLM and COGCC regulations and guidelines. Batch completion operations would commence after completing the drilling of a 10-well batch, and would be conducted on the same 10-well batch previously drilled and cased. Fracture fluid would be pumped into the formation under high pressure until development of the induced fractures. All flowback water following the stimulation operation would go back into tanks for re-use or disposal at a state approved permitted disposal facility. Following completion, the well would be tested, typically using the previously constructed flowlines so that flaring of produced gas would not generally occur.

Drilling operations would normally require approximately 22 personnel per drill rig, including seven per shift, two shifts per day, plus eight additional personnel (mud engineer, mud loggers, safety specialist, directional drilling techs, and company representatives). When an average well is being logged, up to five additional personnel (a total of 27) are needed for about two days. Approximately 15–20 additional personnel (for a total of up to 42 people) would be on location for two to four days for the running and cementing of casing strings. Typically, one well would be drilled, logged, and cased within 25 days. On average, each 20-well pad would require 500 drilling days plus another 100 days to complete the wells, for a total of 600 days to drill and complete. Because completion operations would normally include testing equipment to capture

produced gas and send it to the existing Central Treatment Facility (CTF), gas venting and flaring would be minimal. On occasion, however, it could be necessary to vent minor amounts of gas for short periods. This would occur in accordance with prescribed BLM or COGCC procedures and requirements. Completion fluids or produced water would not be discharged onto surface areas within the project area or elsewhere.

No abnormal temperatures, pressures, or hydrogen sulfide levels are anticipated during drilling. Any shallow water zones encountered would be reported and adequately protected. Fresh-water aquifers would be protected by running casing into the open borehole and cementing the casing into place. Cementing would also isolate all other formations in the hole and would effectively eliminate the possibility of contamination between hydrocarbon zones, water aquifers, and other mineral resources.

Operations: Other than wellheads, most production facilities would be located within a relatively small (approximately 0.6 acre area (included within the total 3.0 acres of wellpad remaining following interim reclamation) situated at one end of the wellpad. Buried flowlines from each well would connect the wellheads to the production facilities pad. Skids containing injection devices for inserting chemicals into the flowlines to prevent icing or bacterial growth would be located adjacent to the wellheads. A table indicating the types and purposes of potential production facilities is indicated in Table 2. Not all of these facilities would necessarily be present on each production pad. A typical producing wellpad layout is illustrated in Figure 5.

Table 2. Potential production pad facilities.

Facilities	Description	Purpose
Line Heater Skids	2 each (wells 1 -10, wells 11-21)	Pre-heats well stream to avoid freeze-off during initial well flow
Choke Skids	two each	Individual well control and flowline pressure protection.
Gas Liquid Compact Cyclone Modules (GLCC)	two each. 10 vertical 12" O.D. x 12' 3-phase production separators per module	Separate gas, condensate, and water from wells in the continuous test to measure individual well's gas, condensate, and water production.
Primary Separator Module	1 each. Horizontal 60" x 15' 2-phase production separator	Combined wellpad separation of gas and liquids . Production flows to common gathering trunk line system. Gas orifice meter used for gas sales measurement.
Primary Pipeline Pump Module	1 each	Pumps condensate and produced water from wellpad to common gathering trunk line system.
Utility Module	1 each	Provides electrical generation, instrument air compression, and control system hardware.
Blowdown tank	1 each, 400 bbl	Accumulates liquids from wellpad process equipment during routine operations and maintenance activities.
Flowline from Wellhead to Line Heater Skid	3" XXH Fusion bonded externally coated pipe	Transfers full well stream production to production facility plot limits.
Gas Flowline	On pad Flowline	Flow gas from the production separator to the gas gathering system tie in point on the edge of wellpad location

Gas Flowline	Off pad Flowline	Flow gas from the wellpad into the gas gathering trunk line system
Liquids Flowlines	On pad flowlines	Flow combined liquids from onsite production separation to tie in point on edge of wellpad location
Liquids Flowlines	Off pad flowlines	Flow combined liquids into the trunk line gathering system to the PA tank battery.

Produced Water: The amount of produced water varies fairly directly with the level of gas production. XTO data indicate that Mesaverde wells produce a fairly consistent 110-120 bbls of water per million cubic feet (MMCF) of gas. Because Mesaverde wells show steep initial gas decline with lower long-term production rates, water production rates behave in a similar manner. Over the first year, a typical gas well will average around 154 bbls/day of produced water, declining to about 50 bbls/day in the fourth year. Subsequent years show a slow decline for the life of the well. As discussed in the following section, produced water would provide a major portion of the water required for drilling and completing the wells.

XTO currently handles the disposal of water from approximately 193 producing wells with an existing 12 injection wells that dispose of produced water no longer used for drilling or completion. XTO also maintains a produced water evaporation pond at Love Ranch, in NW SW Section 9, T2S, R97W. This pond, comprising approximately 3.6 acres with a maximum storage volume of 50 ac-ft, is used for emergency storage of produced water.

The PDP EA authorized the installation of an additional 79 injection wells. The current water-handling capabilities, augmented by additional, previously approved, injection wells as needed, indicate that there is adequate capacity available to dispose of production water from the additional wells. No additional project injection wells beyond those approved in the PDP EA would be required.

Water Use:

During construction, fresh water would be obtained from the Love Ranch FW pond and the B&M pond; water may also be obtained from other sources as to which XTO has appropriate water rights. The fresh water would be used to mitigate dust emissions. Fresh water requirements for construction dust suppression use have been estimated in the PDP EA, to which this EA tiers. For a surface disturbance of 86.2 acres of wellpads, dust suppression usage is estimated at approximately 17,500 bbls (2.26 ac-ft.). For the 8.6 acres of wellpad access roads, fresh water use would be approximately 1,750 bbls (0.23 ac-ft.), and for the 21.6 acres of flowlines disturbance, freshwater use would be approximately 4,400 bbls (0.57 ac-ft.) (BLM 2007).

Drilling operations would use an average of approximately 18,000 bbls of water per well from the pond sources noted above. Drilling the surface hole would require fresh water, but approximately 10 percent of the water required to drill the remainder of the hole would be re-used produced water. Completion operations would require an average of approximately 26,000 bbls of re-used produced water per well. Fresh water would not be used for completion operations. For the 120 wells, drilling and completion operations are estimated to require

approximately 1,944,000 bbls of fresh water (250.55 ac-ft.). Approximately 3,336,000 bbls (429.96 ac-ft.) of re-cycled produced water would also be used.

Flowlines would be hydrostatically tested with fresh water from the ponds or with the fresh water used previously for hydrostatic testing. Assuming a maximum 8-inch diameter gas pipeline and re-use of the hydrostatic test fresh water for each of the lines, hydrostatic testing would require approximately 650 barrels for all of the flowlines (0.08 ac-ft.). Hydrostatic testing would be done at the completion of flowline construction from each wellpad, not all at one time. Test water would be collected and disposed in the same manner as that discussed in the section discussing hydrostatic testing of the main NGH pipelines.

No used water would be discharged to the surface within the project area or elsewhere. The per well water use for this project is estimated to be 2.14 ac-ft, (Table 4), which is lower than the 2.62 ac-ft average used for the programmatic biological opinion between the BLM and the U.S. Fish and Wildlife Service (USFWS) as mitigation for water withdrawal impacts to the endangered Colorado River fish species. The number of wells drilled each year is reported to USFWS as part of this agreement and payments have been made to the recovery program to address these depletions from the Colorado River System.

Surface Disturbance and Water Use Summary:

A summary of the amounts of construction and life-of-project surface disturbance resulting from implementation of the North Hatch Gulch Project is indicated in Table 3. All of the disturbance would be located on lands managed by BLM, with the exception of 1,323 feet of road crossing surface managed by the Colorado Division of Wildlife and 145 feet of road crossing private land.

The requirements for water to be used in implementing the Proposed Action are summarized in Table 4. Fresh water will be supplied by truck hauling from XTO's Love Ranch and B&M ponds, which are ultimately sourced from Piceance Creek. Water may also be supplied from other sources as to which XTO has appropriate water rights.

Table 3. NHGP surface disturbance summary.

Disturbance Source	Length (ft.) or Count	Construction		Life-of-Project	
		ROW (ft.)	Disturbance (ac)	ROW (ft.)	Disturbance (ac)
Pipelines ¹					
Main Pipeline	21,522	100	49.4	50	0.0
Flowlines	10,471	90	21.6	0	0.0
Temporary Work Areas	2		4.2		0.0
Pig Launcher ²	1		0.0		0.7
Pig Receiver ²	1		0.0		0.5
Total Pipelines	31,993		75.2		1.2
Roads					
Northern Access Road (Total)	7,908	40	7.3	18	3.3
BLM Surface	6,585	40	6.0	18	2.7
CPW Surface	1,323	40	1.2	18	0.5
Southern Access Road	12,677	40	11.7	18	5.2
TUA Access Roads	872	40	0.9	18	0.4
Pig Receiver Access (Total)	2,818	40	2.6	18	1.2
BLM Surface	2,673	40	2.5	18	1.1
Private Surface	145	40	0.1	18	0.1
Future Well Pad Access	9,391	40	8.6	18	3.9
Total Roads	33,666		31.1		13.9
Well Pads ³					
20-well Pads	6		86.2		18.0
Total BLM Surface			191.2		32.5
Total Non-BLM Surface			1.3		0.6
Total Surface Disturbance			192.5		33.1

¹ A permanent ROW will be maintained for the main pipeline, however the entire disturbed surface will be reclaimed.

² Construction disturbance is included within NHGP pipeline ROW

³ Disturbance estimates include average estimated cuts and fills. Actual average working area is approximately 6 acres per pad. Interim reclamation reduces long-term working area to approximately 3 acres per pad.

Totals may not add due to rounding.

Table 4. NHGP estimated water use summary.

Use	Fresh Water		Produced Water	
	Bbls	Ac-Ft	Bbls	Ac-Ft
NHGP Pipeline Construction				
Hydrostatic Testing ¹	12,050	1.55	0	0.00
Dust Suppression ²	10,881	1.40	0	0.00
Access Roads				
Dust Suppression ³	6,313	0.81	0	0.00
Wellpads (20 Wells)				
Drilling ⁴	1,944,000	250.55	216,000	27.84
Completions ⁵	0	0.00	3,120,000	402.12
Dust Suppression ⁶	17,499	2.26	0	0.00
Wellpad Flowlines				
Hydrostatic Testing ⁷	650	0.08	0	0.00
Dust Suppression ⁸	4,400	0.57	0	0.00
TOTALS	1,995,793	257.23	3,336,000	429.96

1. Assumes full load of NHGP main pipeline at 21,522 feet - $3.14159 \times (1)^2 \times 21522 = 67613$ cu. ft. = 506,000 gallons = 1.55 ac-ft

Assumes that smaller NHGP pipelines are tested re-using the water for the big pipe.

2. Uses dust suppression numbers for roads and wellpads from the PDP EA, figured at 190,000 bbl./938 ac road/pad disturbance

Uses calculation of 203 bbls/disturbed acre * 53.6 acres.

3. Same as 2., but uses 31.1 ac all roads

4. From PDP EA, as modified by XTO direction on using 10 percent produced water

5. From PDP EA

6. Same as 2. but uses 86.2 ac

7. Assumes maximum 8-inch flowline and re-use of water for other flowlines.

8. Same as 2, but uses 21.6 ac

Design Features

A number of features intended to minimize impacts to the human environment from implementation of the Proposed Action have been incorporated into the project design and are listed below. XTO has agreed to implement the following design features:

Air Quality

- All drill rigs used within the project area will comply with Environmental Protection Area (EPA) Tier two diesel or better technology.
- Water and/or chemical dust suppressants will be applied to control fugitive dust during construction activities to achieve at least a 50 percent control efficiency.
- XTO will comply with all local, state, and federal air quality regulations as well as for providing documentation to the BLM that they have done so.

Floodplains

Impacts to floodplains will be mitigated by implementing the following mitigation measures:

- Install road and pipeline crossings perpendicular to the stream channel where topographic conditions allow.
- Bury pipelines at least five feet deep in areas within the 100-year floodplain and/or use acceptable engineering practices to ensure negative buoyancy during flood events.
- BLM mitigation measures will be implemented to protect against scour and bank erosion that are described in Hydraulic Considerations for Pipeline Stream Crossings (BLM 2003b), such as burying pipelines below scour depth and using concrete-coated pipe or set-on weights.

Invasive, Non-native Species

XTO will do the following:

- Promptly recontour and revegetate all disturbed areas with the seed mix specified in APDs or ROW grants. In addition, XTO will monitor the area of the Proposed Action until final abandonment to detect the presence of noxious and invasive species, and be responsible for eradication of noxious weeds and cheatgrass using materials and methods authorized in advance by the AO.
- Upon detection of noxious, non-native, and/or invasive plant species, control their presence before seed production using materials and methods as outlined in the RMP and/or authorized in advance by the White River Field Office Manager. Application of herbicides will occur under field supervision of an EPA certified pesticide applicator. Herbicides must be registered by the EPA and application proposals must be approved by the BLM before application. Herbicides intended for use in riparian areas will be labeled for aquatic use. Herbicide application will be in accordance with label instructions (the label is considered a legal document).

Migratory Birds

XTO will employ measures to discourage migratory bird access to, or contact with, reserve pit contents that through ingestion or exposure may result in mortality or have potential to compromise the water-repellent properties of bird plumage. Exclusion methods installed prior to placing fluids in pits may include netting, the use of flags, cannons, decoys, or other alternatives that are effective for discouraging migratory bird contact with pit contents and meet BLM's approval. XTO will notify the BLM of the method that will be used to discourage migratory bird use two weeks prior to initiation of drilling activities. The BLM-approved method will be applied within 24 hours after drilling activities have begun. All lethal and non-lethal events that involve migratory birds will be reported to a White River Field Office Petroleum Engineer Technician and the assigned Natural Resource Specialist (NRS) immediately.

Wastes, Hazardous or Solid

XTO will do the following:

- Collect and properly dispose of any solid wastes generated by the Proposed Action.
- Reuse produced water in well drilling and completion processes to the extent feasible.
- Completion fluids will be recycled.
- Provide receptacles for management of trash and construction debris generated during construction and operations.
- Manage equipment and vehicle maintenance fluids such as used oil and antifreeze managed through third-party recyclers.
- Provide county-approved septic systems, closed septic treatment packages, and portable toilets for all operations.
- Expand and continually implement the field-wide SPCC to cover new activities.
- Ensure that all construction activities are covered by Construction Stormwater Pollution Prevention Management Plans.
- Handle the use, storage, transport, and disposal of hazardous materials in accordance with applicable state and federal laws.
- Locate storage facilities on production pads to the extent feasible, make use of enhanced remote monitoring, and use fiberglass or poly pipe and tankage.

Water Quality, Surface and Ground

- XTO will be responsible for obtaining all necessary federal and state permits, and complying with the Corps of Engineers (COE) Nationwide Permit 12 conditions, Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) Minimal Industry Discharge Permit conditions as well as providing documentation to the BLM that they have done so. This documentation would include an approved Storm Water Management Plan (SWMP).
- Protection of surface water resources will be accomplished by using the COAs cited in Appendix B of the White River ROD/RMP (BLM 1997a).
- All surface-disturbing activities will strictly adhere to “Gold Book” (fourth edition) surface operating standards for oil and gas exploration and development.

Vegetation

- XTO will contact the assigned NRS, petroleum engineer (PE), or petroleum engineering technician (PET), as indicated below, 24 hours prior to the following operations:
 - construction of access road and well site (NRS, PET, PE)

- spudding (including dry hole digger or rat-hole rig) (NRS, PET, PE)
 - running and cementing of all casing strings (PE, PET)
 - pressure testing of BOPE or any casing string (PE, PET)
 - commencing completion operations (NRS, PE, PET)
 - surface reclamation work (NRS, PE, PET)
- XTO will promptly recontour and revegetate all disturbed areas with the seed mix specified in the APD or ROW grant, monitor the ROW for a minimum of five years post-construction to detect the presence of noxious and invasive species, and be responsible for eradication of noxious weeds and cheatgrass on the ROW using materials and methods authorized in advance by the AO.
 - XTO will revegetate disturbed areas as follows:
 - Distribute topsoil evenly over the location and prepare a seedbed by disking or ripping;
 - Drill seed on contour at a depth no greater than ½ inch, or, in areas that cannot be drilled, broadcast at double the seeding rate and harrow seed into the soil;
 - Use seed that is certified and free of noxious weeds. Seed certification tags will be submitted to the assigned NRS within 30 days of seeding. All seed tags will be submitted via Sundry Notice (SN), and the SN will include the associated well API number, the date(s) the seed was applied, the seeding method, acres seeded, the feature that was seeded (e.g., well pad cut and fill slopes, road corridor, working surface of pad, etc.), the seed mix number, the name and phone number for the contractor that applied the seed, and a map that clearly illustrates the areas that were seeded.
 - XTO will utilize one of two options for treatment of slash from this project. A hydro-ax or other mulching machine could be used to remove the trees. The machines are capable of shredding trees up to 12 inches in diameter and 15 feet tall as well as a mower similar to a conventional brush beater. They generally leave small branches and pieces of wood from pencil size up to bowling ball size, and the mulch will be evenly scattered across the surface. This will effectively break down the woody fuel and scatter the debris, thereby eliminating any hazardous fuel load adjacent to the new road and wellpad. The other option will be to cut trees and have them removed for firewood, posts, or other products. The branches and tops will be lopped and scattered to a depth of 24 inches or less. Should the products be left for collection by the general public, they will be piled alongside the road or pad to facilitate removal. For the pipeline, the trees should be dealt with according to forestry and wildlife stipulation. However, material brought back onto the pipeline easement will not exceed five tons/acre.
 - Where there is existing ROW, new ROW will be located immediately adjacent to minimize total disturbance.

Access and Transportation

XTO will:

- Ensure that all XTO and contractor employees adhere to state and local traffic regulations.
- Coordinate with the Rio Blanco County Road and Bridge Department during transport of overweight/oversize loads.

Forestry Management

- During pad, road, and pipeline layout, consideration will be given to maintaining old-growth stands in their entirety. Old-growth stands will be those with trees containing individuals of an apparent age greater than 300 years and having old-growth stature and development.
- All trees removed in the process of construction must be purchased from the BLM.

Recreation

Impacts on recreation resources will be minimized by implementing the following operator-committed mitigation measures:

- Warnings on roads with project traffic will alert project participants and recreation visitors to each other's presence and potentially promote the avoidance of accidents.
- XTO will work with BLM to schedule initiations of road, wellpad, pipeline, gathering line, and other infrastructure construction on BLM-administered lands to reduce or minimize activity during hunting seasons. Drilling and well completion operations will not be subject to rescheduling due to the long duration and nature of these activities. XTO will work with BLM to reduce traffic from road, wellpad, pipeline, gathering line, and other infrastructure construction and other project-related activities during specified hours during hunting season.

No Action Alternative: Under this alternative, XTO's proposal would be denied and the development as envisioned would not occur. Management of the public lands in the project area would continue as before. However, because the project area is located within the area approved in the PDP EA for development of up to 120 wellpads and 1,080 wells and associated facilities, it is likely that additional proposals for oil and gas development, and possibly actual development, would occur.

ALTERNATIVES CONSIDERED BUT NOT ANALYZED:

Alternative 1. Modification to Lease Stipulation TL-08 Alternative: Included in the Proposed Action is the applicant's proposal for BLM to modify the existing lease stipulation TL-08. As envisioned, the modification would permanently remove timing constraints from the footprint of all disturbance features (e.g., wellpads, access and pipeline corridors, etc.) associated with the North Hatch Gulch project, while leaving the timing limitation intact on the remainder of the

lease. The terms of this modification, in terms of the stipulation's purpose, would be functionally equivalent to a lease-wide waiver. The purpose of stipulation TL-08 is to reduce disruption of big game on winter ranges that the Colorado Parks and Wildlife (CPW) consider most important to the support of big game populations. Subjecting deer to disruptive activity during their occupation of severe winter range is widely recognized as a serious challenge to the nutritional and energetic demands of animals. As provided in the WRFO's Record of Decision and Approved Resource Management Plan (1997), this stipulation may be modified if the CPW determines that animal use patterns are no longer consistent with dates established for animal occupation. Based on recent and ongoing CPW big game monitoring efforts, big game seasonal-use patterns across the project area have been verified to be consistent with dates established in the Timing Limitation. In addition, because this alternative does not meet the principal requirements for modification, it would therefore not be in conformance with the land use plan, and the only options available to BLM would be to deny the proposal, modify the proposal or amend the land use plan. From 43 CFR 1610.5-3:

“a) All future resource management authorizations and actions, as well as budget or other action proposals to higher levels in the Bureau of Land Management and Department, and subsequent more detailed or specific planning, shall conform to the approved plan.”

“(c) If a proposed action is not in conformance, and warrants further consideration before a plan revision is scheduled, such consideration shall be through a plan amendment in accordance with the provisions of §1610.5-5 of this title.”

And from 516 DM Chapter 11:

“Where a BLM land use plan (LUP) exists, a proposed action must be in conformance with the plan. This means that the proposed action must be specifically provided for in the plan, or if not specifically mentioned, the proposal must be clearly consistent with the terms, conditions, and decisions of the plan or plan as amended. If it is determined that the proposed action does not conform to the plan, the Responsible Official may:

- A. reject the proposal,
- B. modify the proposal to conform to the land use plan, or
- C. complete appropriate plan amendments and associated NEPA compliance requirements prior to proceeding with the proposed action.”

Therefore, because mule deer severe winter range that occurs within the designated lease still exhibits a functional capacity to support and attract mule deer when winter conditions are severe, and because this alternative does not comply with the LUP, this alternative was considered but not carried forward for detailed analysis.

Alternative 2. Seasonal Drilling Alternative: For comparison purposes, under seasonal stipulations that do not allow drilling from December 1 to April 30 of each year, only 7 months are available during which drilling and construction can occur. During that 7 month period, 6 to

7 wells might be drilled and completed under ideal conditions (e.g., constraints include unfavorable weather; availability of contractor, equipment and personnel; timely mobilization and de-mobilization; annual wildlife / botanical / raptor surveys; availability of wellpads, etc.) which means a single wellpad with 20 wellbores would require a minimum of 36 months (3 years) to drill and complete, or 18 years for the entire North Hatch Gulch Project with 1 rig. Seasonally drilling 120 wellbores using 2 rigs would take 108 months (9 years), and using 3 rigs would take 72 months (6 years) (Table 1).

In addition to the longer duration that is required under seasonal drilling, new logistical problems arise concerning the 5-month period during which drilling is prohibited. The key issue is that the rig(s) cannot sit idle for 5 months and must be continuously drilling to be economically viable for both the Operator and the Drilling contractor be kept busy. One possibility might be to move the rig(s) to other wellpads in Piceance that do not have seasonal restrictions and continue drilling. To accomplish this option, each rig will require 2 wellpads, which means disturbance associated with wellpads, roads and flowline construction will be approximately double that which is necessary for continuous operations at any given time. One wellpad will be in use for 7 months and the second wellpad will be used the remaining 5 months of each year. In addition to more disturbance, interim reclamation of wellpads cannot begin until all the wells on each pad are drilled and placed on production. In addition to greater surface disturbance, each rig will need to make 2 moves. Each move will require 1 week to move on location, 1 week to rig-up, and 1 week to rig-down, for a total of 6 weeks to make the 2 moves, which leaves only 5.5 months of the 7-month drilling window available for drilling. Each move and rig-up or rig-down will require more cranes and truck hauling which means increased vehicular traffic, noise and manpower.

A summary chart comparing project duration under seasonal drilling and year round continuous scenarios is presented below. A detailed analysis of the differences in terms of rig moves, truck hauling and overall duration to complete the project is presented in Attachment 1. A summary is presented below in **Table 1**.

Table 1: Continuous versus Seasonal Drilling Comparison

Time Required to Drill 120 Wells Using Continuous vs. Seasonal Drilling						
Seasonal drilling	No. of Wellpads	Acres of Pad Disturbance	No. of Years	No. of Rig Moves	Rig Move Days	Rig Move Truckloads
1 rig	2	24	18	36	396	3,600
2 rigs	4	48	9	36	396	3,600
3 rigs	6	72	6	36	396	3,600
Year-Round and Continuous Activity						
1 rig	1	12	11	7	77	700
2 rigs	2	24	6	8	88	800
3 rigs	3	36	4	9	99	900

Therefore, this alternative was considered but not carried forward for detailed analysis.

Alternative 3. Through Access Road: New and upgraded road construction and use was initially proposed between the PCU 197-35A and PCU 197-35B wellpads which would have resulted in a continuous network of road between the existing PCU 297-6A wellpad (SE4, SW4, Section 6, T2S, R96W) and Rio Blanco County Road 5 (SE4, NW4, Section 28, T1S, R97W). This road segment between the -35A and -35B would have mostly paralleled the proposed multiple pipeline gathering system corridor. The continuous road network would have provided access to all North Hatch Gulch Project facilities from the west (CR 5) and from the east (CR 76).

The alternative road segment that would have resulted in a continuous road network from east to west was eliminated from consideration and analysis to prevent harm to the environment that would likely result from increased use and traffic by oil and gas industry vehicles and by the public. The increased traffic would likely result in increased dust, entrainment, distribution, and deposition, that would affect air quality and general use experience of the area by the public, and could adversely affect the nearby special status plants and plant habitat especially during the flowering period due to dust deposition. This road network between CR 5 and CR 76 would likely become a main thoroughfare for industry and public access. Therefore, this alternative was considered but not carried forward for detailed analysis.

Alternative 4. Alternate Utility Corridor Alignment: The proposed gathering pipeline system corridor was initially proposed to follow a route that crossed areas of steep slopes and other areas of old growth pinyon-juniper trees. During on-site inspections of the proposed pipeline system ROW, the alignments of corridor segments were altered to avoid construction on steep, fragile slopes and to avoid or minimize damage or loss of old growth trees as part of the Proposed Action. Therefore, this alternative was considered but not carried forward for detailed analysis.

Alternative 5. Alternate Road Alignment: The proposed alignment of new and upgraded road ROW initially traversed excessively steep grades and fragile soils. Engineering review and on-site inspections identified the segments of excessively steep grade/fragile soils and the proposed road alignment was altered to reduce grade to acceptable levels and to avoid fragile soils as part of the Proposed Action. Therefore, this alternative was considered but not carried forward for detailed analysis.

Alternative 6. Alternate Temporary Use Areas: Temporary Use Areas (TUAs) or work areas were initially proposed for location on previously undisturbed BLM-administered lands. To minimize overall disturbance to result from the project, the two TUAs were moved to be located on future wellpad locations (PCU 197-35A and FRU 197-28B) as part of the Proposed Action. Therefore, this alternative was considered but not carried forward for detailed analysis.

PLAN CONFORMANCE REVIEW: The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Name of Plan: White River Record of Decision and Approved Resource Management Plan (ROD/RMP).

Date Approved: July 1, 1997

Decision Number/Page: Page 2-5 and Page 2-49

Decision Language: "Make federal oil and gas resources available for leasing and development in a manner that provides reasonable protection for other resource values." And "To make public lands available for the siting of public and private facilities through the issuance of applicable land use authorizations, in a manner that provides for reasonable protection of other resource values."

Additional decisions and standards to which the Proposed Action conforms include:

Bureau of Land Management (BLM). 2007. Finding of No Significant Impact and Decision Record - Piceance Development Project. EA# CO-110-2005-219-EA. White River Field Office, Meeker, Colorado.

Bureau of Land Management (BLM) and U.S. Forest Service (USFS). 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book), Fourth Edition, U.S. Bureau of Land Management, Denver, Colorado.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Standards for Public Land Health: In January 1997, the Colorado BLM approved the Standards for Public Land Health. These standards cover upland soils, riparian systems, plant and animal communities, special status species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. Because a standard exists for these five categories, a finding must be made for each of them in an EA.

Cumulative Effects Analysis Assumptions: Cumulative impacts are those impacts on the environment which result from the incremental impact of the Proposed Action or an alternative when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

The contribution to an action from incremental impacts may vary depending upon resource. Air quality effects, for example, may result from distant air pollutant contributions because of the mobile nature of the resource. This document tiers to the cumulative impacts analysis done for the PDP EA. In that document, the cumulative impacts analysis area was chosen to be the White River Resource Area (WRRRA) since all of that project was located within the borders of the resource area and the effects of distant projects would generally not be detectable within the project area.

As indicated in the PDP EA, the primary human influences on the project area are oil and gas development, nahcolite mining, the potential for oil shale development, and livestock grazing. Livestock grazing land use has remained fairly constant in recent years and large increases in grazing usage of public lands are not anticipated. As indicated in the Geology section of this EA, the mining of nahcolite has been scaled back in the WRRRA with the closure of the American Soda solution mine northwest of the project area. The Natural Soda facility is adding additional capacity however the additional capacity remains below American Soda's previous annual production. There are no new proposals for additional mines.

The WRRRA includes what are estimated to be the largest deposits of oil shale in North America (Johnson, R.C., *et al* 2010). The PDP EA included analysis of cumulative impacts associated with five oil shale research, development, and demonstration tracts issued during Round 1 leasing in 2007, and determined that development of these leases would result in approximately 616 acres of surface disturbance (BLM 2006, BLM 2006a, BLM 2006b). Subsequently, in 2010, two additional tracts were nominated for leasing within the resource area during the Round 2 leasing phase. According to the submitted Plans of Operations, initial development of these tracts would result in up to an additional 58 acres of surface disturbance. An EA to disclose impacts associated with the leasing decision is in progress and the decision to issue the leases has not been made.

Cumulative impacts from oil and gas development within the WRRRA were disclosed in the 1997 RMP (BLM 1997). A Reasonably Foreseeable Development scenario (RFD) compiled for the EIS supporting the RMP projected that total surface disturbance associated with federal oil and gas development over the succeeding 20 years would approximate 11,540 acres. Because of increased oil and gas activity in the WRRRA in recent years, a plan amendment to the RMP is currently in progress and the resource area RFD will be updated. As part of the amendment process, federal oil and gas development surface disturbance since the approval of the RMP (July 1, 1997) through August 15, 2010 was estimated to be 8,596 acres. This estimate has been updated for current and foreseeable disturbance for this EA through June 2011. Total federal current and foreseeable disturbance is approximately 8,860 acres.

Estimates for the update were generated using well data stored in BLM’s Automated Fluid Minerals Support System (AFMSS), WRFO’s digital GIS data, and approved Environmental Assessments (EAs). A summary of these estimates is included in Table 4 below.

Table 4. Current and foreseeable federal oil and gas development in the WRFO.

Federal Oil & Gas Surface Disturbance 7/1/1997-8/15/2010¹	Acres
Estimated wellpad surface disturbance	5,648
Estimated pipeline ROW 2004 - 8/15/2010	3,142
Estimated federal surface facility disturbance	156
Estimated federal oil & gas disturbance	8,946
Estimated reclaimed P&A wells	-350
NET OIL & GAS SURFACE DISTURBANCE	8,596
1997 RMP OIL & GAS FORESEEABLE DISTURBANCE (RFD)	11,540
WRFO NET REMAINING RFD ACREAGE 8/15/2010	2,944
Average Surface Disturbance per Federal Well¹	Count
Federal wells drilled 7/1/1997 - 8/15/2010	1,091
Federal wellpads constructed 7/1/1997 - 8/15/2010	717
Federal Oil & Gas Surface Disturbance 8/15/10-6/27/11	
Estimated WRFO Wells Permitted 8/15/2010 - 6/27/2011 ²	WRFO
Total Spudded Wells (includes Federal, fee and split-estate wells) ³	176
Number of Well Pads ⁴	37
	Acres

Estimated WRFO Federal Surface Disturbance 8/15/2010 - 12/31/2011 ⁴	264
Federal Oil & Gas Surface Disturbance 7/1/97-12/31/2011	8,860

¹ Estimate made by WRFO in support of RMP Amendment process

² Estimates based on COGCC issued permits, prorated by percent current county producing wells in WRRRA

³ Data for this estimates applies to wells that were drilled from 8/15/2010 – 12/31/2011

⁴ Includes 14 existing well pads and 23 new well pads (source: AFMSS, WRFO’s GIS data, approved EA’s).

This estimate, based on COGCC data is considered conservative because state permits are typically easier to obtain and are considerably less expensive than federal permit applications. In addition, historically, a sizable fraction of the issued permits will not be drilled for various reasons. Addition of 191 acres of NHGP federal surface disturbance to the 8,860 acres of existing and foreseeable oil and gas disturbance within the WRRRA would still be within the cumulative impacts analysis supporting the RFD projection of 11,540 acres.

The Proposed Action is a subset of the PDP EA Proposed Action. The PDP Proposed Action total initial surface disturbance was estimated to be 1,637 acres. As of July 2011, XTO records indicate that approximately 867 acres of initial surface disturbance has occurred in conjunction with prior and current development of the PDP project. Approximately 441 acres have been recontoured and re-seeded and are in the process of interim reclamation. Addition of 193 acres of disturbance from implementation of the NHGP Proposed Action would be within the 1,637 acres of project disturbance analyzed for the PDP EA and the current project would be within the cumulative impacts analysis supporting the PDP EA.

Affected Resources:

The Council on Environmental Quality (CEQ) Regulations state that NEPA documents “must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail” (40 CFR 1500.1(b)). While many issues may arise during scoping, not all of the issues raised warrant analysis in an Environmental assessment (EA). Issues will be analyzed if: 1) an analysis of the issue is necessary to make a reasoned choice between alternatives, or 2) if the issue is associated with a significant direct, indirect, or cumulative impact, or where analysis is necessary to determine the significance of the impacts. Table 5 lists the resources considered and the determination as to whether they require additional analysis.

Table 5. Resources and Determination of Need for Further Analysis

Determination ¹	Resource	Rationale for Determination
Physical Resources		
PI	Air Quality	Short-term construction operations and long-term production operations will result in emissions of various oil and gas development pollutants.
PI	Geology and Minerals	The proposed project is located within an area where there may be conflict with other mineral resources.

Determination¹	Resource	Rationale for Determination
PI	Soil Resources*	Surface disturbance associated with construction of wellpads, roads, and pipeline trenches will result in disturbance of local soils. Construction and reclamation practices that minimize disturbance to soils and maximize reclamation potential will be analyzed.
PI	Surface and Ground Water Quality*	Surface disturbance has the potential to result in increased sediment loads to local drainages. Drilling and production operations may result in spills affecting surface and ground water. Improper casing cement jobs and fracturing operations have the potential to affect ground water.
Biological Resources		
NI	Wetlands and Riparian Zones*	No systems directly affected.
PI	Vegetation*	Vegetation will be disturbed as a result of construction activities.
PI	Invasive, Non-native Species	Ground disturbing activities along with increased vehicle traffic may provide opportunity for establishment of Invasive, Non-native species.
PI	Special Status Animal Species*	Need to address depletion impacts as integral with BLM's Programmatic Fluid Mineral BA for Colorado River fishes. Address bats, goshawk in terms of mature woodlands subject to removal, modified stand configuration, or proximity of disturbance capable of compromising habitat utility (relative context of extent, duration, etc). Consider potential for offsite effects on T/E and sensitive fish (e.g., entrainment when pulling water from channels).
PI	Special Status Plant Species*	There are no known special status plants within 600m of the proposed project area. The area was thoroughly surveyed during the 2010 blooming season to ensure that no threatened plant populations are affected. In the survey, suitable habitat was identified within 20 m of the Proposed Action. To encourage recovery of communities supporting and surrounding special status plant species, use the recommended seed mixes using native species in Appendix C according to range site description for all reclamation activities. It is also encouraged to use all forbs recommended in the mixes.
PI	Migratory Birds	Disclosure of acreage by community removed/modified as nest habitat, including projected numbers of BOCC involved. Whether here or not, effects on woodland raptor nest features, nest habitat integrity, and prey base discussed in context of applied mitigation (interim reclamation, TL and 1/8 mile avoidance) and somewhat integral with Special Status animal section).
NI	Aquatic Wildlife*	Same as riparian, as long as there are no suspected offsite influences. Discussion regarding endangered Colorado River fishes is directly applicable to non-special status fish species.

Determination¹	Resource	Rationale for Determination
PI	Terrestrial Wildlife*	Primarily accounting of relative habitat involvement and behavioral effects; important to develop argument/rationale for blanket exception of established timing limitations for big game severe winter range via WMP. Should also integrate discussion and effects of veg treatments (including enhanced seed mixes and interim reclamation practices) that are being proposed (or applied as COAs) to offset big game influences (including other wildlife groups). Consider influences of vehicular access situation through production phase and how these may influence the efficacy of big game mitigation in the longer term.
NI	Wild Horses	The proposed project is situated approximately five miles from its nearest point to the 190,130 acre Piceance-East Douglas Herd Management Area (HMA). Although several wild horses were observed during one of the three onsite for the North Hatch Gulch Project, no adverse impacts to these individuals or others that may be present in the vicinity of the proposed project are anticipated as they can move away from human activity as needed to adjacent habitat. The distance to the HMA from the proposed project precludes adverse impacts to the wild horses and habitat in the HMA. Note: The permittee for this allotment may also graze up to 5 head of horses on the allotment therefore some of the horses seen in the area may actually be domestics.
Heritage Resources and the Human Environment		
NI	Cultural Resources	An archaeological inventory report for the North Hatch Gulch project has been completed (Stahl 2010 compliance dated 10/15/2010), reviewed, and accepted. There are no NRHP eligible or listed resources in the project area.
PI	Paleontological Resources	The project is located in an area classified by the BLM.WRFO as a PFYC 5 area
NP	Native American Religious Concerns	Requests for tribal consultation will be mailed to tribes with a prior noted interested in this area during August. Tribes will have 30 days from receipt of the letters to respond with comments. Though archaeological data suggest the project area was not heavily occupied by historic Native American groups and no Native American Religious Concerns are known in the area, the final determination of this category (NP) may change according to the tribal authorities' responses during consultation.
PI	Visual Resources	The view to the casual observer driving RBC 5 and 24 will be able to see the linear disturbance of the pipeline and the derricks of the oil rigs plus the contrast in the disturbed soil to the surrounding vegetation.
PI	Hazardous or Solid Wastes	Project implementation could result in the generation of hazardous and solid wastes

Determination¹	Resource	Rationale for Determination
PI	Fire Management	Woodland areas disturbed will generally create excessive dead and down woody material that needs to be addressed, especially in materials that are left for reclamation. Same mitigations as Forestry will suffice the Fire Management portion.
PI	Social and Economic Conditions	The proposed project could have some effect on socio-economic conditions for those residing in the vicinity of the project in terms of income and available services, both private and government, and would increase tax contribution to federal, state, and county governments.
NP	Environmental Justice	According to the most recent Census Bureau statistics (2010), there are no minority or low income populations within the WRFO.
Resource Uses		
PI	Forest Management	Mature and old growth concerns have been discussed at onsite. But avoid as much as possible. Mechanical mastication of the woodlands is not the preferred method. The WRFO would prefer that the trees are cut with a maximum 6 inch stump height and stockpiled at the edge of the disturbed area. Material not required for the 20-30 percent surface cover for reclamation needs to be removed from the site. Wood chips can be stockpiled and used to incorporate into the top 10 inches of the topsoil.
PI	Rangeland Management	Livestock forage, rangeland improvement projects and livestock may be impacted by the Proposed Action.
PI	Floodplains, Hydrology, and Water Rights	Increased sedimentation associated with construction and the potential for spills during drilling and production operations, as well as withdrawal of surface or ground water have the potential to impact local floodplains and existing water rights.
PI	Realty Authorizations	The pipeline system will require separate, permanent ROWs and TEWAs. The SF299 also includes the west end of the access road and the pigging station. There are existing facilities, primarily at the west end of the route. XOM would need to coordinate with the landowners and facilities, including RBC.
PI	Recreation	Construction activities may impact dispersed recreation activities like hunting and camping.
PI	Access and Transportation	Increase in infrastructure may increase unauthorized use of ROW for recreational OHV activities and access to the top of Magnolia Bench. Increase traffic on roads that were not designed for such use and entering RBC 5 from the access road needs to be analyzed.
NP	Prime and Unique Farmlands	There are no Prime and Unique Farmlands within the project area.
Special Designations		
NP	Areas of Critical Environmental Concern	There are no Areas of Critical Environmental Concern in the vicinity of the proposed project.

Determination ¹	Resource	Rationale for Determination
NP	Wilderness	There are no Wilderness areas in the vicinity of the proposed project.
NP	Wild and Scenic Rivers	There are no Wild and Scenic Rivers in the WRFO.
NP	Scenic Byways	There are no Scenic Byways within the project area.

¹ NP = Not present in the area impacted by the Proposed Action or Alternatives. NI = Present, but not affected to a degree that detailed analysis is required. PI = Present with potential for impact analyzed in detail in the EA.

* Public Land Health Standard

Effects to environmental resources or values resulting from implementation of the Proposed Action may be either beneficial (positive) or detrimental (negative) and may vary in duration from short-term, typically less than three years, to long-term which would encompass project life and may be permanent in the absence of successful restoration or reclamation. Effects anticipated for this project are likely to be negligible (little or no effect to the resource), low (effects are difficult to detect and cause minimal change to the resource), and moderate (effects which are readily apparent but which do not meet the criteria of significant impacts). Effects may be either direct, occurring at the same time and place as the Proposed Action, or indirect, occurring at another time or location.

AIR QUALITY AND CLIMATE

Affected Environment: The project area is situated in western Colorado, in an area of rugged topography which can result in large climate variations over short distances. Elevations within the project area range from approximately 6,100 feet in the northwest in the valley of Piceance Creek to approximately 7,350 feet in the southeastern portion of the proposed access road. The most representative climatic data for the area were obtained during 1948-1991 from the Little Hills Oil Shale site, located approximately six miles northeast of the center of the project area at an elevation of 6,140 feet. A summary of climate data from this station is indicated in Table 6.

Table 6. Project area climatic summary.

Reading	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	37.1	41.8	47.9	58.2	68.2	78.8	85.8	83.3	76.2	64.0	48.5	39.1	60.8
Average Min. Temperature (F)	3.4	8.2	16.8	24.1	31.6	38.1	45.0	43.6	33.9	23.8	14.5	5.8	24.1
Average Total Precipitation (in.)	0.74	0.78	1.23	1.45	1.36	1.14	1.25	1.60	1.14	1.29	0.99	0.94	13.91
Average Total Snowfall (in.)	11.1	9.1	11.2	5.1	1.0	0.1	0.0	0.0	0.1	2.3	6.4	10.4	56.8
Average Snow Depth (in.)	7	6	2	0	0	0	0	0	0	0	1	3	2

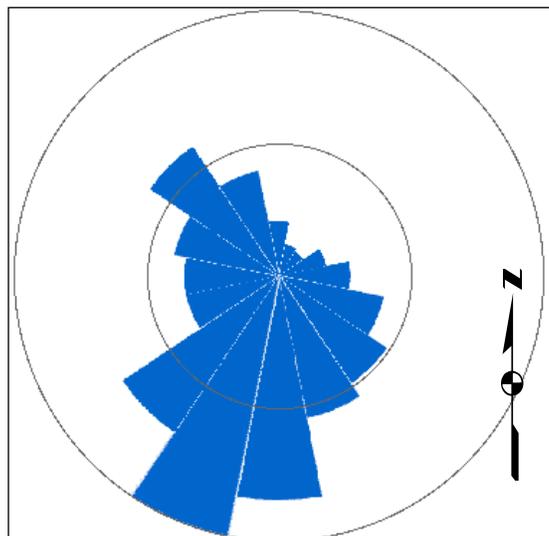
Percent of possible observations for period of record (1948-1991).

Max. Temp.: 94.4 percent Min. Temp.: 95.4 percent Precipitation: 97 percent Snowfall: 92.8 percent Snow Depth: 85.8 percent

Source: WRCC 2010.

Wind data most representative of the vicinity of the project area were obtained at the Cathedral Bluffs oil shale site in 1984, located approximately 10 miles to the south. Measured wind speeds in the area were generally low to moderate, 12 mph or less approximately 94 percent of the time. Wind directions were dominantly from the southwest (Figure 7) (BLM 2007).

Figure 7. Wind Directions Frequency Plot, Cathedral Bluffs Oil Shale Site, 1984



The National Ambient Air Quality Standards (NAAQS) are maximum levels for certain pollutants set by EPA based on health criteria ("criteria pollutants") under terms of the Clean Air Act (40 CFR Part 50). Colorado has developed its own set of standards (CAAQS), which generally equate to the NAAQS. In addition, the Clean Air Act mandates limitations on certain

emissions above established baseline levels under the Prevention of Significant Deterioration (PSD) program. PSD Class I areas, defined by the Clean Air Act, have lower increments than that permitted in Class II areas. A summary of the NAAQS and CAAQS standards, PDS increments, and estimated ambient background levels for criteria pollutants in the vicinity of the project area is indicated in Table 7.

Table 7. Criteria Pollutant Standards, PDS Increments, and Ambient Air Quality

Pollutant	National and Colorado Ambient Air Quality Standards (NAAQS ¹ and CAAQS ²)		PSD Increment ³ (µg/m ³)		Estimated Background Concentrations from Monitor Data ⁴
	Concentration	Averaging Time	Class I	Class II	
Carbon Monoxide (CO)	9,000 ppb 10,000 µg/m ³	8-hour	n/a	n/a	1 ppm ^{4d}
	35,000 ppb 40,000 µg/m ³	1-hour	n/a	n/a	1 ppm ^{4d}
Lead (Pb)	0.15 µg/m ³	Rolling 3-month Average	n/a	n/a	
	1.5 µg/m ³	Quarterly Average	n/a	n/a	
Nitrogen Dioxide (NO ₂)	53 ppb	Annual	2.5	25	3 ppb
	100 ppb	1-hour	n/a	n/a	43 ppb ^{4a}
Particulate Matter (PM ₁₀) ⁵	150 µg/m ³	24-hour	8 µg/m ³	30 µg/m ³	11 µg/m ^{4a}
Particulate Matter (PM _{2.5}) ⁶	15.0 µg/m ³	Annual	n/a	n/a	4 µg/m ^{4a}
	35 µg/m ³	24-hour	n/a	n/a	
Ozone (O ₃)	75 ppb	8-hour	n/a	n/a	67 ppb ⁷
	120 ppb	1-hour	n/a	n/a	72 ppb ⁷
Sulfur Dioxide (SO ₂)	30 ppb	Annual	2	20	2 ppb ^{4b}
	140 ppb	24-hour	5	91	5 ppb ^{4b}
	700 µg/m ³	3-hour	25	512	9 ppb ^{4b}
	75 ppb	1-hour	n/a	n/a	12 ppb ^{4c}

Source: EPA 2010a

¹ EPA NAAQS <http://www.epa.gov/air/criteria.html>

² CAAQS from Colorado Air Quality Control Commission Report to the Public 2009-2010

³ 40 CFR 51.166

⁴ CDPHE - Chick 2010. NO₂ & SO₂ 1-hr levels represent highest hourly concentrations.

^{4a} Greasewood Hub, 2009-2010

^{4b} Unocal Oil Shale Project, 1983-1984

^{4c} Holcim Portland Cement, 2005-2006

^{4d} American Soda Plant Parachute 2003-2005

⁵ Particulate matter less than 10 microns in effective diameter

⁶ Particulate matter less than 2.5 microns in effective diameter

⁷ 2007-2008 Dinosaur National Monument 4th max values

The project area is roughly centered in the combined areas of Rio Blanco and Garfield counties, located within the Colorado Air Quality Control Commission's nine-county Western Slope Region. Principal air pollution sources include emissions from motor vehicles, oil and gas development, coal-fired power plants, coal mines, sand and gravel operations, windblown dust, and wildfires and prescribed burns (CAQCC 2010). Facility emissions in the two-county area are dominated by emissions related to oil and gas exploration, processing, or transportation. Total 2002 facility criteria pollutant emissions within the two-county area :

CO	NH ₃	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOCs
4,652	0.00	6,146	538	324	19	6,874

Rio Blanco - Garfield counties 2002 emissions in tons per year (EPA 2010)

VOCs: total volatile organic compounds, NO_x: nitrogen oxides

Areas which are in compliance with the NAAQS are termed "attainment" areas, and all of western Colorado is currently considered an attainment area. Pollutants of principal concern are particulates and ozone, although monitoring data are sparse. BLM established two Federal reference air quality monitors in 2010 in Rio Blanco County to measure ozone and particulates among other air quality parameters one located near Meeker and the other near Rangely. There are nine particulate monitors in the two-county area located along the I-70 corridor with a longer period of record. Air quality index trends from these monitors suggest that ambient particulate levels have been increasing in the 2000s. EPA has estimated that, under continuous monitoring, the Rifle and New Castle areas would have experienced 3-4 days of PM₁₀ 24-hour standard exceedances in 2007 and 2008. The average value of Air Quality Index (AQI) 90th percentile PM₁₀ levels for 2005-2008 in the two-county area was 48.75, within the upper values of the "good" category (EPA 2010).

Ozone pollution has become an increasing concern in oil and gas development areas. Ozone is formed by photochemical reactions among various nitrogen oxides (NO_x) and volatile organic compounds (VOCs), both of which may be produced from oil and gas exploration and production operations, as well as from other sources. Ozone data have been obtained at Colorado National Monument in Mesa County since 2007 and monitors were established in Palisade (Mesa County) and Rifle, in the two-county area, in 2008. No full-year data for the latter two monitors are available from the EPA AirData website. There were no exceedances of the NAAQS standard at the Colorado National Monument monitor in 2007-2008, and partial year 2008 results from the Palisade and Rifle monitors also met the 1-hour and 8-hour standards (EPA 2010, CAPCD 2009). Full-year raw monitor data from the Rifle monitor for 2009 and for an EnCana monitor located along Colorado Highway 13 about 16 miles east-southeast of the project area for 2008 and 2009 indicated attainment of the ozone standard. For both monitors, highest 2008 data were higher than highest 2009 values (Volante 2010).

High levels of wintertime ozone in the upper Green River Basin in Wyoming and the Uinta Basin in northeast Utah have been measured the last few years. Although the phenomenon of wintertime ground level ozone formation is poorly understood, there have been concerns that ozone formation precursors arising from oil and gas development could be responsible (Streater 2011). The BLM air quality monitors in Rangely and Meeker measured ozone concentrations over the 2010-2011 winter. The Meeker monitor did not record exceedances of either the 1-hour or 8-hour NAAQS standards, although levels up to 80 and 73 ppb, respectively were noted. In

Rangely, the 1-hour standard was not exceeded (maximum value of 96 ppb), the 8-hour limit was exceeded (maximum level of 88 ppb) during three days in February 2011. The monitors provided data to the Gaseous Pollutant Monitoring Program managed by the National Park Service (NPS 2011) and the EPA.

With respect to PSD, all of the project area and its vicinity are considered Class II. The nearest Class I area is the Flat Tops Wilderness, located approximately 40 miles to the east, and there are a number of other wilderness areas and national parks and monuments located within 100 miles. Dinosaur National Monument (about 35 miles to the northwest) and Colorado National Monument (about 50 miles to the southwest) are Class II areas which are regulated by CDPHE as Class I with respect to SO₂. Project emissions could potentially affect these areas. The PSD Class I and II increments (Table 7) are evaluated to determine levels of concern and do not represent a PSD increment consumption analysis which would be required under air permitting regulations.

In addition to incremental increases in criteria pollutant emissions, the PSD program monitors changes in air quality-related values (AQRV), including impacts to visibility and regional haze and reductions in the acid neutralizing capacity of sensitive receptors. Visibility monitoring is performed by the Interagency Monitoring of Protected Visual Environments (IMPROVE) Program. The closest IMPROVE monitor is located near the Flat Tops Wilderness area, other IMPROVE monitors near the project area are in the PSD Class I Mt. Zirkel and Maroon Bells-Snowmass wilderness areas, approximately 100 miles northeast and 90 miles southeast, respectively. Visibility in the Rocky Mountains and Colorado Plateau, including the project area, is generally considered to be very good, with an estimated standard median visual range of more than 150 km (Trijonis *et al* 1990).

The transfer of air pollutants to terrestrial or aquatic surfaces comprises atmospheric deposition, reported as the rate of mass deposited per given area (kg/ha/year). Pollutants are removed by both wet (precipitation) and dry (gravitational settling and surface adherence of gaseous pollutants) depositional processes. The deposition of acids, such as sulfuric acid (H₂SO₄) and nitric acid (HNO₃) is of particular concern. Acid deposition occurs when SO₂ and NO_x emissions are transformed in the atmosphere and returned to the surface. Wet deposition is monitored by the cooperative National Atmospheric Deposition Program (NADAP). The closest NADAP monitors to the project area were operating at Ripple Creek Pass in the Flat Tops Wilderness, approximately 55 miles to the northeast of the project area at 9,600 feet elevation and approximately the same distance to the north at Pine Ridge in Moffat County, at an elevation of 6,550 feet. The latter is considered more representative of the project area. Nitrate deposition at Pine Ridge was generally consistent from 1979-2009 at around 3 kg/ha/yr. Sulfate deposition has shown a sharp decrease from nearly 6 kg/ha/yr in 1979 to around 2 kg/ha/yr in 2009 (NADP 2010). The NADAP monitor at Ripple Creek Pass is no longer maintained.

Dry deposition is monitored by the EPA's Clean Air Status and Trends Network (CASTNET). The nearest monitor is located approximately 95 miles to the southeast at 9,600 feet elevation. Because of the topographic difference and distance from the Project, data from the station are not considered representative of the project area (CASTNET 2010).

Certain atmospheric components including water vapor, carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄) have the ability to act as "greenhouse gases" (GHGs) by absorbing

incident solar radiation reflected from the ground and increasing ambient air temperature. Water vapor is the most important greenhouse gas (GHG). Anthropogenic deforestation and industrial processes in the last 200 years have increased emissions of GHGs, particularly CO₂, such that the atmospheric concentration of CO₂ has increased by 35 percent in the last 150 years to approximately 379 parts per million (ppm). Observed average temperature increases in various parts of the world have been contemporaneous with increased GHG concentrations in the atmosphere. Governmental initiatives to control GHG emissions have resulted from this observed trend and from future projections of this trend continuing as indicated by certain computer climate projection models (IPCC, 2007). In the U.S., the primary source of anthropogenic greenhouse gas emission is fossil fuel combustion. Fossil fuels are responsible for supplying approximately 85 percent of U.S. primary energy needs and approximately 98 percent of estimated anthropogenic CO₂ emissions (EIA, 2008).

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: The Proposed Action represents a subset of the Proposed Action analyzed in the Applicant's PDP EA (BLM 2007), which included the drilling of 1,080 wells from 120 well pads, plus installation of associated centralized production facilities. Because the Proposed Action increases the well density to 20 wells per pad from the 9 wells contemplated in the PDP EA, the Proposed Action components represent variously 3 percent to 11 percent of the PDP's analyzed components. The analysis of air quality impacts from the Proposed Action tiers to the analysis done for the PDP project.

Emission of air pollutants would occur from construction of well pads, access roads, and pipelines, from drilling and completion operations, and from long-term production. Coarse (PM₁₀) and fine (PM_{2.5}) fugitive particulate emissions would be associated with construction operations and long-term travel on unpaved roads. Construction particulate emissions would be controlled using water and/or chemical suppressants to achieve a control efficiency of at least 50 percent. Construction, drilling, and completion heavy equipment engines would result in emissions of particulates, NO_x, CO, SO₂, and VOCs. Long-term production phase emissions from the central processing facilities and tank batteries would include NO_x, CO, SO₂, VOCs and particulates, as well as certain hazardous air pollutants (HAPs) commonly associated with oil and gas production (benzene, toluene, ethylbenzene, xylene, and n-hexane). Emissions resulting from project construction are indicated in Table 8.

Table 8. Proposed Action Construction Emission Estimates (tons)

Pollutant	CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
Excavation Particulates						
Wellpad Construction	-	-	-	-	8.94	2.36
Road Construction	-	-	-	-	1.79	0.47
Pipeline Construction	-	-	-	-	16.30	4.30
Heavy Equipment Emissions						
Wellpad Construction	5.80	10.63	0.29	2.20	0.33	-
Road Construction	1.71	3.13	0.08	0.65	0.10	-
Pipeline Construction	6.08	10.61	0.28	2.19	0.35	-
Total Construction	13.59	24.38	0.66	5.04	27.81	7.13

Source: EPA AP-42 calculations. Calculations assume 50 percent dust control efficiency.

Annual project emissions resulting from drilling and production activities are indicated in Table 9.

Table 9. Annual Drilling and Production Air Emission Estimates (tons/year)

Pollutant	NOx	CO	SO2	PM10	PM2.5	VOC	HAPs
Production Operations							
Central Treatment Facility							
Thermal Oxidizer	1.77	4.30	0.00	0.37	0.36	1.43	1.07
Flare	0.17	0.92	0.00	0.00	0.00	0.38	0.01
Heater	1.82	1.53	0.00	0.14	0.14	0.10	0.03
Compressor Seal Gas	-	-	-	-	-	0.58	0.01
Fugitives	-	-	-	-	-	2.61	0.12
Emergency Generator	1.08	0.24	0.02	0.03	0.03	0.03	-
Evaporation Pond	-	-	-	-	-	1.29	0.83
Storage Tanks	-	-	-	-	-	0.90	0.13
Total	4.83	7.00	0.02	0.54	0.53	7.32	2.20
Black Sulphur Tank Battery / Slug Catcher Area							
Tank Battery	0.09	0.51	0.00	0.00	0.00	1.92	0.17
Slug Catcher Area	0.01	0.06	0.00	0.00	0.00	0.20	0.01
Condensate Truck Loading	-	-	-	-	-	7.98	0.39
Total	0.10	0.57	0.00	0.00	0.00	10.10	0.56
Other Tank Batteries (3)	0.27	1.53	0.00	0.00	0.00	5.77	0.50
Total Estimated Annual Production Emissions	5.20	9.10	0.02	0.54	0.53	23.19	3.27
Annual Drilling and Completion Operations							
Drill Rigs (3)	149.48	86.33	6.08	4.99	4.84	9.68	-
Production and Drilling Total Annual Emissions	154.67	95.42	6.10	5.53	5.37	32.86	3.27

Source: BLM 2007 AP-42 calculations with pollutants apportioned for 120 wells and maximum 3 Tier II drilling rigs

In addition to the emissions indicated in Table 9, rig moves (3-rig scenario) over unpaved surfaces would result in an additional 6.07 tons of PM₁₀ and 0.93 ton of PM_{2.5} particulate emissions over the life of the project.

Air quality impacts resulting from oil and gas development can be estimated using air modeling techniques. On June 23, 2011, the Department of Interior, Department of Agriculture, and EPA signed a Memorandum of Understanding (MOU) regarding the methodology to use for analyzing impacts to air quality and AQRVs during NEPA evaluations of federal oil and gas development projects. The memorandum indicates those instances in which air modeling should be used during NEPA analysis and which models are recommended for a given project.

Under terms of the MOU, air modeling is required for EIS level NEPA analyses and should be "considered" by the Lead Agency for EA level analyses, and is recommended under specific circumstances. Since this is not an EIS-level NEPA analysis air quality modeling was not initiated by BLM as the lead agency. The MOU recommends an inventory where modeling is not required. Based on previous NEPA for the PDP EA, this project was considered within the inventory for the PDP to determine expected impacts (Table 9).

The NHGP Proposed Action is a subset of the PDP Proposed Action which was approved by WRFO in April 2007 through the PDP EA (CO-110-2005-219-EA) Decision Record and FONSI, to which this document tiers. An emissions inventory was prepared for the PDP project which covered the wells and production facilities associated with the NHGP Proposed Action. The foreseeable numbers of wells and associated facilities were known and their locations specifically or generally determined within the PDP project area. Air quality modeling of PM₁₀, PM_{2.5}, NO_x, CO, SO₂, and typical oil and gas-related HAPs emissions was conducted using AERMOD software. That analysis has been used to assess impacts to air quality and AQRVs for the current Proposed Action.

Modeled impacts indicated that NAAQS and CAAQS standards would not be violated by the full PDP project development and modeled concentrations were below applicable PSD Class II increments. Air modeling was used to predict maximum impacts from PM₁₀, PM_{2.5}, NO₂, and SO₂ at the PSD Class I Flat Tops Wilderness and at Dinosaur National Monument (Class II, but regulated by CDPHE as Class I for SO₂). Modeled concentrations were well below PSD Class I increments at both areas. Nitrogen and sulfur total deposition and changes to acid neutralizing capacity for three lakes in the Flat Tops Wilderness were calculated to be below significance thresholds, and maximum visibility impacts to the wilderness area were calculated to be 0.97 dv, or just barely noticeable. Finally, modeling for maximum concentrations of various oil production-related HAPs at the nearest human residence indicated emissions below threshold levels (BLM 2007).

Direct scaling of modeling results to different numbers of emitters and emissions outputs is not reliable. However, as the Proposed Action represents 11 percent of the wells, 5 percent of the well pads, and 37 percent of the maximum concurrently operating rigs modeled for the PDP EA, it seems apparent that the maximum North Hatch Gulch project emissions would be less than the concentrations modeled for the PDP analysis and therefore within applicable regulatory standards.

Greenhouse gas levels are a global issue. Emissions of GHGs, principally CO₂ and water vapor, from the Proposed Action would largely be attributable to the drilling rig diesel engines. These emissions would contribute an infinitesimal increment to global ambient levels.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under the No Action Alternative, no project-related emissions would occur and there would be no project related impacts to air quality and AQRVs. However, the project area is located within the area of the previously approved PDP project and it is very likely that oil and gas development would continue in the area. Ongoing impacts to air quality would be comparable to those analyzed in the PDP EA.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional mitigations protective of air quality resources and climate are not required.

GEOLOGY AND MINERALS

Affected Environment: General Geology - The project area is located within the northeastern portion of the Uinta-Piceance Petroleum Province, comprised of the Uinta and Piceance basins, east-west trending features of Laramide (late Cretaceous-early Tertiary) age, subdivided by the north-south trending Douglas Creek Arch. The Piceance Basin is bounded on the north and east by the Axial Basin Uplift and Grand Hogback, by the Gunnison and Uncompahgre uplifts on the south, and by the Douglas Creek Arch on the west. The basin is asymmetrical, roughly 90 by 135 miles in extent, with an area of approximately 12,500 sq. miles. In the deepest portion, in the vicinity of the project area, the Phanerozoic sedimentary section exceeds 20,000 feet in thickness (USGS 2002).

The project area occupies a dissected upland and is located almost entirely on one of a series of northwesterly-trending ridges separated by adjacent intermittent drainages, with plateau slope to the northwest towards Piceance Creek. Ridges typically stand 200-300 feet above the flanking drainages. Elevations in the project area range from almost 7,400 feet in the southeast to around 6,280 feet in the northwest where the proposed pipeline would cross Hatch Gulch. In the vicinity of the project area, surface bedrock consists of stratigraphically complex intertonguing members of the Middle Eocene lower Uinta and upper Green River formations. The Uinta Formation is mainly composed of brownish sandstones with some subsidiary siltstones and marlstones deposited in fluvial environments, which gradually infilled the older Green River lacustrine environment. The Green River Formation is principally composed of light gray marlstones with subsidiary sandstones. The valleys between the ridges are floored with Quaternary (Holocene) alluvial fill with some remnant Pleistocene alluvial terrace deposits along the sides of Piceance Creek (Duncan 1976, Duncan 1976a, Hall and Smith 1994).

Mineral Resources - Mineral resources in the vicinity of the project area with the potential for near-term economic exploitation include oil and gas, oil shale, and sodium minerals. Natural gas has been produced in the area since 1940 from the Tertiary Wasatch Formation. Additional production has been achieved from the Douglas Creek Member of the Green River Formation and from the Cretaceous Mesaverde Formation (Wray et al. 2002). The Mesaverde gas is the principal objective of the Proposed Action. Piceance Creek Field, in which the project area is located, produced 31.5 billion cubic feet of natural gas in 2009 (COGCC 2011). Federal exploration units have been established in the area and the project area is contained within the Piceance Creek (COC 047666X) and Freedom (COC 069547X) units. Essentially all federal surface and mineral estate in the area is currently leased or held by existing production for continued oil and gas development (BLM 2010).

The Green River Formation in the Piceance Basin contains layers of heavily organic, dolomitic marlstones termed oil shale, principally located in the Parachute Creek Member of the formation. The in-place assessed resource in the basin has been estimated at 1,500 billion barrels of shale-derived oil, the world's largest known oil shale deposit. The Green River Formation contains layers identified as alternately rich and lean with respect to oil shale content, and the USGS has

estimated the total yield of eight rich layers in the project area to be approximately 2,500,000 barrels/acre (Johnson *et al* 2010). The project area is located in the areas identified as available for oil shale leasing and development in the RMP (BLM 1997, as amended by Oil Shale PEIS 2008). In the project area, the top of the oil shale-rich Mahogany zone, in the upper portion of the oil shale interval, is located at depths between about 900 and 1,200 feet below the surface. There are currently no active oil shale leases in the immediate vicinity of the project area.

The Energy Policy Act of 2005 provided for issuance of research, development, and demonstration (RD&D) oil shale leases. The RD&D leases comprise 160 acres with a preferential lease right to an additional 4,960 acres upon demonstration of the ability for commercial production. There are five issued RD&D leases located within 10-12 miles to the west and southwest of the project area. BLM announced a second round of applications for RD&D leases in November 2009. In November 2008, a Record of Decision was issued for the Programmatic Oil Shale and Tar Sands Environmental Impact Statement. This decision amended eight RMPs (including the White River RMP) to expand the area, including all of the project area, in which BLM would consider available for oil shale leasing (BLM 2008). BLM announced a second round of applications for RD&D leases in November 2009. On April 14, 2011, the BLM published a Notice of Intent in the Federal Register to prepare a new programmatic EIS which would supersede the 2008 effort.

Bedded and disseminated deposits of sodium minerals, principally nahcolite (NaHCO_3), with subsidiary amounts of dawsonite ($\text{NaAl}(\text{OH})_2\text{CO}_3$), and halite (NaCl) are present in the central portion of the Piceance Basin Green River Formation depocenter. The minerals are associated with oil shale layers in the lower and middle portion of the Parachute Creek Member. Nahcolite, a source of sodium bicarbonate, a mineral exploited for use in various industrial processes, is the only sodium mineral in the basin which is likely to be currently commercially exploitable. The nahcolite-bearing interval is mapped as being as much as 1,400-1,500 feet thick and contains about 43.5 billion short tons of reserves. While bedded nahcolite occurs, most of the mineral occurs as variable-sized aggregates within the oil shale. The project area overlies the central and southeastern portion of the nahcolite deposit and is outside of lands available for multiple mineral or sodium leasing under the White River ROD/RMP (BLM 1997).

American Soda, LLP, a division of Solvay America, Inc., initiated solution mining of nahcolite in 2000 from federal leases at a facility located two miles northwest of the project area. The process dissolved nahcolite from oil shale at depths of 1,500-2,000 feet using heated water. The target zone is in the lower portion of the Parachute Creek Member, about 700 feet below the Mahogany zone. Operations at the processing plant were discontinued in April 2004 following a failure to economically produce soda ash from the nahcolite (Hardy *et al* 2003). (Business Wire 2004). No sodium production is occurring from the associated federal leases (BLM 2010). Active nahcolite solution mining continues at the Natural Soda facility approximately 3.7 miles west of the project area. The mine produced approximately 122,000 short tons of sodium bicarbonate in 2010.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Implementation of the Proposed Action could interfere with the potential development of sodium minerals in the vicinity, as the project area is located within the area available for oil shale leasing in the White River RMP. The only current application for

consideration of leasing is located outside the disturbance proposed for project activities. While future lease application nominations could occur, much or all of the Proposed Action is likely to be constructed prior to such development.

Oil and gas drilling in the vicinity of the project area could be affected by geologic characteristics of portions of the Green River and Wasatch formations. Both units are known to contain zones prone to lost circulation, particularly the informally named Dissolution Surface and A and B Grooves within the Green River Formation Parachute Creek Member. Circulation problems in these zones can also affect the integrity of casing cement jobs. These potential problems are manageable using careful drilling techniques, appropriate mud, cement, and casing design, and performing proper post-cementing integrity evaluations according to BLM requirements.

Implementation of the Proposed Action would largely deplete the existing Mesaverde natural gas resource, which is the purpose of the project. Production of natural gas would generate revenues, some of which would be transmitted to state and local economies. Other oil and gas resources, including reserves in deeper stratigraphic units, would not be affected. Other mineral resources would not be affected by the Proposed Action.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the White River ROD/RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, natural gas production from the project area would not occur at this time. However, the project area is located within the area approved for oil and gas development by the Decision Record of the PDP EA. Future oil and gas development in the project area would, therefore, likely occur.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional mitigations protective of geology and mineral resources are not required.

SOIL RESOURCES (includes a finding on Colorado Public Lands Health Standard 1)

Affected Environment: Soils of the project area are developing on features characteristic of the Colorado Plateau in mostly in residuum of the upland plateau, bench, and butte surfaces, in colluvium of the steeper plateau surface features and the sides of canyons and valleys, and in alluvium of gulch and creek bottoms. A variety of lithologies form the exposures of the lower to middle Eocene Green River Formation and the overlying upper Eocene Uinta Formation (Hail and Smith 1994). Sandstones, claystones, marlstones, limestones, shales, and oil shales of these formations are principal parent materials. Tongues of both formations are interbedded over the extent of the project area.

Upland soils of the plateau, bench surfaces, and upper gulch canyon sides are mostly loams/sandy loams to channery loams/sandy loams with slopes ranging from 5 to 50 percent (Tripp et al. 1982) (Table 10). These soils are derived mostly from sandstones of the lower Uinta Formation. Representative soil map units include Castner channery loam, 5 to 50 percent slopes, Rentsac channery loam, 5 to 50 percent slopes, Redcreek-Rentsac complex, 5 to 30 percent slopes, Irrigul-Parchute complex, 5 to 30 percent slopes, and Parachute-Rhone loams, 5 to 30 percent slopes. These soils range in depth from shallow to deep, depending on slope, position, and parent material. Shallow soils predominate the steeper slopes and soil depth generally shifts to moderately deep and then to deep with decreasing slope across the landscape within the project area. These upland soils are mostly well drained. Potentials for accelerated water erosion range from slight to very high with increasing slope and/or decreasing coarse fragment content. Wind erosion potentials range from slight to moderate. Exposures of rock outcrop are limited in number and extent within the project area as residuum and colluvium plus areas of eolian deposits cover most of the area.

Table 10. Soil Map Units to be Affected by the Proposed Action

Soil Map Unit Number	Soil Mapping Unit Composition	Total Area (acres)	percent of Total Project Area
70	Redcreek-Rentsac complex, 5 to 30 percent slopes	102.9	53.5
73	Rentsac channery loam, 5 to 50 percent slopes	59.5	30.9
91	Torriorthents-Rock outcrop complex, 15 to 90 percent slopes	10.8	5.6
15	Castner channery loam, 5 to 50 percent slopes	7.5	3.9
64	Piceance fine sandy loam, 5 to 15 percent slopes	5.0	2.6
6	Barcus channery loam, 2 to 8 percent slopes	4.8	2.5
41	Havre loam, 0 to 4 percent slopes	1.0	0.5
104	Yamac loam, 2 to 15 percent slopes	1.0	0.5
Total		192.5	100

Source: Tripp et al. 1982

Upland soils forming in the lower slopes of the deeper, more incised drainages/gulches mostly occupy steeper slopes formed by exposures of the Green River Formation. The principal soil map unit that occupies most of the steeper slopes is Torriorthents-Rock outcrop complex, 15 to 90 percent slopes (Tripp et al. 1982). The Torriorthent soils range in depth from shallow to moderately deep and are mostly well to excessively well drained (Table 11). The soils are forming in residuum and colluvium derived from sandstones, shales, limestone, and siltstone. Potentials for accelerated water erosion range from high to very high. Wind erosion potentials are mostly low. Soils of this soil mapping unit provide the principal substrate and suitable habitat for the special status plant species that are present in the vicinity of the proposed NHGP.

The alluvial valley/gulch bottom soils are mostly loams to fine sandy loams over loam to clay loam subsoils that are deep, mostly well drained, nearly level to gently sloping (one to 5 percent slopes) (Tripp et. al. 1982). The alluvial bottoms are subject to flooding (rare) and are used for hay production (if managed for crop production) or grazing on private lands. Potentials for accelerated erosion range from slight to moderate with an increase in slope (Table 11). Wind erosion potentials are low to moderate. Where irrigated, the Havre soils meet Prime Farmland requirements.

All but Havre soils are non-saline (less than 2 mmhos/cm); Havre soils are slightly saline (less than 4 mmhos/cm). Soil salinity levels should not inhibit successful reclamation of lands and soils disturbed by the proposed NHGP.

Table 11. Key Characteristics of Soils to be Affected by the Proposed Action

Soil Mapping Unit Number	Soil Mapping Unit	Slope (%)	Physiographic Position	Parent Material ¹	Depth Class/Depth to Bedrock (inches)	Runoff Potential	Water/Wind Erosion Potential	Flooding Potential	Salinity (mmhos/cm)	Wildlife Habitat Potential ³	Land Capability Class	Ecological Site Description
6	Barcus channery loamy sand	2-8	Alluvial fans and in narrow valleys	Alluvium - calcareous ss and sh	Deep/60+	Slow	Moderate/Slight	Rare	< 2	Poor for grass habitats, fair for herbaceous and shrub habitats	IVe	Foothill Swale
15	Castner channery loam	5-50	Mountainsides : ridgetop and uplands	Residuum - ss	Shallow/10-20	Medium to rapid	Moderate to very high/	None	<2	Poor for grass, herbaceous, and shrub habitats	VIIe	Pinyon-Juniper Woodland
41	Havre loam	0-4	Flood plains and low stream terraces	Alluvium - calcareous	Deep/60+	Medium	Slight/	Rare	<4	Good for grass habitat, fair for herbaceous and shrub habitats	IIIc, non-irrigated	Foothill Swale
64	Piceance fine sandy loam	5-15	Uplands and broad ridgetops	Eolian and colluvium - ss	Moderately Deep/20-40	Slow to medium	Moderate to high/	None	<2	Poor for grass habitats, fair for herbaceous and shrub habitats	VIe	Rolling Loam
70	Redcreek-Rentsac Complex	5-30	Mountainsides and ridges	Residuum and colluvium - ss	Shallow/10-20	Medium	Moderate to high/	None	<2 (both soils)	Very poor to poor for grass habitats, fair to poor for herbaceous and shrub habitats	VIe	Pinyon-Juniper Woodland
73	Rentsac channery loam	5-50	Ridges, foothills, and sideslopes	Residuum - ss	Shallow/10-20	Rapid	Moderate to very high/	None	<2	Very poor for grass habitats, poor for herbaceous and shrub habitats	VIIe	Pinyon-Juniper Woodland
91	Torriorthenes-Rock outcrop complex ²	15-90	Ridges, and canyonsides - extremely rough and eroded	Residuum and colluvium	Very shallow to moderately deep/<10-40	Very rapid	Very high/	None	NA	Not rated	VIIe	Stony Foothills
104	Yamac loam	2-15	Rolling uplands, terraces, and fans	Eolian and alluvial materials	Deep/60+	Medium	Slight to moderate	None	<2	Fair for grass, herbaceous, and shrub habitats	IVe	Rolling Loam

¹ Parent Materials: soil materials derived from ss = sandstone and sh=shale

² Rock outcrop: consists of barren escarpments, ridgetops, and points of sandstone, shale, limestone, or siltstone

³ Rating potentials for wildlife habitat in terms of ease of establishment, improvement, or maintenance: good = wildlife habitat is easily established, improved, or maintained; fair = wildlife habitat can be established, improved, or maintained in most places; poor = limitations are severe for the establishment, improvement, or maintenance of wildlife habitat; and very poor = creating, improving, or maintaining habitat is impractical or impossible.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Potential impacts to soils from the Proposed Action include removal of vegetation, mixing of soil horizons, soil compaction, increased susceptibility to erosion, loss of topsoil productivity and contamination of soils with petroleum constituents. If reclamation is successful and spills are contained and cleaned up, impacts from this project would be minor and localized to disturbed areas.

Initial construction disturbance acreages would total approximately 75.2 acres for pipelines and temporary use areas; 31.1 acres for access roads; and 86.2 acres for the six proposed well pads (Table 3). Total disturbance would be approximately 192.5 acres for the proposed NHGP. With the successful application of post-construction interim and final reclamation measures (Appendix C), as appropriate; long-term, life-of-project disturbance would be reduced to approximately 1.2 acres for pipelines; 13.9 acres for access roads, and 18.0 acres for well pads (Table 3). Life-of-project pipeline disturbance of 1.2 acres would be those acres associated with the pipelines' surface pig launcher and receiver facilities (Figure 1). Total disturbance for the life-of-project would be approximately 33.1 acres (Table 3).

The proposed gathering system ROW crosses two areas of slopes in excess of 35 percent. Slopes steeper than 35 percent are defined as Fragile Soils and have a Controlled Surface Use (CSU 1) stipulation in the White River ROD/RMP (BLM 1997). Both segments are approximately 250 feet long by 100 feet in width and together would represent 1.2 acres (0.6 percent) of the Project's anticipated 192.8 acres of initial disturbance. The segments of Fragile Soils are located in NWSW Section 36, T1S, R97W and SWSE Section 28, T1S, R97W, respectively. The first segment occupies soil map unit 73 Rentsac channery loam, 5 to 50 percent slopes (Table 11). The 39 percent slopes of this segment combined with the shallow and highly erodible nature of this soil type would pose challenges to successful reclamation. With the application of engineered reclamation measures including soil stabilization and revegetation, soil loss would be minimized (Appendix C). Frequent monitoring of this segment after reclamation should be conducted to identify and remediate any evidence of accelerated erosion.

The second segment occupies soil map unit 91 Torriorthents Rock outcrop complex, 15 to 90 percent slopes (Table 11). The 45 percent slopes of this segment combined with mostly shallow and highly erodible nature of the soils comprising this soil unit would also pose challenges to successful reclamation. In addition, the nature of the soil map unit's composition indicates the presence of rock outcrop (no vegetative cover or soils) throughout the mapping unit. Where soils are present, they are limited in development and do not provide substrate for extensive vegetative cover, and are therefore subject to accelerated erosion under natural conditions and precipitation events. The application of engineered reclamation measures and monitoring as described for the first segment should result in limited soil loss.

The proposed new main roads would make use of as much of the disturbance of existing road routes as possible. There are some portions of existing roads, including two-tracks, that would not be used. The proposed new main roads follow the ridge line of fairly flat terrain and slopes associated with drainages tributary to the east to west drainages of Lee Gulch to the north and Hatch Gulch to the south (Figure 1). Where new road construction or reconstruction/upgrade is required, topsoil materials would be salvaged and stockpiled along the edge of the road ROW separate from fill materials placed as part of road construction. Topsoil and fill material loss

from road construction would be stabilized in accordance with storm water management control measures and interim reclamation requirements. Post-construction and ultimately post-abandonment of the roads as approved by the BLM would require the application of interim and final reclamation measures and monitoring, respectively (Appendix C).

The six proposed well pads would be located on fairly flat terrain along the ridge line between Lee Gulch and Hatch Gulch adjacent to the proposed gathering pipeline system and main access roads. Topsoil materials would be salvaged and stockpiled along the edge of the well pad separate from fill materials placed as part of pad construction. Topsoil and fill material loss from well pad construction area would be stabilized in accordance with storm water management control measures and interim reclamation requirements. Post-construction and ultimately post-abandonment of the well pads would require the application of interim and final reclamation measures and monitoring, respectively (Appendix C).

Contamination of surface and subsurface soils can occur from leaks or spills of oil, produced water, and condensate liquids from wellheads, produced water sumps and condensate storage tanks. Leaks or spills of drilling and hydraulic fracturing chemicals, fuels and lubricants could also result in soil contamination. Such leaks or spills could compromise the productivity of the affected soils. Of these materials, leaks or spills of condensate would have the greatest potential environmental impact. Depending on the size and type of spill, the impact to soils would primarily consist of the loss of soil productivity. In addition, petroleum released to the surface infiltrates the soil and, under the right conditions, can migrate vertically until the water table is encountered, thus contaminating shallow groundwater.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under the No Action Alternative, no project-related disturbance would occur and there would be no project related impacts to soil resources. However, the project area is located within the area of the previously approved PDP project and it is very likely that oil and gas development would continue in the area. Ongoing impacts to water resources would be comparable to those analyzed in the PDP EA.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation:

- Surface-disturbing activities shall cease when soils or road surfaces become saturated to a depth of three inches or more unless approved by the Authorized Officer.
- XTO will clean up all diesel and gasoline, hydraulic fluid, or other such spills. All spill-related material will be transported to an approved disposal site. Contaminated soils will be removed and disposed of in a permitted facility or will be bioremediated in place using

techniques such as excavating and mulching to increase biotic activities that would break down petrochemicals into inert and/or common organic compounds.

- XTO will water access roads, so there is not a visible dust trail behind vehicles during construction and drilling operations to reduce soil loss (fugitive dust) and to minimize impacts to air quality and visual resources.
- Suitable erosion control structures (e.g., water bars, sediment dams, etc.) will be installed where deemed necessary in accordance with direction from the Authorized Officer.
- If after initial reclamation, soil productivity is diminished from its pre-disturbance condition, then re-seeding, hydromulching or other efforts will be initiated to reestablish soil productivity.
- To aid in the reestablishment of soil productivity, post reclamation surface rock, as a percentage of ground cover, will not exceed the pre-disturbance conditions.
- If erosion features such as rilling, gullyng, piping and mass wasting occur as a result of surface disturbance associated with this project, such erosion features will be addressed immediately after the observations by contacting the Authorized Officer and by submitting a erosion control plan with proposed methods, procedures, or measures designed to resolve such erosion issues.
- Under no circumstances will topsoil, soil material below or adjacent to the trench spoils or subsoil excavated from the trench down through the ERD (Effective Rooting Depth) for the reclamation plants (Reclamation ERD) be used as padding in the trench, to fill sacks for trench breakers, or for any other use as construction material. Reclamation ERD will be a minimum of 16 inches and a maximum of 24 inches below the ground surface for all soils.
- After pipeline-construction activities are completed, the XTO will be responsible for taking measures to prevent off-road vehicle use along the pipeline ROW until reclamation has been fully successful or as directed by the AO.
- Winter construction of pipelines/flowlines, roads, and well pads in snow-covered areas will be avoided to minimize potential mixing of snow with soils stockpiled for redistribution during interim and final reclamation.
- The operator shall monitor the segment of pipeline located in the NW¹/₄SW¹/₄ of Section 36, T1S, R97W, and the SW¹/₄SE¹/₄ of Section 28, T1S, R97W after reclamation activities have begun to identify and remediate any evidence excessive erosion.

Finding on the Public Land Health Standard for upland soils: Implementation of the Proposed Action in accordance with mitigations indicated is unlikely to reduce the productivity of soils impacted by surface disturbing activities.

SURFACE & GROUND WATER QUALITY (includes a finding on Colorado Public Lands Health Standard 5)

Affected Environment: Surface Water - The project area is located near the center of the Piceance-Yellow Creeks USGS 4th-order watershed, hydrologic unit code (HUC) 14050006, encompassing an area of approximately 904 sq. miles, which drains to the north to the White River. (Seaber *et al* 1987). The project area is largely contained on highlands separating intermittent Hatch Gulch and Lee Gulch drainages, both of which are tributary to perennial Piceance Creek (CDWR 2001). Most project facilities would be located along the drainage divide between Hatch Gulch and Lee Gulch, although runoff from a portion of the northern access road would drain directly to Piceance Creek. The North Hatch Gulch pipeline ROW would cross Hatch Gulch and Lee Gulch, and the pig receiver facility and access road would be located within the Hatch Gulch 100-year floodplain.

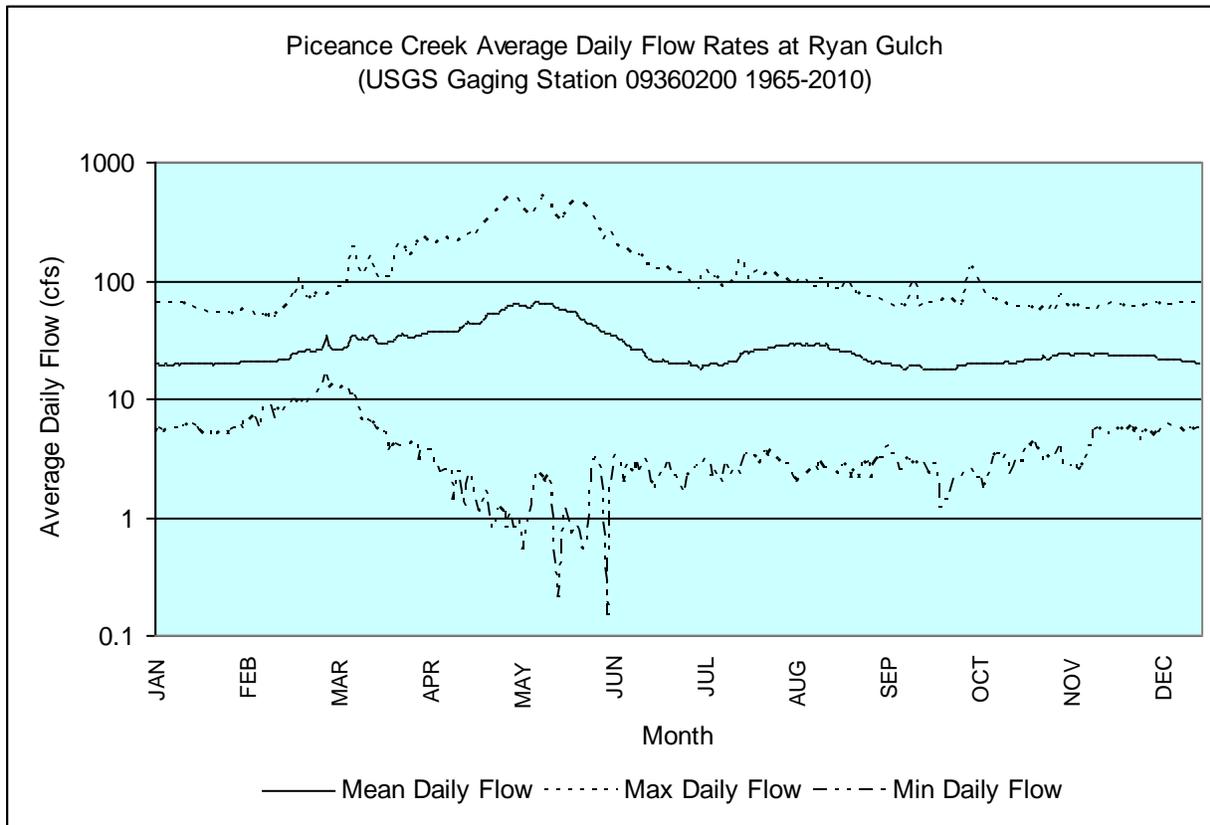
Piceance Creek tributaries are assigned stream segmentation code COLCWH16 by the Colorado Water Quality Control Commission (CWQCC 2011) under the most recent updates (June 2011) to Regulation 37, dealing with classifications and numeric standards for the Lower Colorado River Basin. Hatch and Lee gulches enter Piceance Creek approximately one and three miles, respectively, north (downstream) of the confluence of Ryan Gulch with Piceance Creek. The Ryan Gulch confluence forms the boundary between the upper, cold water portions of Piceance Creek (segments COLCWH14a and 14b) and its lower, warm water portion (COLCWH15), extending north to the confluence with the White River. Water quality assessments done in 2010 under requirements of the federal Clean Water Act have determined that Piceance tributaries (COLCWH16) are fully supporting of agricultural uses and warm water aquatic life. Lower Piceance Creek (COLCWH15) is evaluated as being fully supportive of agricultural uses, warm water aquatic life and secondary contact recreation (CWQCD 2010).

Water quality in Piceance Creek and tributaries is principally related to ground water quality, as approximately 80 percent of the annual flow comes from discharge from alluvial and bedrock (Uinta and Green River formations, in the vicinity of the project area) aquifers. The total dissolved mineral load increases in a downstream direction from an upstream average of about 1.5 tons/day transported to about 122 tons/day transported near the confluence with the White River. Principal constituents include bicarbonate, sulfate, and sodium. Dissolved solids concentrations diminish during high runoff periods and increase during the irrigation season because of added mineral content in irrigation runoff (Tobin 1987). Water quality has been sampled in Piceance Creek by the U.S. Geological Survey (USGS) over varying times and for various components. Four USGS stations with long-term sample history are were located in the upper reaches near Rio Blanco, near the confluence with Black Sulphur Creek, at the confluence with Ryan Gulch, and above the confluence with the White River. Summary data from these stations, detailed in the PDP EA to which this NEPA analysis is tiered, demonstrate the general degradation in water quality in a downstream direction for such parameters as total dissolved solids (TDS), total hardness, and dissolved oxygen (BLM 2007, USGS 2010). BLM has sponsored conductivity probes on Piceance Creek at the USGS streamflow site near Ryan Gulch and near the confluence with the White River. This data and additional sampling scheduled for spring 2012 will continue studies of groundwater interactions along this reach.

Flow in local streams typically peaks in the spring in response to runoff of winter snowmelt and rainfall. Transit time from the headwaters of Piceance Creek to the White River probably takes

about one day during high flow periods and several days when flow rates are low (Taylor 1987). The nearest USGS gaging station to the project area, with records since 1965, is located at the confluence of Ryan Gulch, approximately one mile upstream of the confluence of Hatch Gulch with Piceance Creek. Peak mean daily flows measured at this station have occurred in late April and May. Average mean daily flow has varied from 18 to 66 ft³/sec. (cfs). Average maximum daily flows have varied from 46 to 534 cfs and average minimum daily flows have varied from 0.15 to 16 cfs (USGS 2010). Average daily flow rates at the Ryan Gulch gaging station are graphically represented in Figure 8.

Figure 8. Piceance Creek Daily Flow Rates near the project area



Source: USGS 2010

Groundwater - Aquifers in the vicinity of the project area include shallow alluvial aquifers within local floodplains, the Tertiary Uinta-Animas aquifer, and the Cretaceous Mesaverde aquifer. The latter aquifer represents the principal target of the Proposed Action and would be located at depths of 7,000 feet or greater, according to existing well data. The Uinta-Animas aquifer consists of portions of the Green River and Uinta formations. The aquifer is divided into upper and lower units by the Mahogany zone of the Parachute Creek Member of the Green River Formation, which retards water movement vertically. The base of the lower aquifer is represented by the Garden Gulch Member confining layer (Robson and Banta 1995). The upper aquifer average thickness is approximately 700 feet while the lower aquifer averages approximately 900 feet in thickness (Taylor 1987).

TDS values for the Mesaverde aquifer in the central Piceance Basin are between 10,000 and 35,000 mg/l and the contained water would therefore not be suitable for domestic or agricultural uses (Robson and Banta 1995). A study of the characteristics of produced water from Mesaverde reservoirs within the Piceance Creek Unit indicated typical salinities of around 16,000 mg/l (BLM 2007). Water quality within the Uinta-Animas aquifer varies between the upper and lower units. In the vicinity of the project area, TDS values in the upper aquifer are between 500 and 1,000 mg/l, while salinities in the lower aquifer typically range from around 1,000 to 3,000 mg/l, although values as high as 16,000 mg/l have been reported locally. The lower aquifer is underlain by the Green River Formation "saline zone" and fractures have allowed vertical transport of more saline waters into the lower unit which has degraded water quality. Water chemistry is dominated by sodium and bicarbonate in both upper and lower units, with calcium and magnesium observed in portions of the upper aquifer. Concentrations of most solutes are higher in the lower than the upper aquifer (BLM 2007, Robson and Banta 1995, Tobin 1987). Data analyzed for the PDP EA, to which this analysis tiers, included a summary of water quality and chemistry for the alluvial and Uinta-Animas aquifer in the vicinity and is reproduced as Table 12.

Table 12. Groundwater Properties, Vicinity of the project area (mg/L)

Parameter	Alluvial Aquifer		Upper Uinta-Animas Aquifer		Lower Uinta-Animas Aquifer	
	Range	Mean	Range	Mean	Range	Mean
Potassium	0.8-6.8	2.5	0.2-6	1.5	0.4-78	11
Sodium	66-2,900	490	55-650	210	230-16,000	3,980
Calcium	2.4-120	57	7.4-110	50	2.8-15	7.4
Magnesium	3.6-160	80	9.8-187	60	3.0-26	9.5
Bicarbonate	336-3,560	1,220	307-918	550	493-40,000	9,100
Chloride	5.2-270	42	3.4-63	16	1.3-2,900	690
Sulfate	41-1,500	430	34-850	320	4.2-350	80
Fluoride	0.1-33	4.6	0-12	1.4	5.0-66	28
TDS	469-6,720	1,750	345-2,180	960	491-38,900	9,400

Source: BLM 2007

Groundwater production rates in the immediate vicinity of the project are poorly known. There are approximately 25 wells located within one mile of project facilities, almost all northeast of the project along and west of Piceance Creek, and at the extreme southeast end of the project near the XTO gas plant. Wells in the former area are almost all monitor wells associated with the former American Soda pilot nahcolite solution mine, drilled to depths of around 1,000 to 1,400 feet in the producing nahcolite zone of the Green River Formation. Approximately four wells have been drilled in the Piceance Creek alluvium to depths of 35-100 feet. Permitted production rates from these wells range from 5 to 125 gallons/minute (gpm). There are three wells near the gas plant within the one mile buffer. These wells have been drilled to depths of several hundred feet into the upper Uinta-Animas aquifer. Permitted flow rates of 4 and 30 gpm have been reported (CDWaR 2008). Five springs have been mapped within one mile of project facilities at the apparent contact of bedrock with alluvial fill in Ryan, Greasewood, and Lee

gulches. None of the springs is located within 600 meters of any project facilities and no production rates have been reported (CDWaR 2009).

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Implementation of the Proposed Action would result in total short-term surface disturbance of approximately 193 acres until completion of interim reclamation, which would result in long-term disturbance of approximately 33 acres (Table 3). Because the Proposed Action would be constructed in stages, not all of this disturbance would occur simultaneously. Almost all of the disturbance would occur along the crest of a ridge separating North Hatch and Lee gulches. Approximately 2,673 feet of road construction, 250 feet of pipeline construction, and the pig receiver facility would be located within the 100 year Hatch Gulch floodplain, a short-term disturbance of approximately 3.7 acres and a long-term disturbance of 1.8 acres. Approximately 250 feet of the main pipeline corridor would cross the Lee Gulch 100-year floodplain, a short-term disturbance of approximately 0.6 acre. The closest construction activity to Piceance Creek would be approximately 400 feet where the Northern Access Road upgrade would connect to Piceance Creek Road on the side of the road away from Piceance Creek. Approximately 94 percent of the project area disturbance would occur in shallow to very shallow soils associated with upland pinyon-juniper woodlands (see the Soils section).

Potential impacts to surface water would be largely related to increased sediment transport into local intermittent drainages related to exposed construction surfaces and long-term unreclaimed areas (33 acres) such as road surfaces and well pads. Pipelines would be reclaimed immediately following installation. The highest potential for such effects would involve construction of the pig receiver facility, construction and long-term use of the pig receiver access road, and pipeline crossing of the Hatch Gulch floodplain. Other, less likely impacts to surface water or groundwater include leakage from hydrocarbon or produced water pipelines, chemical spills, and leaks from vehicles at facilities. Subsurface contamination of aquifers could result from casing and/or cement job failures in the wells.

Sediment transport from disturbed areas should be largely controlled in accordance with provisions of the field-wide storm water pollution prevention (SWPP) plan. Chemical or fuel spills on facilities would be avoided or mitigated in accordance with the provisions of the project SPCC plan. Well designs would be reviewed and approved or modified by a BLM petroleum engineer prior to APD approvals and evidence of proper cement jobs is required.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under the No Action Alternative, no project-related disturbance would occur and there would be no project related impacts to surface water or groundwater resources. However, the project area is located within the area of the previously approved PDP project and it is very likely that oil and gas development would continue in the

area. Ongoing impacts to water resources would be comparable to those analyzed in the PDP EA.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation:

- Monitoring of formerly disturbed areas for presence of noxious weeds and invasive species will be continued through the life-of-project and through final reclamation.
- Wellpad storage tanks will be surrounded by an impermeable berm capable of containing 110 percent of the contents of the largest tank.
- Storage of hazardous materials, fuels, chemicals, lubricating oils and concrete coating and refueling activities will be prohibited within 200 feet of any surface water or wetland.
- Trench dewatering water will be discharged onto well-vegetated, stable surfaces as far as practical from surface waters and wetlands.
- Pipeline installation across the Hatch Gulch floodplain will be done during times of low or non-existent flow and will be completed in the minimum time feasible, consistent with engineering and safety considerations.
- A minimum two feet of freeboard will be maintained in all pits at all times.
- All drill cuttings will be contained in a lined pit or hauled away to an approved disposal site.
- In addition to monitoring for weeds, XTO will monitor the condition of overall reclamation success, in particular the development of any erosion features on reclaimed surfaces. Development of such features will be controlled as soon as feasible and the circumstances, treatment methods, and initial success evaluation will be reported to the AO.

Finding on the Public Land Health Standard for water quality: Currently, Piceance Creek and its tributaries in the vicinity of the project area meet the beneficial use standards set by the Colorado Water Quality Control Commission. Implementation of the Proposed Action in conformance with incorporated design features and additional recommended mitigation measures would be unlikely to affect the attainment of these standards.

VEGETATION (includes a finding on Colorado Public Lands Health Standard 3)

Affected Environment: Vegetation mapping in the vicinity of the project area is based largely on spatial data from the Colorado Vegetation Classification Project (CDOW 1997). The project area is located within the following vegetation communities:

- Pinyon/juniper (PJ) woodland primary vegetation type which comprises about 29 percent of the total soil surface of the project area or about 55 acres; This type is co-dominated by pinyon pine and Utah or Rocky Mountain juniper. The understory includes sagebrush, mixed mountain shrubs, and grasses.
- PJ-Sagebrush Mix (16 percent or 32 acres), which is co-dominated by woodland and shrubland species. Woodland areas are dominated by pinyon pine and Utah or Rocky Mountain juniper while big sagebrush grows in spaces between the trees and may constitute up to 25 percent of the total cover with a grass and forb understory.
- PJ-Mountain Shrub Mix (15 percent or 28 acres), which is similar to the PJ-sagebrush mix, except that the shrubland component is dominated by tall shrubs such as Gambel oak, mountain mahogany, serviceberry, and sagebrush;
- Sagebrush-Grass Mix (21 percent or 41 acres), which consists of co-dominant sagebrush shrubland and perennial grassland. Principle shrub species include big sagebrush, serviceberry, and mountain mahogany. Principle grass species include: crested wheatgrass, bluebunch, wheatgrass, and Indian ricegrass.
- Juniper-Sagebrush Mix (6 percent or 11 acres), which consists of co-dominant Utah juniper woodland at cover densities around 25 percent, and interstitial big sagebrush at densities up to about 25 percent..
- Sagebrush Community (4 percent or 7 acres), which is shrubland principally dominated by predominantly Wyoming and Basin big sagebrush. Often associated with Rabbitbrush, Bitterbrush, Broom Snakeweed, various grasses, and mixed cacti. Greasewood, Serviceberry, Snowberry, or Winterfat may also be present as secondary species.
- Other (10 percent or 18 acres), which consists of intermixed patches of Sagebrush/Mesic Mountain Shrub Mix, Sagebrush/Rabbitbrush Mix, Sagebrush/Greasewood, PJ-Oak Mix, Juniper, Sparse Juniper/Shrub/Rock Mix, Greasewood, Bare Soil, Sparse PJ/Shrub/Rock Mix, Grass Dominated, Irrigated Agriculture, Serviceberry/Shrub Mix, Shrub/Grass/Forb Mix, Rabbitbrush/Grass Mix communities.

Biological soil crusts have been identified in arid and semi-arid environments where they may occupy a portion of the ground not covered by vascular plants. However, as noted in the PDP EA, reconnaissance investigations in 2005, which included portions of the project area, indicated that biological soil crusts are poorly developed or absent in this portion of the Piceance Basin (BLM 2007). Accordingly, these organisms will not be discussed further in this EA.

Portions of the project area contain old-growth PJ individuals or stands. Old-growth PJ is late successional in development with large diameter trees older than 150 years on low elevation sites and older than 200 years on high elevation sites. There are a few standing and down dead trees. Dead branches, limbs, and parts of stems of the older trees are also present both in the canopy and on the forest floor. Stand structure can be single or multi-storied. Species composition is variable. Typical PJ old-growth is fairly open, with the presence of an understory of grass, forbs, and often shrubs. In the absence of regular fires, woodland stands have a larger number of trees and a denser canopy cover (Michels 2010).

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Direct impacts to the vegetation resource would principally occur during the construction phase. Direct impacts would include removal of native vegetation, topsoil, and loss of long-term disturbed acreage due to construction and installation of permanent structures (e.g., pig launcher and receiver sites, roads, and unreclaimed portions of well pads). Other impacts could include soil compaction, mixing of soil horizons, loss of topsoil productivity, increased soil surface exposure resulting in soil loss due to wind and water erosion, and fugitive dust production, principally from roads. Short-term disturbance would affect approximately 205 acres of vegetative cover and would affect approximately 34 acres for the life of the project (Table 3).

To minimize impacts to old-growth trees, minor changes to the original routing of the proposed North Hatch Gulch pipeline corridor and to well pad locations were made during project on-site inspections. Areas which would have resulted in a heavy loss of old-growth trees would be avoided.

Indirect impacts to vegetation resources could include the short- to long-term increased potential for noxious/invasive weed invasion and establishment, shifts in species composition and density in response to changes in forage types and availability, changes in visual aesthetics, and altered runoff hydrology as a result of unreclaimed roads, well pads, and other facilities. These sites increase natural runoff to down slope locations and increase channelization of flows and gullying, which could result in lower productivity, cover, and species composition below these facilities.

In general, the extent of these impacts will be influenced by the success of mitigation and reclamation efforts and the time period required for disturbed areas to return to pre-existing conditions. Reclamation success, in part, depends on the amount of surface area disturbed and quality of topsoil salvaged and stockpile/redistribution methods in disturbed areas, precipitation, soil type, and moisture availability. Interim reclamation efforts including reseeding would proceed after cessation of surface-disturbing activities. Final reclamation would include recontouring each site to its original contour and grade before reseeding the area.

Following heavy disturbance (e.g., fire, chaining, construction activities), plant succession in the pinyon/juniper ecosystem has been categorized into about 5 stages. The following stages are summarized from Buttery and Gilliam (1983):

- Grass-forb Stage (1): This stage occurs only after a significant disturbance (e.g. fire or chaining). This stage is relatively short-lived, lasting only 10–15 years. This stage provides maximum herbaceous forage production.
- Shrub-Seedling Stage (2): This stage is the result of invasion of the grass-forb site by junipers and shrubs and will last 15–20 years. Shrubs, which are dominant in the early part of this stage, provide food for wildlife; when adjacent to or intermingled with suitable hiding and thermal cover. Shrubs constitute a major element of mule deer winter range in Colorado.

- Sapling-Pole Stage (3a, 3b and 3c): This stage consists of trees 25–50 years of age. All ranges of canopy closures can exist in this stage; however, the most common is the mid-range, 40 to 70 percent (Stage 3b). Pinyon pine and junipers produce chemical growth inhibitors which, in combination with litter accumulations and root competition, result in nearly a complete absence of grasses, forbs, and shrubs when canopy closure exceeds 40 percent.
- Mature Stage (4a, 4b, and 4b) and Old Growth Stage (5): Mature and old growth stages in pinyon/juniper are virtually indistinguishable because of the way old growth develops. The major difference between mature and old growth stands is the higher incidence of snags in the latter. Pinyon pines take 75 to 200 years to reach maturity, at which time they are 6 to 18 inches in diameter and are 10 to 30 feet in height. These trees commonly reach 400 years of age and can exceed 500 years. Junipers reach maturity at 80 to 100 years of age, at which time they are 6 to 12 inches in diameter and average 18 feet in height. Precluding a major disturbance such as fire, mature and old-growth stages perpetuate themselves.

Based on these five recognized stages, it seems reasonable to assume that the grass-forb stage (1) through the shrub-seedling stage (3a, b, c) would be dominant for about 25–35 years after reclamation is initiated.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, the proposed project would be denied and construction would not occur on BLM-administered lands. Therefore, there would be no project-related impacts. Ongoing production operations within the PDPA would continue.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures - Additional recommended mitigations protective of vegetation resources include:

- Construction-related traffic will be restricted to routes approved by the AO. New access roads or cross-country vehicle travel will not be permitted unless prior written approval is given by the AO. Authorized roads used by the holder will be rehabilitated or maintained when construction activities are complete as approved by the AO.
- Monitoring of reclamation areas will continue for the life of the project and through final reclamation and abandonment.
- Final reclamation of disturbed areas will occur at the first appropriate timeframe (between September and March) after burial of pipelines or plugging the final well on the pad or as otherwise recommended by the White River Field Office.

Finding on the Public Land Health Standard for plant and animal communities: Standard 3 of the Colorado BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a) states that plant and animal communities of native and desirable species should be maintained at viable population levels to sustain public land health. Currently, this land health standard is being met in the project area. With implementation of mitigation measures and successful reclamation, the proposed project would be unlikely to impair the continued attainment of the land health standard.

INVASIVE, NON-NATIVE SPECIES

Affected Environment: The Colorado Noxious Weed Act (Title 35 Article 5.5, enacted 1996) defines noxious weeds as plant species that are not indigenous to the State of Colorado and which aggressively invade or are detrimental to economic crops or native plants; are poisonous to livestock; are carriers of detrimental insects, diseases, or parasites; or the presence of the plant is detrimental to the environmentally sound management of natural or agricultural ecosystems. This definition applies to species listed by both the state and local governing bodies. Federal agencies are responsible for consideration of invasive species impacts under terms of Executive Order 13112. Numerous species of noxious weeds have been recognized by the Colorado Weed Management Association (CWMA) and are grouped into three categories: Lists A, B, and C (CWMA 2009).

Species in List A have limited distribution throughout the state, and are designated by the Commissioner for eradication on all county, state, federal, and private land. Many of these species are currently not known to exist in Colorado, but the potential for spread from neighboring states is feasible (CWMA 2009). List B includes species for which a state noxious weed management plan is required to stop their spread. List C includes species that are common in Colorado. Optional programs provide resources to governing bodies that choose to require management of List C species, however, prevention of these weed species is not state-mandated (CWMA 2009). Twenty-two noxious weed species, listed in Table 14, either occur, or have the potential to occur in the Piceance Basin, based on nearby observations (HWA 2008, HWA 2009).

Table 14. Noxious Weeds with the Potential to Occur in the Piceance Basin

Noxious Weed	Scientific Name	CWMA List Status
Black henbane	<i>Hyoscyamus niger</i>	B
Bull thistle	<i>Cirsium vulgare</i>	B
Canada thistle	<i>Cirsium arvense</i>	B
Common burdock	<i>Arctium minus</i>	C
Common mullein	<i>Verbascum thapsus</i>	C
Common teasel	<i>Dipsacus fullonum</i>	B
Downy brome	<i>Bromus tectorum</i>	C
Field bindweed	<i>Convolvulus arvensis</i>	C
Halogeton	<i>Halogeton glomeratus</i>	C
Hoary cress (whitetop)	<i>Cardaria draba, C. pubescens</i>	B
Houndstongue	<i>Cynoglossum officinale</i>	B
Knapweed, diffuse	<i>Centaurea diffusa</i>	B
Knapweed, Russian	<i>Acroptilon repens</i>	B

Noxious Weed	Scientific Name	CWMA List Status
Knapweed, spotted	<i>Centaurea maculosa</i>	B
Leafy spurge	<i>Euphorbia esula</i>	B
Musk thistle	<i>Carduus nutans</i>	B
Perennial pepperweed	<i>Lepidium latifolium</i>	B
Plumeless thistle	<i>Carduus acanthoides</i>	B
Salt cedar	<i>Tamarix spp.</i>	B
Scotch thistle	<i>Onopordum acanthium, O. tauricum</i>	B
Toadflax, Dalmation broad-leafed	<i>Linaria dalmatica</i>	B
Toadflax, yellow	<i>Linaria vulgaris</i>	B

Source: HWA 2008, HWA 2009

As a component of this EA, a noxious weed survey was conducted for the project area. In compliance with the Bureau of Land Management White River Field Office (BLM-WRFO) standards, the survey extended 50 m from the edge of proposed disturbance. The survey area included the ROWs for the North Hatch Gulch pipeline corridor, flowlines, and main access roads, as well as the six associated well pads. The survey was conducted during July 2010 (HWA 2010).

Within the approximately 520-acre survey area, seven noxious weed species were located (Table 15). Bull thistle and common mullein were the most common, occupying approximately 3.1 acres and 5.4 acres, respectively. A large population of common mullein and bull thistle were found growing on an existing pipeline in the eastern portion of the survey area. The eastern portion of the survey area was observed to have higher overall disturbance from roads and well pads. Ground disturbance provides an optimal location for noxious weed infestations (Sheley *et al.* 1996). Occurrence of downy brome was generally higher in this part of the survey area, reaching up to 25 percent cover in patches along the existing access road. It was present in small amounts throughout much of the survey area, which is typical for this widespread species (Allen and Meyer 2002). All weed species found were either list B or C status. Also observed in the survey area were the following non-noxious weedy species: Russian thistle (*Salsola iberica*), pinnate tansy mustard (*Descurainia pinnata*), kochia (*Kochia scoparia*), lambsquarter (*Chenopodium berlandieri*), and yellow sweetclover (*Melilotus officinalis*). Total occupied area was less than 9 acres, or less than 2 percent of the survey area.

Table 15. Noxious Weeds Located in the North Hatch Gulch Survey Area

Noxious Weed	Estimated Population Size	Occupied Area (ac)	List Status
Bull thistle	753	3.1	B
Canada thistle	1	<0.1	B
Common mullein	3,084	5.4	C
Field bindweed	95	<0.1	C
Houndstongue	1	<0.1	B
Musk thistle	1	<0.1	B
Downy brome	<i>Present</i>		C

Source: HWA 2010

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Surface-disturbing activities associated with this project could increase the potential for infestation and spread of invasive plant species. Implementation of the Proposed Action would result in the short-term disturbance of 192.5 acres and long-term disturbance, following interim reclamation, of 33.1 acres. Invasive weed species usually thrive on newly disturbed surfaces such as road and pipeline rights-of-way and out-compete more desirable native plant species. Construction equipment traveling from weed-infested areas can facilitate the spread of noxious weeds into previously weed-free areas. As required by the WRFO *Standards for contractor inventories for special status plant species & noxious weed affiliates* (2009), XTO would be responsible for the management and control of noxious weed infestations on project-related surface disturbances and would consult with the WRFO and/or the Rio Blanco County Weed and Pest Control District Supervisor regarding acceptable weed control methods. Control measures would be those authorized in *the Bureau of Land Management programmatic environmental impact statement vegetation treatments using herbicides on Bureau of Land Management lands in 17 Western states* (BLM 2007b) and as approved by the BLM Authorized Officer.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, the project would be denied, and construction would not occur on BLM-administered lands, and there would be no project-related impacts. Ongoing production operations within the PDPA would continue.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures - Additional recommended mitigation measures include:

- Monitoring efforts for invasive species will continue through final abandonment.
- Final reclamation of disturbed areas will occur at the first appropriate timeframe (between September and March) after burial of pipelines or plugging the final well on the pad or as otherwise recommended by the White River Field Office.

SPECIAL STATUS ANIMAL SPECIES (Includes a finding on Colorado Public Land Health Standard 4)

Affected Environment: Threatened and Endangered Species: No threatened or endangered animal species listed under the Endangered Species Act (ESA) are expected to occur within the project area (<http://www.fws.gov/mountain-prairie/endspp/CountyLists/Colorado.pdf> updated July 2010). Four fish species are federally listed as endangered within the Upper Colorado River Basin and its tributaries. Withdrawals of water from the surface or ground waters within the Basin have been determined to negatively impact these species. All four species are native to the Upper Colorado River Basin, where they were once abundant. They all

inhabited the larger channels of the Colorado River and its major tributaries (BLM 2007). The White River below Rio Blanco Lake is designated critical habitat for Colorado pikeminnow populations that are currently confined to the river below Taylor Draw dam (BLM 1999). The Proposed Action is separated from the White River's critical habitat by roughly 3 miles of ephemeral channel and 13 valley miles of Piceance Creek, and from occupied pikeminnow habitat by an additional 26 miles of river. The endangered bonytail, humpback chub, and razorback sucker do not occur in Colorado portions of the White River, but water depletions in the White River system may affect downstream habitats occupied by these species in the Green River.

Bonytail habitat is primarily limited to narrow, deep, canyon-bound rivers with swift currents and whitewater areas (BLM 2007, Upper Colorado River Endangered Fish Recovery Program 1999). With no known reproducing populations in the wild today, the Bonytail is thought to be the rarest of the endangered fishes in the Colorado River system.

Colorado Pikeminnow were once abundant in the main stem of the Colorado River and most of its major tributaries in Colorado, Wyoming, Utah, New Mexico, Arizona, Nevada, California, and Mexico. Now, they exist primarily in the Green River below the confluence with the Yampa River, the lower Duchesne River in Utah, the Yampa River below Craig, the White River from Taylor Draw Dam near Rangely downstream to the confluence with the Green River, the Gunnison River in Colorado, and the Colorado River from Palisade, downstream to Lake Powell. Biologists believe Colorado pikeminnow populations in the upper Colorado River basin are now relatively stable and in some areas may even be growing (BLM 2007).

Humpback Chub live primarily in canyons with swift currents and white water. Historically, it inhabited canyons of the Colorado River and four of its tributaries: the Green, Yampa, White and Little Colorado Rivers. Now there are two populations near the Colorado/Utah border—one at Westwater Canyon in Utah and one in an area called Black Rocks, in Colorado. Though now smaller in number than they were historically, the two populations seem to be fairly stable in these two areas (BLM 2007).

Razorback Sucker is an omnivorous bottom feeder and is one of the largest fishes in the sucker family. Adult habitat varies depending on season and location. This species was once widespread throughout most of the Colorado River Basin from Wyoming to Mexico. Today, Colorado River Basin populations are only found in the upper Green River in Utah, the lower Yampa River in Colorado, and occasionally in the Colorado River near Grand Junction (Upper Colorado River Endangered Fish Recovery Program 1999).

BLM Sensitive Species: Although BLM-designated sensitive animal species are not afforded legal protection under the Endangered Species Act (ESA), the BLM and USFWS maintain an active interest in their numbers and status. It is BLM policy to manage these species as candidates to preclude the need for listing under the ESA. Sensitive species in this section include those listed on the Colorado BLM State Sensitive Species List (BLM 2009c) for the White River Field Office (Table 16). Those BLM sensitive species that may potentially be affected by the proposed project are discussed in more detail below. Those species that would not be affected are not discussed further.

Table 16. BLM-sensitive Species that May Occur within the project area

Common Name	Scientific Name
Mammals	
Townsend’s big-eared bat	<i>Corynorhinus townsendii</i>
Fringed myotis	<i>Myotis thysanodes</i>
Spotted bat	<i>Euderma maculatum</i>
Big free-tailed bat	<i>Nyctinomops macrotis</i>
Birds	
Northern goshawk	<i>Accipiter gentilis</i>
Greater sage-grouse	<i>Centrocercus urophasianus</i>
Brewer’s sparrow	<i>Spizella breweri</i>
Amphibians	
Northern leopard frog	<i>Rana pipiens</i>
Great Basin spadefoot	<i>Spea intermontana</i>
Boreal toad	<i>Anaxyrus boreas boreas</i>

Townsend’s big-eared bats may occur in many types of habitat including semi-desert shrublands, but often are found near forested areas including pinyon-juniper woodlands and open montane forests (Fitzgerald et al. 1994). Distribution of this species is most likely determined by the availability of roosts such as snags, caves, mines, tunnels, and crevices (rocks and trees) with suitable temperatures (Clark and Stromberg 1987). This species does not make any major annual migrations. Although uncommon, the species occurs within Rio Blanco County (NDIS 2011), and may use pinyon-juniper snags or crevices on cliffs for roosting within or adjacent to the project area. No field work was conducted for Townsend’s big-eared bats in 2010.

Fringed myotis occupy coniferous forests and woodlands at moderate elevations in Colorado. Specific roosting habitats in Colorado include ponderosa pine, pinyon-juniper, and scrub oak. This species is also known to roost in rock crevices, caves, mines, and buildings. Fringed myotis are known to hibernate in caves and buildings, and do not make any major annual migrations. Although rare, the species occurs within Rio Blanco County (NDIS 2011), and may use pinyon-juniper snags or crevices on cliffs for roosting within or adjacent to the project area. No field work was conducted for fringed myotis in 2010.

Spotted bat habitat includes ponderosa pine of montane forests, pinyon-juniper woodlands, and open semi-desert shrublands. Rocky cliffs are necessary to provide suitable roosting habitat, as is access to water. The diet consists of moths, grasshoppers, beetles, and other insects. Although spotted bats have not been documented in Rio Blanco County (NDIS 2011), potentially suitable habitat occurs in the project area.

Big free-tailed bat habitat includes rocky or canyon country where individuals roost in crevices on cliff faces or in buildings. Big free-tailed bats can migrate as far north as Canada. The diet largely consists of moths. Although big free-tailed bats are not known to breed in this area, they have been documented in the Piceance Basin.

Northern goshawk primarily occur in dense, mature forest, but occasionally hunt in nearby open meadows. They tend to select stands with relatively large-diameter trees and high canopy closure for nesting (Siders and Kennedy 1995, Daw et al. 1998). Nesting habitat in the project area consists of mature and old-growth pinyon-juniper woodlands. Much of the pinyon-juniper woodlands within the project area could be classified as mature stands (>300 years old). Goshawks exhibit high nest site fidelity and may maintain alternate nest sites within a territory. Typically, they return to their breeding territories in late March or April and lay eggs in May. Chicks hatch by mid-June, fledge by late July and generally are independent by early September. Goshawks primarily hunt from perches and prey upon a variety of small and medium-sized mammals and birds. Woodland raptor nesting habitat in the project area was surveyed and old growth pinyon-juniper stands were delineated in the survey area in 2010 (HWA 2010a). No northern goshawk nests were documented within the project area; however, 28 acres of old growth pinyon-juniper woodland was mapped for potential use by goshawks in 2010 (Figure 1, HWA 2010a). In 2009, an active northern goshawk nest was documented within three miles northeast of the project area (HWA 2009). Goshawks also use pinyon-juniper woodlands and sagebrush parklands that occur in the project area as winter foraging habitat (Smithers 2011).

Greater sage-grouse have undergone a recent status review by the USFWS in response to petitions requesting the listing of this species, across its range, under the ESA. A decision was released in 2009 and the sage-grouse was warranted but precluded for listing under the ESA. The greater sage-grouse remains as a candidate species.

Human activities during the breeding season may disrupt normal use of leks and subsequently affect local breeding success. Populations across the West have declined from historic levels due to a wide range of factors including drought, habitat loss, habitat fragmentation and habitat degradation (Connelly and Braun 1997, Braun 1998, Connelly et al. 2000, Connelly et al. 2004). No sage-grouse leks occur on or within two miles of the project area. The closest active lek is about three miles east of proposed well pad PCU 297-1A. Total attendance (i.e. total males and females) at this active lek has been fewer than 12 birds in recent surveys (personal communication, T. Knowles, CPW). The majority of the project area is dominated by woodland habitat types which generally are unsuitable sage-grouse habitat (Commons et al. 1999). Sagebrush communities within the project area are limited, but may provide suitable nesting, brood-rearing, and winter habitat for sage-grouse. The southern portion of the Southern Access Road overlaps the Parachute/Piceance/Roan sage-grouse range, including brood, winter, and production habitat for this population; based on GIS coverage obtained from CPW (2010). This overlap is approximately 225 feet (0.5 acre) of the Southern Access Road.

Brewer's sparrow breeds in landscapes dominated by big sagebrush (*Artemisia tridentata*) throughout the Great Basin and intermountain West and winters in sagebrush shrublands and brush desert habitat in the southwestern United States and northern Mexico (Rotenberry et al. 1999). This species is a summer resident on mesas and foothills of western Colorado and local in lower mountains (NDIS 2011). The breeding season occurs during mid-April through August. They depart breeding grounds in October for their winter range, found in southern California through northern Mexico. Brewer's sparrows occur in the area and were documented in open habitats within the eastern portion of the project area in 2010.

Northern leopard frogs usually inhabit areas in or near permanent water with aquatic vegetation, and are found in a wide variety of environments including deserts, plains, woodlands,

and mountain meadows. This species occurs throughout North America, except on the West Coast, and generally is found north of the 40th parallel. A member of the true frog family (*Ranidae*), the northern leopard frog is an obligate of permanent water in plains, foothills, and montane zones. Although the Colorado Herpetofaunal Atlas (CDOW 2011a) contains no record of this species within the project area, northern leopard frogs commonly are found along Piceance Creek (personal communication, H. Sauls, WRFO – BLM).

Great Basin spadefoot are found in pinyon-juniper woodlands, sagebrush, and semi-desert shrublands where they utilize permanent and temporary water sources for breeding (NDIS 2011). This species was observed within approximately four miles of the project area near the confluence of Black Sulphur Creek and Piceance Creek in 1973 (CDOW 2011a). Although they are locally common where they occur, no recent sightings have been documented within the project area.

Boreal toad occurs in wet areas in the vicinity of marshes, wet meadows, streams, beaver ponds, glacial kettle ponds, and lakes within subalpine forests. Boreal toads range from southeastern Alaska to northern Baja California, Utah, and northern New Mexico. The elevation range in Colorado is mainly 8,500 – 11,500 feet (CDOW 2011a). Adults often feed in meadow and forest openings near water but sometimes in drier forest habitats. This species congregates near water bodies to breed from mid-May to July, dependent upon seasonal weather and elevation. Larvae metamorphose into small toads from late July through mid-September, mainly in August. The Colorado Herpetofaunal Atlas (CDOW 2011a) contains no record of this species in the vicinity of the project area.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects:

Threatened and Endangered Animal Species: No threatened or endangered animal species are expected to occur within the project area. Cumulative water depletions from the Colorado River Basin are considered likely to jeopardize the continued existence of the Colorado pikeminnow, as well as downstream populations of humpback chub, bonytail, and razorback sucker and result in the destruction or adverse modification of their critical habitat. In 2008, BLM prepared a Programmatic Biological Assessment (PBA) that addressed water depleting activities associated with BLM's fluid minerals program in the Colorado River Basin in Colorado, including water used for well drilling, hydrostatic testing of pipelines, and dust abatement on roads. In response, the U.S. Fish and Wildlife Service (FWS) prepared a Programmatic Biological Opinion (PBO) that addressed water depletions associated with fluid minerals development on BLM lands.

The PBO included reasonable and prudent alternatives which allowed BLM to authorize oil and gas wells that result in water depletion while avoiding the likelihood of jeopardy to the endangered fishes and avoiding destruction or adverse modification of their critical habitat. The reasonable and prudent alternative authorized BLM to solicit a one-time funding contribution to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) in an amount based on the average annual ac-ft depleted by fluid minerals activities on BLM lands. This contribution was ultimately provided to the Recovery Program through an oil and natural gas development trade association. The Proposed Action is

covered by this agreement and water-use figures associated with this project would be entered into the White River Field Office fluid minerals water depletion log that will be submitted to the Colorado State Office at the end of the fiscal year.

BLM Sensitive Species: Construction activities associated with building well pads, temporary use areas, roads, pipelines and other facilities may result in the loss or alteration of sensitive species potential habitat within the project area. The effects of these activities begin with the construction phase and continue through drilling and completion and field operations until reclamation is determined successful by the BLM.

The Proposed Action would result in a direct loss of 192.5 acres with an estimated 146.1 acres of potential sensitive species habitat initially, and the direct loss of 33.1 acres with an estimated 100.1 acres of potential sensitive species habitat for the estimated life of the project. Habitats impacted by the Proposed Action are described in Table 17.

Table 17. Disturbance to Potential Sensitive Species Habitats, project area

BLM Sensitive Species	Habitat Type	Initial Disturbance (acres)	Project Life (acres)
Townsend's Big-eared Bat	Mature Woodland ¹	87.0	87.0
Fringed Myotis	Mature Woodland	87.0	87.0
Spotted Bat	Mature Woodland	87.0	87.0
Northern Goshawk	Mature Woodland	87.0	-87.0
Greater Sage-Grouse	Sagebrush ²	58.8	12.9
Brewer's Sparrow	Sagebrush	58.8	12.9
Northern Leopard Frog	Grass Dominated	0.3	0.2
Great Basin Spadefoot	Temporary Bodies of Water	0	0
Boreal Toad	Wetlands	0	0
Total Acres		146.1	100.1

¹ Mature Woodland includes the following cover types: Juniper, Pinyon-Juniper, PJ-Mtn Shrub Mix, and PJ-Oak Mix.

² Sagebrush includes the following cover types: Sagebrush Community, Sagebrush/Grass Mix, Sagebrush/Greasewood, Sagebrush/Mesic Mtn Shrub Mix, and Sagebrush/Rabbitbrush Mix.

Short-term disturbance of vegetation clearing should have no measurable impact on the abundance or distribution of sensitive species at the regional scale, i.e. within the ranges of individual species. The loss or alteration of habitat is contained to a small geographic area, where no identified critical habitat types would be affected. Based on limited recent and historic observations, there is likely a low abundance of sensitive species in the project area, and with the implementation of the proposed mitigation measures and ACDFs, the environmental consequence of sensitive species habitat loss is not anticipated to threaten the continued viability of any sensitive species.

Construction and vegetation clearing activities associated with the Proposed Action potentially could displace fringed myotis, Townsend's big-eared bat, and spotted bat temporarily, but would have no measurable influence on the abundance or distribution of these species at the scale proposed. No disturbance is planned in the vicinity of perennial streams or wet meadows, which

would reduce potential impact on northern leopard frog and foraging habitat of the three bat species. Impact on these species could include direct mortality due to crushing by construction equipment, reduction of suitable habitat, and temporary disturbance, displacement and avoidance. Suitable habitat exists outside of the trunk line ROW and individuals displaced by construction could relocate along or near disturbance areas in adjacent habitat. Impacts from habitat disruption would last until revegetation efforts are successful and native vegetation is reestablished.

Construction would result in habitat loss and potential displacement or avoidance of nesting goshawks from areas near development sites. Assuming that abundant suitable habitat exists within and adjacent to the project area, individuals displaced by construction could relocate to adjacent suitable habitat. Although no goshawk nests were documented in the project area (HWA 2010a), impacts to potential goshawk nesting habitat would be longer than life-of-project, until successful pinyon-juniper woodland regeneration occurs (which may take 75-200 years). Avoidance of mature pinyon-juniper habitats and old growth pinyon-juniper stands, where feasible and acceptable to the BLM, would minimize impact to potential goshawk nesting habitat. Potential impact to northern goshawks should be similar to those for all raptor species that are present. Potential effects are described in more detail under the terrestrial wildlife section.

Across the entire project area, impacts on sage-grouse and sage-grouse habitat in general are expected to be minimal because the majority (98 percent) of the project area is unsuitable as sage-grouse habitat. In the long term, the removal of younger stands of pinyon-juniper may result in increased availability of sagebrush as regeneration occurs along pipeline ROWs, potentially increasing grouse-preferred habitat.

Impacts to Brewer's sparrow are expected to be minimal because of the small amount of suitable habitat within the project area. Impacts to Brewer's sparrow could include reduction of habitat, and temporary disturbance and displacement. Suitable habitat exists outside of the project area and individuals displaced by construction could relocate to adjacent habitat. Potential impacts to migratory birds, which are directly applicable to Brewer's sparrow, are described in more detail under the migratory bird section.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under the No Action Alternative, the proposed project would be denied and construction would not occur on BLM-administered lands, and there would be no impact to threatened or endangered, candidate, or BLM sensitive species. Ongoing production operations within the PDPA would continue.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Impacts to threatened, endangered, and sensitive wildlife species would be reduced by implementing the following measures:

- For raptor species, avoid construction or forest clearing activity from February 1 through August 15, unless raptor survey results indicate that raptor nest structures would not be impacted by the proposed activities.
- Raptor survey report products and survey methodology will follow established guidelines and procedures described in the WRFO Diurnal Raptor Survey Protocol (Smithers 2012).
- All raptor nests (e.g., stick-built structures, nest cavities, eyries, etc.), regardless of their breeding or non-breeding season status, are to be reported to WRFO NRS, Brett Smithers via phone (970.878.3818) or by E-mail (bsmithers@blm.gov; preferred) within 24 hours of the observation.
- The following information will be provided when reporting raptor nests to BLM:
 - the species observed using the nest, if applicable;
 - UTM coordinates for each nest (recorded in NAD83, Zone 12);
 - the status of the nest (e.g., occupied, unoccupied, unknown)
 - the condition of the nest (e.g., excellent, good, poor, fallen out of tree) (see Smithers 2012)
 - the date the nest was re-visited (for known nests) or first documented (for newly found nests);
 - brief summary describing adult and/or juvenile behavior and number of nestlings observed, if applicable;
 - project name and NEPA document number, if applicable.
- XTO will provide all drivers with information and possibly training with regard to the types of wildlife species in the area that are susceptible to vehicular collisions, in order to reduce the risk to raptors feeding on road-killed carrion. Vehicle collisions with raptors, sage-grouse, and all other wildlife species will be reported to the BLM-White River Field Office, the local CPW Manager, and the USFWS Grand Junction office.

Finding on the Public Land Health Standard for threatened and endangered species:
The Proposed Action would not jeopardize the viability of any special status animal population. The proposed project would have no substantial consequence on habitat condition, utility, or function, nor have any discernible effect on species abundance or distribution at any landscape scale. The public land health standard would continue to be met.

SPECIAL STATUS PLANT SPECIES (Includes a finding on Colorado Public Land Health Standard 4)

Affected Environment: *Physaria congesta* (Dudley Bluffs bladderpod) and *Physaria obcordata* (Dudley Bluffs twinpod) may be affected by the Proposed Action. Both species are federally listed as threatened under the Endangered Species Act. Both species occupy habitats

that are narrowly endemic to various tongues of the Green River Formation which is in close proximity to the Proposed Action.

There are no known special status plants within 600 m of the proposed project area. The area was thoroughly surveyed during the 2010 blooming season to ensure that no threatened plant populations are affected. In the survey, suitable habitat was identified within 20 m of the Proposed Action. To encourage recovery of communities supporting and surrounding special status plant species, use the recommended seed mixes using native species in Appendix C according to range site description for all reclamation activities. It is also encouraged to use all forbs recommended in the mixes.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: The Proposed Action would not directly affect populations of special status plant species. Suitable habitat would be disturbed by development activities under the Proposed Action. Removing suitable habitat of the special status endemic species could potentially indirectly affect the species. Disturbance of the native communities may also create opportunities for exotic species invasion and establishment which may spread into neighboring suitable habitat.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative there would be no construction or disturbance as the project would not be approved. Therefore there would be no impacts.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations protective of special status plants include:

- All reclamation activities should follow recommendations found in the White River Field Office Surface Reclamation Plan (WRFO-SUP). The reclamation seed mixes should use native species found in corresponding range site descriptions and when available the highest amount of forbs species should be used in the mix to promote pollinator habitat. Any exotic species found after disturbance should be treated in accordance with White River Field Office Integrated Weed Management Plan to avoid encroachment on special status plant species suitable habitat. Also see mitigation measures in the *Vegetation* and *Invasive, Non-Native Species* sections.
- GIS locations of surveyed suitable BLM-sensitive plant habitat must be received by WRFO prior to beginning any surface disturbing activity. In areas where suitable BLM-sensitive plant habitat will be disturbed, thirteen-mile tongue soils must be carefully removed and stored separately from other geologic layers. When the suitable habitat

areas are reclaimed, thirteen-mile tongue soils must be re-distributed separately to avoid mixing with other geologic layers, and returned to their to pre-disturbance surface exposure.

- If the Proposed Action is not constructed by 2013 then all suitable habitat within 600 m of disturbance must be re-surveyed for special status plant species. If special status plant species are found within 600 m of the Proposed Action, consultation with the US Fish and Wildlife Service must be initiated. Any conservation measures outlined in the biological assessment will apply to the Proposed Action.

Finding on the Public Land Health Standard #4 for Special Status Species: The proposed and no-action alternatives would have no influence on populations of plants associated with the Endangered Species Act or BLM sensitive species and, as such, would have no influence on the status of applicable land health standards. The Proposed Action will have an influence on habitat associated with the Endangered Species Act but with implementation of mitigation measures and successful revegetation, the proposed project would not adversely affect the continued attainment of the land health standard in the vicinity of the project area.

MIGRATORY BIRDS

Affected Environment: Migratory birds are species that in the course of their annual migration traverse certain parts of the United States, Canada, Mexico, Russia, or Japan. This includes long-distance migrants, short-distance migrants, and resident species. The Migratory Bird Treaty Act of 1918 makes it unlawful to pursue, hunt, kill, capture, possess, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition, Executive Order 13186 (signed in 2001) makes federal agencies responsible for implementing bird conservation principles by ensuring that any federal action evaluates its effects upon migratory bird populations. A variety of migratory birds utilize the vegetation communities within the project area during the nesting period (typically May 15 – July 15) or during spring and fall migrations.

Opportunistic sightings of 61 migratory bird species were documented during surveys conducted in the project area in 2010 (HWA 2010a, Table 18). Fifteen of the species documented are species of concern identified by the USFWS Birds of Conservation Concern list for Bird Conservation Region (BCR) 10: U.S. Northern Rockies (USFWS 2008), the Partners in Flight North American Landbird Conservation Plan for the Intermountain West (Rich et al. 2004), or the Colorado BLM Sensitive Species List for the WRFO (BLM 2009c; Table 19).

Table 18. Opportunistic Sightings of Migratory Bird Species in the Vicinity of the Project Area

Common Name	Scientific Name	Common Name	Scientific Name
American Kestrel	<i>Falco sparverius</i>	Juniper Titmouse	<i>Baeolophus ridgwayi</i>
American Robin	<i>Turdus migratorius</i>	Lark Sparrow	<i>Chondestes grammacus</i>
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	Loggerhead Shrike	<i>Lanius ludovicianus</i>
Black Swift	<i>Cypseloides niger</i>	Long-eared Owl	<i>Asio otus</i>
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	Mountain Bluebird	<i>Sialia currucoides</i>

Common Name	Scientific Name	Common Name	Scientific Name
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	Mountain Chickadee	<i>Poecile gambeli</i>
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	Mourning Dove	<i>Zenaida macroura</i>
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	Northern Flicker	<i>Colaptes auratus</i>
Brewer's Sparrow	<i>Spizella breweri</i>	Northern Goshawk	<i>Accipiter gentilis</i>
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	Northern Harrier	<i>Circus cyaneus</i>
Brown-headed Cowbird	<i>Molothrus ater</i>	Northern Pygmy-owl	<i>Glaucidium gnoma</i>
Bushtit	<i>Psaltriparus minimus</i>	Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>
Cassin's Finch	<i>Carpodacus cassinii</i>	Plumbeous Vireo	<i>Vireo plumbeus</i>
Chipping Sparrow	<i>Spizella passerina</i>	Red Crossbill	<i>Loxia curvirostra</i>
Clark's Nutcracker	<i>Nucifraga columbiana</i>	Red-breasted Nuthatch	<i>Sitta canadensis</i>
Common Nighthawk	<i>Chordeiles minor</i>	Red-tailed Hawk	<i>Buteo jamaicensis</i>
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	Sage Thrasher	<i>Oreoscoptes montanus</i>
Common Raven	<i>Corvus corax</i>	Say's Phoebe	<i>Sayornis saya</i>
Cooper's Hawk	<i>Accipiter cooperii</i>	Sharp-shinned Hawk	<i>Accipiter striatus</i>
Dark-eyed Junco	<i>Junco hyemalis</i>	Spotted Towhee	<i>Pipilo maculatus</i>
Downy Woodpecker	<i>Picoides pubescens</i>	Townsend's Solitaire	<i>Myadestes townsendi</i>
Dusky Flycatcher	<i>Empidonax oberholseri</i>	Turkey Vulture	<i>Carthartes aura</i>
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Vesper Sparrow	<i>Pooecetes gramineus</i>
Golden Eagle	<i>Aquila chrysaetos</i>	Violet-green Swallow	<i>Tachycineta thalassina</i>
Gray Flycatcher	<i>Empidonax wrightii</i>	Virginia's Warbler	<i>Vermivora virginiae</i>
Great Horned Owl	<i>Bubo virginianus</i>	Western Bluebird	<i>Sialia mexicana</i>
Green-tailed Towhee	<i>Pipilo chlorurus</i>	Western Scrub-Jay	<i>Aphelocoma californica</i>
Hairy Woodpecker	<i>Picoides villosus</i>	White-breasted Nuthatch	<i>Sitta carolinensis</i>
Hermit Thrush	<i>Catharus guttatus</i>	White-throated Swift	<i>Aeronautes saxatalis</i>
House Finch	<i>Carpodacus mexicanus</i>	Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>
House Wren	<i>Troglodytes aedon</i>		

Source: HWA 2010a

Table 19. Migratory Bird Species of Conservation Concern Documented within the Project Area

Common Name	Scientific Name	Primary Habitat Association ⁴	Seen in 2010 in Project Area
Black Swift ^{1,2,3}	<i>Cypseloides niger</i>	None suitable	yes
Brewer's Sparrow ^{1,2,3}	<i>Spizella breweri</i>	Western Shrublands	yes
Cassin's Finch ^{1,2}	<i>Carpodacus cassinii</i>	Conifer Forest	yes
Clark's Nutcracker ²	<i>Nucifraga columbiana</i>	Conifer Forest	yes
Dusky Flycatcher ²	<i>Empidonax oberholseri</i>	Western Shrublands	yes
Gray Flycatcher ²	<i>Empidonax wrightii</i>	Woodland	yes
Green-tailed Towhee ²	<i>Pipilo chlorurus</i>	Western Shrublands	yes
Loggerhead Shrike ¹	<i>Lanius ludovicianus</i>	Various	yes
Mountain Bluebird ²	<i>Sialia currucoides</i>	Western Shrublands	yes
Northern Goshawk ³	<i>Accipiter gentilis</i>	Mature Woodland	yes

Common Name	Scientific Name	Primary Habitat Association ⁴	Seen in 2010 in Project Area
Pinyon Jay ²	<i>Gymnorhinus cyanocephalus</i>	Woodland	yes
Sage Thrasher ^{1,2}	<i>Oreoscoptes montanus</i>	Western Shrublands	yes
Virginia's Warbler ²	<i>Vermivora virginiae</i>	Woodland	yes
White-throated Swift ²	<i>Aeronautes saxatalis</i>	Various	yes
Williamson's Sapsucker ^{1,2}	<i>Sphyrapicus thyroideus</i>	Conifer Forest	yes

Source: HWA 2010a

¹ USFWS Birds of Conservation Concern list for Bird Conservation Region (BCR) 10: U.S. Northern Rockies (USFWS 2008)

² Partners in Flight North American Landbird Conservation Plan for the Intermountain West (Rich et al. 2004)

³ Colorado BLM Sensitive Species List for the WRFO BLM (2009)

⁴ Habitat association based on habitat types described in Rich et al. 2004. Vegetation communities within the project area that comprise Western Shrublands include sagebrush shrublands and mixed mountain shrublands; Woodlands include piñon-juniper woodlands; and Coniferous Forest includes mixed aspen/conifer forest.

Environmental Consequence of the Proposed Action:

Direct and Indirect Effects: The Proposed Action would result in the direct surface disturbance of 192.5 acres of the project area during the construction phase. Potential migratory bird breeding and feeding habitats within the project area that would be affected by the Proposed Action are summarized in Table 20. Life-of-project direct residual habitat loss would be 132.2 acres following successful reclamation.

Table 20. Surface Disturbance to Migratory Bird Habitats, Proposed Action.

Habitat (CDOW 1997)	Construction (Acres)	Post-reclamation Residual (Acres)
Pinyon/juniper ¹	55.5	55.5
PJ-Sagebrush Mix ²	32.0	32.0
PJ-Mountain Shrub Mix ³	28.0	28.0
Sagebrush-Grass Mix ⁴	41.0	7.8
Juniper-Sagebrush Mix ⁵	11.0	2.0
Other ⁶	25.0	6.9
Total	192.5	132.2

¹ Pinyon/juniper (PJ). This type is co-dominated by pinyon pine and Utah or Rocky Mountain juniper. Understory is typified by sagebrush, mixed mountain shrubs, or grasses.

² PJ-Sagebrush Mix. Co-dominated by woodland and shrubland species. Woodland areas are dominated by pinyon pine and Utah or Rocky Mountain juniper while big sagebrush grows in spaces between the trees and may constitute up to 25 percent of the total cover.

³ PJ-Mountain Shrub Mix. Similar to the PJ-sagebrush mix, except that the shrubland component is dominated by tall shrubs such as Gambel oak, mountain mahogany, serviceberry, and sagebrush.

⁴ Sagebrush-Grass Mix. Consists of co-dominant sagebrush shrubland and perennial grassland. Principle shrub species include big sagebrush, 3-winged sage, and black sage. Principle grass species include: crested wheatgrass, bluebunch, wheatgrass, and blue gramma.

⁵ Juniper-Sagebrush Mix. Consists of co-dominant Utah juniper woodland at cover densities around 25 percent, and interstitial big sagebrush at densities up to about 25 percent.

⁶ Other. Consists of intermixed patches of Sagebrush/Greasewood, Sparse PJ/Shrub/Rock Mix and Sagebrush/Mesic Mountain Shrub communities.

Construction activities associated with building well pads, staging areas, roads, pipelines and other facilities –would result in the loss or alteration of migratory bird breeding and feeding habitat within the project area. The effects of these activities begin with the construction phase and could continue through drilling and completion and operations until reclamation is determined successful by the BLM. Under natural succession, approximately 75 percent of migratory bird habitat within the project area would require extended periods of time to reach composition and successional stage comparable to existing conditions (Table 20). Pinyon pine may require 75–200 years to reach early mature states, at which time they are 6–18 inches in diameter and are 10–30 feet in height. These trees commonly reach 400 years of age and can exceed 500 years of age. Junipers reach maturity at 80 to 100 years of age, at which time they are 6–12 inches in diameter and average 18 feet in height (Buttery and Gilliam 1983). Re-establishment of sagebrush species may vary from 35 or more years for mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*) to 50-120 years for the more arid-adapted Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*) sub-species common to the lower elevations of the project area (Baker 2006). Old-growth PJ stands would be avoided and maintained in their entirety wherever possible (See Vegetation section).

If vegetation clearing coincides with the nesting season, direct loss of nests with eggs or young could potentially occur. However, short-term disturbance of vegetation clearing should have no measurable impact on the abundance or distribution of migratory birds at the regional scale, i.e. the range of any particular species. The environmental consequence of migratory bird breeding and feeding habitat loss is anticipated to be minimized at the regional scale based on the following:

- 1) the loss or alteration of nesting, breeding, and foraging habitats are confined to a relatively small geographic area (compared to migratory bird population range);
- 2) no identified critical habitat types would be affected; and
- 4) the implementation of the proposed mitigation measures and ACDFs should minimize impacts.

Activities associated with construction of well pads, staging areas, roads, and pipelines would increase effects of noise and human presence in the area and would likely be a primary cause for temporary avoidance of the area by migratory birds. The effect of increased human presence and noise during the high intensity construction phase would be expected to be more pronounced than during the longer reduced-activity production phase. Sensory (noise) disturbance associated with construction would be short-term at any specific location, and is not expected to result in more than temporary avoidance of the construction site by migratory birds. Assuming some suppression of nesting activity within 100 meters of disturbance, up to 850 acres of habitat would be affected in total. However, because not all construction would occur at one time or in the same breeding season, the 850 acre total would not be reached at any given time.

In the absence of prescribed thresholds for displacement, avoidance and abandonment, the significance of the project's environmental effect on migratory birds was determined qualitatively. Birds displaced by temporary construction activities would be expected to repopulate affected areas through production phase, albeit at reduced densities. Birds associated with mature woodland and shrubland communities would be subject to long term reductions in

the availability of suitable nest habitat. With the implementation of the proposed mitigation measures and ACDFs, it is anticipated that environmental consequences of temporary displacement of migratory birds and reduction in the habitat base would affect some individuals, but would not impact the continued viability of any species.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP.

Environmental Consequence of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, the proposed project would be denied, construction would not occur on BLM-administered lands, and there would be no project-related effects on migratory birds or associated habitats. Ongoing production operations within the PDPA would continue.

Cumulative Effects - As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures - Additional recommended mitigations protective of migratory birds include:

- For all other non-raptor migratory birds, avoid ground or vegetation disturbing activity to the extent possible during the nesting season (May 15 – July 15).

TERRESTRIAL WILDLIFE

Affected Environment: A variety of wildlife habitats and their associated species occurs in the project area. Each habitat type provides food, cover, and shelter for mammal, bird, amphibian and reptile species common to northwest Colorado. Although all of the species are important members of native communities and ecosystems, most are common and have wide distributions within the state and region. As indicated in the PDP EA to which this analysis is tiered, small mammal populations are poorly documented; however those species that are likely to occur in the project area display broad ecological tolerance and are widely distributed throughout the Great Basin and/or Rocky Mountain regions. No narrowly distributed or highly specialized species or subspecific populations are known within the project area or adjacent lands within the PDP analysis area.

Of the variety of species present within an area, the BLM commonly places management emphasis on certain species of value specific to locations within BLM-administered federal lands. The primary wildlife issues in relation to the proposed surface disturbance activity for the proposed project are potential impacts to big game winter range and raptor nesting areas. BLM sensitive species are discussed under the Special Status Animal Species section above. As other general wildlife species were thoroughly discussed in the PDP EA, to which this analysis tiers, those species will not be further discussed in this analysis.

Big Game: Elk and mule deer are the two big game species of concern for which potential impacts to individuals and their habitats, particularly winter habitat, are the focus of the analysis. We note that elk are of less concern within the context of managing human/ungulate interaction in the Piceance Basin than are mule deer. Although elk occur within the project area, there is no known resident population. Much of the Piceance Basin is classified as elk summer and winter range. All of the project area is classified as elk winter range, with elk winter concentration areas extending over the majority of the project area. No specific elk migration route or highway crossing has been identified within the project area, but elk presumably migrate from higher elevation to lower elevation along Piceance Creek in the winter.

Research on elk/human interaction has shed light on several responses that could be expected in the project area during both construction and life-of-project phases of the Proposed Action. Elk generally tend to avoid infrastructure, such as roads, that channels human activity, and show strong selection for habitat features that provide security cover (Edge and Marcum 1985, Morrison et al. 1995, Rowland et al. 2000, Preisler et al. 2006). Elk have been shown to respond to human activity by modifying the size of the home range, shifting the home range away from human activity, moving long distances, and making complex movements (Webb et al. 2011a, 2011b). Some research has suggested negative demographic consequences associated with infrastructure development and associated human activity (Friar et al. 2008), while other research has shown that elk can adapt to infrastructure development and human activity associated with energy development (Dzialak et al. 2011, Webb et al. 2011b).

Mule deer occur throughout the Piceance Basin and the project area. Important winter range habitat includes sagebrush-steppe, mountain shrub, agricultural areas, and pinyon-juniper or pine woodlands below 7,500 feet (Watkins et al. 2007). The winter diet is a diverse combination of browses, forbs, and cool-season grasses, with browses increasing in importance as snow accumulates (Hansen and Dearden 1975, Wallmo and Regelin 1981). Historically, the Piceance Basin has supported some of the highest mule deer densities in Colorado (NDIS 2011). One of the objectives of the White River RMP is to maintain habitat conditions sufficient to support a minimum of 24,900 mule deer in the Piceance Basin during winter (BLM 1997). The project area is located within CPW Game Management Unit #22. CPW has designated Piceance Creek Road (CR 5) as a mule deer highway crossing area. The entire project area is classified as mule deer winter range, and all but 0.85 miles of the lower portion of the Southern Access Road are classified as severe winter range – a specialized component of winter range that periodically supports virtually all of an area's deer under the most severe winter conditions (i.e., extreme cold and heavy snow pack, Figure 9). According to White River RMP stipulations, no surface-disturbing activity is allowed within mule deer severe winter habitat between December 1 and April 30 in the absence of some type of variance from BLM (BLM 1997). Although no specific mule deer migration route has been identified within the project area, mule deer do migrate from higher elevation to lower elevation habitat along Piceance Creek in the winter. Mule deer also migrate west into the Piceance Basin from the Flat Tops Wilderness in the fall.

Based on recent CPW telemetry results, there are two distinct groups of deer that winter on the severe winter ranges east of Piceance Creek and south of the Dry Fork of Piceance (Magnolia). These deer segregate largely north and south of Lee Gulch and there appears to be little interchange between the two groups from December through April. This distribution lent itself well to the design of ongoing CPW research that is designed to demonstrate deer response to

development activity and forage mitigation treatments. The south half of Magnolia has been subject to intense development activity for over a decade; the range north of Lee Gulch is largely undeveloped and deer wintering here serve as the control group. The North Hatch project lies south of Lee Gulch and is adjacent and contiguous with high density development between Collins Gulch and Hatch Gulch.

The issues surrounding mule deer conservation and energy development include potential demographic consequences of: 1) habitat loss or fragmentation, 2) behavioral responses such as displacement and changes in resource selection, 3) physiologic stress, and 4) secondary effects such as vehicle strikes (WAFWA 2010). Mule deer, like elk, tend to show general avoidance of human activity (*sensu* Rost and Bailey 1979, Freddy et al. 1986). Published information bearing directly on the interaction between mule deer and energy development comes from two areas – the Pinedale Anticline in western Wyoming (i.e., the Mesa; Sawyer et al. 2006; 2009, Sawyer and Nielson 2010) and Raton Basin in southern Colorado (Webb et al. 2011c, Van Dyke et al. 2011).

In western Wyoming, mule deer altered resource selection in developed areas and generally selected to be far from infrastructure associated with energy development (Sawyer et al. 2006; 2009). Abundance of mule deer in developed areas, as well as across the herd unit that encompassed those areas, declined over the course of the observation (Sawyer and Nielson 2010). Sawyer and Nielson (2010) note that assigning causes to the observed decline remains difficult, but they speculate reasonably that energy development could affect population performance if the observed behavioral responses cascade to demographic consequences.

In southern Colorado, Webb et al. (2011c) found that mule deer tended to avoid roads, but used habitat near producing well pads more frequently than expected. They found that the response of deer to infrastructure was dampened relative to the response of elk – a finding that is in contrast to previous work that showed that deer generally avoided human activity to a greater extent than elk (Rost and Bailey 1979). Van Dyke et al. (2011) found that mule deer occupied habitat directly adjacent to producing wells and suggested that, in southern Colorado, mule deer demonstrated the behavioral capacity to habituate to habitat modifications and other environmental changes associated with development for the extraction of energy resources. Vitt (2007) noted that mule deer numbers in the Data Analysis Unit in the Raton Basin declined, stabilized, and then increased slightly during the period of observation (1993-2006). Vitt (2007) noted that habitat modification as a consequence of energy development was a concern, but that trends in the deer population were not explained by changes in the intensity of energy development. As in other areas where mule deer are in decline (*sensu* Ellenberger and Byrne 2011), Vitt (2007) noted that competition with increasing elk herds, habitat maturation, and other human activities were issues of concern for long-term mule deer population trends.

Observations from both areas, the Anticline and Raton Basin, inform judgment as to the potential impact of the Proposed Action on mule deer in Piceance Basin. One factor that figures prominently in any effort to reconcile the different and, in some ways, contradicting observations on mule deer between the Anticline and Raton Basin is habitat. The Anticline is characterized by sagebrush and sagebrush-grassland steppe, whereas Raton Basin is characterized by rugged topography and steep slopes dominated by juniper, pine, and fir forest interspersed with mountain shrub and grassland communities. Topography and vegetation have been shown to

ameliorate the effects of disturbance on ungulates (Edge and Marcum 1991; see below). If habitat plays a role in mediating mule deer response to human activity, it would be important to note here that the project area and Raton Basin have several habitat features in common, whereas the Anticline differs substantially from these areas. Ongoing research conducted by CPW would be expected to generate quantitative information bearing on this general observation.

Raptors: The mature pinyon-juniper woodlands (including old growth trees), sagebrush communities, rock outcrops, and snags located within the project area provide nesting substrate and foraging habitat for golden eagles, great horned and long-eared owls, northern harriers, northern goshawks, Cooper’s hawks, sharp-shinned hawks, red-tailed hawks, American kestrels, and prairie falcons (Kingery 1998). Generally, raptors return to areas in which they have nested in the past, often using the same nesting territories. Nesting activities may be initiated in mid-February to late-April depending upon species. Nest occupation continues until chicks are fledged, which usually occurs from early June to mid-August. Raptor nesting is known to occur in suitable habitat within and adjacent to the project area (Smithers 2009).

In June and July 2010, Hayden-Wing Associates, LLC conducted raptor nest surveys within the project area (HWA 2010a). Twenty-five raptor nests were located within 0.25 miles of planned disturbance of the project area. Of the 24 viable raptor nests, seven were active, one was tended, two were visited, and 14 were inactive. The seven active raptor nests were identified as two red-tailed hawk nests, two Cooper’s hawk nests, one long-eared owl nest, one American kestrel, and one sharp-shinned hawk nest (Table 21; HWA 2010a).

Fourteen nests were inactive during surveys conducted in 2010 (HWA 2010a). Because nests in functional condition have the potential of being occupied in any given year, inactive raptor nest sites are often used in subsequent years. Moreover, Smithers (2011) noted that nesting area re-occupancy was high for Cooper’s hawk in Piceance Basin, with 11 pairs returning to the nest structure that was used in 2010, and an additional 20 pairs returning to the same nest stand to either construct a new nest or occupy an alternate nest, for a total of 31 pairs (or 74% of all known 2011 Cooper’s hawk territories) reoccupying 31 known nesting territories during the 2011 breeding season.

All raptors and occupied raptor nests are protected from take or disturbance under the Migratory Bird Treaty Act (16 USC, § 703 *et seq.*). Moreover, WRFO’s RMP provides additional protection for functional raptor nests. Golden and bald eagles also are given additional protection under the Bald Eagle Protection Act (16 USC §669 *et seq.*).

Table 21. Active Raptor Nests and Distance to Nearest Proposed Well Pad

Common Name	Proposed Pad	Distance (meters)
Cooper’s Hawk	PCU 297-1A	1158
Cooper’s Hawk	PCU 197-35B	334
Red-tailed Hawk	PCU 197-35A	329
Red-tailed Hawk	PCU 197-35B	536
Sharp-shinned Hawk	PCU 197-35B	49
Long-eared Owl	PCU 197-27B	329
American Kestrel	PCU 197-27B	692

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Sources of potential impacts to wildlife individuals and habitat that may be affected by the proposed project include the construction of access roads, pipelines (gathering system and flowlines), and well pads; the drilling and completion of up to 20 wells on each well pad, and the operation, monitoring, and maintenance of project facilities for the life-of-project. The potential impacts remaining following the application of mitigation measures to big game, particularly mule deer, and to raptors are addressed in this section.

Habitat Loss: Development, primarily construction of facilities, under the Proposed Action would result in the initial loss of 192.5 acres, and, with the application of final reclamation measures (pipeline ROW) and interim reclamation of roads and well pads, the residual life-of-project loss would be approximately 33.1 acres (Table 3). Impacts on big game and raptor species and their habitats would vary depending upon the requirements of each species and the undisturbed habitat present in the vicinity. Development activities could affect wildlife through disturbance, displacement, and mortality. The primary impact to wildlife would be the removal of existing vegetation and the resulting loss of cover, nesting, and foraging habitat. The degree of impact would depend on the type of habitat affected and the rate that vegetation would regenerate after application of reclamation measures. Herbaceous vegetation would likely reestablish within one to two years and big sagebrush-dominated communities would likely return to their pre-construction condition within 20 to 75 years. Mountain shrub communities may take 50 years, and mature pinyon-juniper woodlands would take from 100 to 300 years to return to pre-construction conditions (Goodrich and Barber 1999). Tree and shrub habitats for big game and raptors would be altered for an extended period of time, although limited to the 192.5 acres, which would be initially removed over approximately 4 years under the 3 rig scenario.

Displacement: Development activities could also result in the displacement or avoidance of big game and raptor individuals from areas within or adjacent to areas of development activity. Reproductive success and nutritional condition could decrease due to increased energy expenditures that result from physical response to disturbance. Sawyer et al. (2006; 2009) observed displacement of mule deer from areas undergoing energy development with no indication of re-occupancy of abandoned areas. In areas where rugged topography and mountain shrub or forest communities may function to ameliorate the effects of disturbance (*sensu* Edge and Marcum 1991), it is possible that displacement would be of a lesser magnitude or displaced animals would return to formerly-occupied range during the production phase and for the life-of-project, particularly if habitat reclamation is conducted (Vitt 2007, Webb *et al.* 2011c, Van Dyke *et al.* 2011).

Big Game: Impacts to big game would include the loss of forage and protective cover, the mortality of individuals from vehicle strikes and poaching, and the displacement of individuals and groups from disturbed former habitat and from portions of the project area where human activity and use of vehicles and equipment occurs. A summary of disturbance to ranges within elk and mule deer habitats is presented in Table 22.

Although there would be an extended period of loss for protective cover for elk and mule deer within the 192.5 acres of project disturbance, final and interim reclamation measures would be applied following construction to the project area leaving approximately 31.1 acres of residual disturbance for life-of-project production phase activities. The residual disturbance would consist of roads, unreclaimed portions of well pads, and pig launcher and receiver sites. In addition to BLM standard seed mixes to be applied as part of required mitigation (Appendix C), site-specific seed mixes that optimize restoration of big game forage are likely to be required, particularly for reclaimed pipeline ROW where attracting big game to reclaiming ROW would not conflict with vehicle activity and potentials for collisions. Protective cover would be lost for an extended period of time, beyond life-of-project for the project area, but such cover exists on either side of the mostly narrow (100 feet maximum), linear disturbance of much of this project, and this adjacent habitat is available for use by the affected animals. Final reclamation would be implemented at the end of life-of-project for the remaining 33.1 acres of disturbance.

Table 22. Big Game Habitat Disturbance, Proposed Action

Season Range/Special Use Area	Initial Disturbance		Life-of-project Disturbance	
	(Acres)	(% of Total)	(Acres)	(% of Total)
<i>Elk</i>				
Summer/Production Area	0	0	0	0
Winter	74.5	38.7	16.1	48.6
Winter Concentration Area	118.0	61.3	17.0	51.4
<i>Mule Deer</i>				
Summer	0	0	0	0
Winter	4.0	2.1	1.8	5.4
Severe Winter	188.5	97.9	31.3	94.6

In the project area, behavioral responses by more adaptive and mobile elk such as changes in space use and movement should be expected but should not adversely affect local populations, provided that sufficient security cover remains available and measures are taken to minimize vehicle collisions and resultant mortality. Effects on less adaptive and more localized mule deer may be of greater consequence, particularly during periods of occupancy of severe winter range during severe winter conditions.

The project area is located within the 40,031 acre Magnolia mule deer population segment which contains approximately 25,982 acres of mule deer severe winter range. The Proposed Action would result in a long-term loss of 31.3 acres of mule deer severe winter range, resulting in a direct loss of 0.12 percent of severe winter habitat within the Magnolia population segment. Impacts of habitat loss, including mule deer severe winter range, could be mitigated by habitat treatment projects to enhance forage for wintering big game; research addressing this subject has been initiated under terms of the Piceance Basin Wildlife Mitigation Plan (WMP) entered into by XTO and CPW, (Appendix A). As part of the WMP, XTO is administering a habitat enhancement project on selected BLM lands in the vicinity of the project area to promote resident mule deer populations. This project is largely aimed at restoring fire-induced early successional shrub-land communities.

Increased traffic volume on roads within and near the project area could increase the frequency of vehicle strikes on elk and deer, particularly during construction and drilling phases. Increased human presence and improved road access within the project area could also result in increased poaching. These potential impacts would likely be greatest during the first four years of project implementation (assuming 3 rigs), but would remain for the life-of-project. Big game impacts associated with road density and use (i.e., behavioral avoidance and habitat disuse; increased energetic demands) received prominent address in the White River ROD/RMP. It is BLM's policy that road construction/reconstruction should be the minimum necessary to support the intended use (BLM 9113 Road Manual). XTO has proposed that access to the pig receiver site consist of a two-lane, all-weather road. Due to the low traffic volumes anticipated on this road, BLM does not believe this segment warrants the need for a two-lane roadway and recommends this segment be maintained as a BLM resource road (12-14 foot, single-lane travelway). Furthermore, BLM recommends that a locked gate be installed and remained locked at all times at the BLM-private land boundary located immediately off of CR 5 (Piceance Creek Road). Although unauthorized tracks have developed since pipelines have been installed in the valley, Hatch Gulch remains one of the few roadless drainages in Piceance Basin. Based on BLM's experience, unrestricted access would likely promote unauthorized vehicle use beyond the pig receiver site, further up Hatch Gulch and/or along the proposed pipeline route to the north or existing pipeline route to the south, potentially subjecting another 300 acres of mule deer severe winter range to human influence. By installing a lockable gate and requiring the minimal road necessary, unauthorized vehicle use should effectively be deterred.

Indirectly, this project would subject another 2,635 acres (approximately 1.5 percent of severe winter range in GMU 22; approximately 8 percent of severe winter range on Magnolia) to prolonged patterns of intense development activity (e.g., drilling and completion) during the big game winter use period. Indirect impacts to big game would include reduced use of habitat that is near or adjacent to project facilities during construction and operations, including drilling and well completions, and displacement of animals from habitat, especially from portions of severe winter range. Daylight construction, especially during the 17-week period of pipeline, road, and initial well pad construction, would likely displace animals to adjacent habitat. Assuming the four-year period of well drilling and completions on as many as three of the six well pads will occur day and night, throughout the 24-hour period, big game, particularly mule deer would be expected to avoid such areas during both day and night. Operation and maintenance of a producing wellpad (20 wells) would result in reduced human activity and noise (compared to construction and drilling phases) in and around the wellpads and pipelines with periodic but few vehicles and limited human activity at development sites. The activities associated with well production and pipeline operations are those which are typically accepted by the BLM as excluded from stipulated limitations. If habitat features mediate the behavioral responses of mule deer, as has been shown in other ungulates (Hirth 1977, Hebblewhite et al. 2005, Crooms and Olf 2006), and if such responses include the capacity to adapt to disturbance (Webb et al. 2011c, Van Dyke et al. 2011), then activities during the life-of-project production phase would be expected to have minimal impact on long-term performance of big game populations occupying habitat adjacent the project area.

CPW began a mule deer study in the larger Piceance Basin in 2007 wherein they deployed GPS collars to estimate density, habitat use and movement patterns of female mule deer. They will

also estimate fawn survival, female body condition and implement small scale habitat improvements. Their main objective is to evaluate the effectiveness of habitat treatments and to determine if habitat mitigation efforts are effective in oil and gas development areas. Radio-collared deer may use the project area, especially during the winter months based on previous CPW mule deer winter range estimates. The CPW study should run through 2015 (possibly into 2018) and should provide the information necessary to develop and implement an adaptive management strategy designed to balance future development in the project area with long-term sustainability of the mule deer herd.

The North Hatch Project area forms a contiguous extension to an area that the WRFO had formerly granted an exception to winter drilling stipulations via an agreement between WRFO, CPW, and XTO. The Project area represents a 13 percent increase in the original extent of that agreement area. The original agreement involved about 21,000 acres on Magnolia south of Hatch Gulch, or about 13 percent of the severe winter range available in GMU 22. The North Hatch Gulch Project would increase that area to involve about 15 percent of severe winter range extent in GMU 22. This agreement was intended to support CPW big game research and promote a drilling strategy that accelerates development timeframes in a localized area as a means to abbreviate the time wintering deer are exposed to intense development activity in any given area.

Overall, the Proposed Action can be expected to affect big game behavior, elk to a lesser extent than mule deer. Considering the relatively limited extent of the Proposed Action, mitigation efforts, and the CPW monitoring study (which should function as a safeguard), the Proposed Action is not expected to have long-term population impacts of consequence. The Proposed Action adds to cumulative development that is ongoing in severe winter range throughout the larger Piceance Basin.

The Proposed Action includes a lease modification and WRFO's intention is to authorize year-round activity via annual exceptions. In contrast to the use of exceptions, the modification of a lease stipulation are permanent and would prevent BLM from adapting management based on ongoing CPW deer research or relevant literature. BLM would effectively divest itself of opportunities to adjust development activity as a means of limiting disturbance to big game in the event future drilling operations are not compatible with these exceptions. Furthermore, because behavioral influences on wildlife are not confined to 50 meters beyond disturbance sources, removing timing limitation measures from the immediate footprint of disturbance would have no practical influence on remedying animal avoidance or habitat disuse and would allow XTO the discretion to conduct any further form of development on these locations/roads through the term of the lease in direct contradiction to the intent of the stipulation and the concept of clustered development.

Raptors: The potential impacts to raptors include nest abandonment and/or reproductive failure due to project activities or increased public access; reductions in prey populations; mortality from vehicle collisions; and loss of nesting and/or foraging habitat in the project area (Smithers 2010). Some direct loss of potential raptor nesting habitat would occur with implementation of the Proposed Action. An estimated 147.6 acres of juniper or pinyon-juniper woodland habitat would be lost with construction of the project and would fail to provide suitable nest substrate for several hundred years. Avoidance of disturbance near existing nest sites and minimizing

disturbance within mature and old growth pinyon-juniper woodlands to the extent feasible and acceptable to the BLM would reduce potential impacts on nesting raptors.

Commencement of construction and clearing of PJ woodland would be avoided from February 1-August 15, unless a field survey indicates that no active raptor nests would be impacted by these activities. When needed, raptor surveys would be conducted between May 15-August 15. Should an active nest(s) be found, appropriate timing stipulations would be applied. After construction has been initiated, the year-round and continuous drilling aspect of the Proposed Action would not be expected to increase the possibility of nest abandonment. Although avoidance of disturbance is expected, it seems reasonable to expect that raptors choosing to initiate a nest in proximity to existing and ongoing construction activities are less likely to later abandon that nest than raptors that initiated a nest prior to commencement of construction activities.

Some raptors feed on carrion along roads, while others (i.e., owls) may attempt to capture small rodents and insects that are illuminated in headlights. These behaviors put them in the path of oncoming vehicles where they are in danger of being struck and killed. The potential for such collisions could be reduced by requiring that drivers receive guidance and/or training that describes the circumstances under which vehicular collisions are likely to occur and possible measures to minimize them.

Project development would disturb habitat for possible raptor prey species. The amount of short-term change in prey base populations created by construction is expected to be minimal in comparison to the overall level of small mammal populations. While prey populations in the project area would likely sustain some reduction during the development phase of the project, some prey species (habitat generalists) would be expected to respond positively to successful reclamation and attain pre-disturbance levels (Smithers 2011). For most prey species, the effects of the Proposed Action are expected to be localized, with changes across the population likely within the range of historic variation. For these reasons, no measurable long-term reduction to the prey base would be anticipated.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP. We note that the Proposed Action, while limited in terms of its local impact on big game, adds to the cumulative effect of ongoing development in severe winter range throughout the larger Piceance Basin.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under the No Action Alternative, the proposed project would be denied and there would be no impacts to big game, raptors or other terrestrial wildlife species.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations designed to minimize impacts to terrestrial wildlife include:

- Provide all drivers with a information and possible training describing the types of wildlife species in the area that are susceptible to vehicular collisions to reduce the potential for vehicle/big-game or vehicle/raptor collisions. Seasonal periods where reduced vehicle speeds would be identified to project workers as a means to reduce potential for vehicle/wildlife collisions.
- Drilling, completion activity, construction and installation of roads, wellpads, pipelines, and related facilities, associated with the North Hatch Gulch project area will be excepted from severe winter range stipulations for a four-year period beginning with the initiation of ground disturbing activity. An annual report will be submitted by the operator, via sundry notice, identifying how the operator has complied with the conditions of approval associated with this decision record, due on October 1st of each year. At the end of each year, BLM will re-evaluate whether an additional year will be added to the time remaining on the exception. Each additional year will be based upon compliance with the conditions of approval, from the previous year and existing conditions at that time. The maximum time of exception will not exceed four years at any time.
- No activities (construction, drilling, etc.) will be allowed within mule deer severe winter range from December 1 – April 30 to reduce adverse behavioral effects on wintering big game (WRRR ROD TL-08). These timing stipulations may be subject to exception/modification provisions addressed in the WRFO RMP.
- The proponent will install a lockable gate at the BLM-private land boundary (NAD 83, Zone 13, Northing 0218683/Easting 4425456. The gate will remain locked at all times and be maintained by the operator throughout the life of the project. It is the proponent's responsibility to ensure that vehicle passage around the gate is effectively precluded.
- Road access to the pig receiver site shall be constructed and maintained as a BLM resource road consisting of 12 to 14 foot wide, single-lane travel-way.
- Preclude vehicle, including OHV, use of reclaimed pipeline ROWs. The proponent will be responsible for maintaining ROWs through the life of the project. Deterrent method will be approved by BLM wildlife staff.
- Conduct raptor surveys during the breeding season prior to construction initiation. If a raptor nest is located, appropriate BLM timing stipulations may be applied (WRRR ROD TL-04).
- For raptor species, avoid construction or forest clearing activity from February 1 through August 15, unless raptor survey results indicate that raptor nest structures would not be impacted by the proposed activities.
- Raptor survey report products and survey methodology will follow established guidelines and procedures described in Smithers 2012.
- All raptor nests (e.g., stick-built structures, nest cavities, eyries, etc.), regardless of their breeding or non-breeding season status, are to be reported to WRFO NRS, Brett Smithers

via phone (970.878.3818) or by E-mail (bsmith@blm.gov; preferred) within 24 hours of the observation.

- The following information will be provided when reporting raptor nests to BLM:
 - the species observed using the nest, if applicable;
 - UTM coordinates for each nest (recorded in NAD83, Zone 12);
 - the status of the nest (e.g., occupied, unoccupied, unknown)
 - the condition of the nest (e.g., excellent, good, poor, fallen out of tree) (see Smithers 2012)
 - the date the nest was re-visited (for known nests) or first documented (for newly found nests);
 - brief summary describing adult and/or juvenile behavior and number of nestlings observed, if applicable;
 - project name and NEPA document number, if applicable.
- Prevent accidental entries or inability of exit of temporary open excavations by wildlife, stock, and public by covering, fencing, sloping or flagging these areas.

Finding on the Public Land Health Standard for plant and animal communities (partial, see also Vegetation): Standard 3 of the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997a) states that plant and animal communities of native and desirable species should be maintained at viable population levels to sustain public land health. The project would not jeopardize the viability of any animal population, nor have a substantial impact on terrestrial habitat condition, utility, or function, or have a discernible effect on animal abundance or distribution at any landscape scale. With implementation of mitigation measures and successful revegetation, the proposed project would not adversely affect the continued attainment of the land health standard in the vicinity of the project area.

PALEONTOLOGICAL RESOURCES

Affected Environment: Surface rocks in the vicinity of the project area include the lower Uinta Formation and upper Green River Formation, both of Middle Eocene age, and Quaternary alluvial deposits. The former are present in the upland areas and are potential sources of fossil material of scientific importance. The latter alluvial deposits are generally not considered to be of paleontological significance. In the Piceance Basin, fossils identified from the Uinta Formation include titanotheres, uintatheres, myacid carnivores, turtles, crocodylians, fish, gastropods, insects, and plant remains. The Green River Formation is highly fossiliferous in the Parachute Creek Member, which is not exposed in the project area. The Thirteen Mile Creek Tongue, which is exposed in the project area, is known to contain ostracods (Armstrong and Wolny 1989) and plant fossils (BLM 2007). Surveys conducted for oil and gas development projects in the area have identified various vertebrate and plant fossils in the Uinta Formation (BLM 2007).

BLM Instruction Memorandum 2008-09 revised the method by which BLM characterizes the paleontological potential of rock units on the public lands. The Potential Fossil Yield Classification (PFYC) system rates geologic units based on their potential for containing vertebrate fossils or invertebrate or plant fossils of scientific significance, as well as their sensitivity to adverse impacts. Rock units are assigned numeric values of 1 to 5, with the higher number indicating units of greater concern for protection of fossil resources. The White River Field Office has determined that the Green River and Uinta formations in the area are category 5 units, indicating highly fossiliferous strata that consistently produce fossils of scientific importance and that are at risk from human impacts. Management concern for Class 5 formations is high. Typically, pedestrian surveys by a qualified paleontologist prior to commencement of activities which could disturb the formations of interest, and monitoring of excavations of formations of interest, would be required (BLM 2007a).

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: USGS geologic mapping of the project area (Duncan 1976, Duncan 1976a) indicates that almost all of the Proposed Action (approximately 94 percent) would occur in areas in which the Uinta Formation forms the bedrock, principally atop ridges. Small outcrops of the Thirteen Mile Tongue of the Green River Formation underlie the main pipeline, a wellpad flowline, and the Southern Access Road in the southeastern portion of the project area. About 4 percent of the project area would be constructed in alluvial deposits of negligible paleontological concern. Soil mapping of the project area (Tripp *et al* 1982) indicates that approximately 94 percent of the disturbance area would occur in shallow soils, generally less than 20 inches in depth. It is likely, therefore, that almost all of the pipeline and wellpad construction and an uncertain amount of road construction would disturb bedrock and that most of this disturbance would be in areas underlain by Uinta Formation.

Excavation of rock containing fossils of scientific importance, and the resultant damage thereto, would likely result in the absence of mitigations, and in the direct loss of scientific information. Increased human presence in the project area during all phases of the Proposed Action would likely increase the potential for illegal collection of fossils. In the event that construction of project components results in increased volumes of storm runoff, increased erosion of drainage channels could result in a faster rate of erosive loss to exposed fossil materials and/or the uncovering of previously buried materials. Mitigation measures associated with implementation of the Proposed Action could increase the current paleontological knowledge base in the area.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, no project-related surface disturbance would occur and there would be no resulting adverse or beneficial impacts to paleontological resources.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional mitigations protective of paleontological resources include:

- Areas underlain by bedrock exposures of the Uinta and Green River formations should be surveyed by a BLM-permitted paleontologist prior to construction disturbance.
- A paleontological monitor will be present prior to and during any excavation into underlying rocks of the Uinta or Green River formations.
- XTO will be responsible for informing all persons associated with the project operations that they will be subject to prosecution for knowingly disturbing paleontological sites, or for collecting fossils.
- Should fossil materials be discovered during any project or construction activities, XTO will immediately stop activities in the immediate area of the find that might further disturb such materials, and immediately contact the AO. Within five working days the AO will inform XTO as to whether the materials appear to be of noteworthy scientific interest and the mitigation measures XTO will likely have to undertake before the site could be used (assuming *in situ* preservation is not feasible). Should XTO opt, at any time, to relocate proposed activities away from resources identified during the initial paleontology survey to avoid impacts to the resource, the AO will assume responsibility for whatever recordation and stabilization of the exposed materials could be required. Otherwise, XTO will be responsible for mitigation cost. The AO will provide technical and procedural guidelines for mitigation and continuation of operations. XTO will be responsible for mitigation cost.
- If fossil remains of potential scientific importance are identified during either survey or excavation, and if such remains would be damaged or destroyed by project activities, then additional mitigation may be proposed as necessary and appropriate. Additional mitigation could include collection, identification, and curation of the fossil remains and continued monitoring of ongoing surface disturbance in the area of discovery.

VISUAL RESOURCES

Affected Environment: Upland ridges/slopes and dissecting tributary drainages, comprised of valley sideslopes and nearly level floodplains, flowing into Piceance Creek comprise the principal landforms in the vicinity of the project area. The narrow upland ridges support varying cover of pinyon/juniper woodlands, mountain shrub or sagebrush vegetation, with grassy or rocky openings. While much of the proposed NHGP is located on the upland ridges, proposed linear facilities drop off an upland ridge into a side drainage and extend across portions of Hatch Gulch bottomlands about a half mile above its confluence with Piceance Creek. The gulch's bottomland/floodplain is about 350 feet wide at this location and supports a mix of sagebrush and grassland. The Piceance Creek valley is about a quarter mile wide and it contains the perennial Piceance Creek, Rio Blanco County Road (CR) 5, and adjacent bottomland/floodplain.

Most traffic on CR 5 at the western end of the project area is comprised of a variety of vehicles supporting oil and gas development and production. Other traffic supports ranching operations and, seasonally, for hunting and general dispersed recreation. The length of sight lines from Piceance Creek valley and CR 5 toward locations of the proposed NHGP are variable due to the dissected terrain, change in elevation, and woodland vegetative cover. Views from ridge-tops in the vicinity of the project area present panoramas of wooded ridges and slopes, gulches, and hillsides of shrubs, grasses, and rock exposure that display a mixture of green and gray vegetation and lighter-colored, rocky outcrops.

The uplands and most of the bottomlands occupied by the proposed Project are BLM-administered federal lands that have been classified by the BLM in the RMP as visual resource management (VRM) Class III (BLM 1997). The Class III designation indicates the BLM's management objective for these lands, in terms of level of observed change allowable for an area, is to partially retain the existing character of the landscape by allowing moderate change. Moderate change may attract attention because of contrasting line, form, color, and texture, but it may not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Remaining bottomlands to be affected by the proposed project are private lands and are not designated or managed under the VRM system.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Visual contrast as observed from adjacent ridge tops and from the Piceance Creek valley and CR 5 would initially be introduced by construction of the proposed pipeline gathering system, main roads, and wellpads including pad access roads and flowlines. However, sight lines from both the adjacent ridge tops and the Piceance Creek valley and CR 5 toward NHGP locations would be limited due to the dissected terrain, change in elevation, and woodland vegetative cover. Observable surface disturbance would be treated shortly after construction with final reclamation measures in the case of the pipeline gathering system and with interim reclamation measures for main roads and wellpads and associated wellpad access roads and flowlines. This relatively immediate application of reclamation measures would reduce the visual contrast between new facilities and adjacent undisturbed areas; however, some contrast would remain over time where observable, particularly where disturbance has resulted in the clearing of pinyon-juniper woodland. The application of onsite adjustments of the alignment, particularly the edge of the construction ROW, where tree and/or brush removal is avoided resulting in a wavy or feathered edge that mimics lines in the vegetation, and the use of local terrain features to naturally screen the pipeline, road, and wellpad disturbances from view would lessen visual contrasts or avoid them. This lessening or avoidance of contrasts would apply to both vantage points of adjacent ridge tops and points along CR5 in the Piceance Creek valley.

Reclamation of the pipeline gathering system ROW would include the placement of trees that were cut and moved to the edge of the construction ROW for the purpose of placement on the ROW following the application of the main reclamation measures outlined in Appendix C. The replacement of the felled trees would further reduce contrast to an observer by restoring forms similar to adjacent lands and to aid in soil stabilization by enhancing the timely reestablishment

of protective herbaceous cover, which in turn would further reduce contrasts of line, color, and texture of exposed soil vs. adjacent vegetated lands.

Similar to that for the pipeline gathering system, onsite adjustments to main road alignment and the application of interim reclamation to main road ROW disturbance visible from adjacent ridge tops and the Piceance Creek Valley/CR 5 would also mitigate visual impacts by lessening or avoiding contrasts. Final road reclamation at project decommissioning would result in the same redistribution of cut trees as described for the reclamation of the pipeline gathering system.

The six wellpads would be mostly located within pinyon-juniper woodlands. Some exposure and visibility of wellpad fill slopes and topsoil storage piles to the adjacent ridge tops would be expected during construction; however, their location in woodlands would likely screen the wellpads and their short access road and flowline ROWs from most ridge top locations and from the Piceance Creek valley/CR 5. During periods of drilling and workovers, rig derricks would likely be noticeable to observers on adjacent ridge tops, and the northwestern-most pad potentially at night from the Piceance Creek Valley when the rig is brightly lit. Rig derricks would likely not be noticed during the day from Piceance Creek valley/CR 5 due to terrain and woodland screening. The application of interim reclamation measures to the wellpads and their access roads would further reduce contrasts by placing topsoil over contoured portions of the wellpads which would in turn support seeded vegetative cover to further lessen contrasts in color and texture. Final reclamation measures would be applied to the flowline ROWs shortly after pipe installation. The final reclamation of the six wellpads would result in the final recontouring of the wellpads to restore approximate natural contours, the respreading of topsoil over the contoured disturbance area, the seeding of vegetative cover, and the redistribution of cut and salvaged trees saved during wellpad construction. Final reclamation would result in minimizing contrasts of form, line, color, and texture.

For the life of operations, any surface facilities including pig receivers and launchers and tanks and other facilities located on wellpads would be painted a color that most blends with the dominant color of the surrounding landscape as selected by BLM.

By use of sound construction and facilities placement techniques, painting all production facilities Shale Green or other appropriate environmental standard color as determined by the AO, and the application of appropriate reclamation measures, the level of change to the characteristic landscape would be within the objectives of the VRM III classification.

Operations, safety, and security lighting of facilities would potentially affect the landscape at night in the project area; however, no night lighting is proposed for any surface facilities with the exception of drill and workover rigs during their temporary operations.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, no project-related surface disturbance would occur and there would be no resulting adverse or beneficial impacts to visual resources.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations protective of visual resources include:

- Selected trees cut during pipeline, road, and wellpad construction and stockpiled along the edge of the ROW and disturbance area will be skidded back onto recontoured, stabilized, and reseeded ROW/disturbed areas as part of reclamation practices.
- Monitoring for weeds and invasive species will continue through final abandonment.
- All new surface facilities placed by the operator in the project area will be painted Juniper Green, a BLM Standard Environmental Color, or other color as directed by BLM. All aboveground facilities will be painted within six months of installation.

HAZARDOUS OR SOLID WASTES

Affected Environment: Most waste materials generated by oil and gas exploration and development activities would be regulated by the Colorado Oil and Gas Conservation Commission or by the Colorado Department of Public Health and Environment (CDPHE) under provisions of the federal Clean Water Act. The project area is located within a natural gas field which has been active since at least 1940 when the Piceance Creek Unit was formed. Up until the early 1980s, various exploration, production, and processing wastes were generally disposed of by burial within the field area. Since then, burial of waste materials has been generally limited to reserve pit contents, which may include drill cuttings (BLM 2007).

Certain types of hazardous or solid wastes are regulated under provisions of the Resource Conservation and Recovery Act (RCRA), Subtitle C. The RCRA hazardous waste program regulates commercial businesses as well as federal, state and local government facilities that generate, transport, treat, store, or dispose of hazardous waste. Both EPA and CDPHE maintain databases of identified RCRA waste generators. Within one mile of project facilities, there is one identified RCRA hazardous waste small quantity generator, the Greasewood Compressor Station, located in SW SW of Section 5, T2S, R96W (CHMWMD 2011). RCRA small quantity generators (SQGs) are those which:

- Generate, in any calendar month, more than 100 kg (220 lbs) but less than 1,000 kg (2,200 lbs) of RCRA hazardous waste; and
- Accumulate on-site no more than 6000 kg (13,200 lbs) of hazardous waste at any one time.

Online sources provide no information regarding the nature of the hazardous waste produced at the Greasewood Compressor site, but there have been no compliance violations within the last three years, according to EPA data (EPA 2011). There are no environmental covenants indicated within the vicinity of the project area and no Voluntary Cleanup Programs administered by CDPHE within Rio Blanco County (CHMWMD 2011a).

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: All phases of the Proposed Action would involve the use, and potential unintended release, of gasoline and diesel fuel, lubricating oils, anti-freeze, trash, and human wastes. The drilling and production phases of the Proposed Action would involve the use of drilling mud, cement, hydro fracturing compounds and proppants, glycol, and corrosion inhibiting chemicals. Most of these substances would be located and used at one of the proposed wellpads, although spills from construction equipment and transportation vehicles could occur anywhere in the project area. Materials on hand at wellpads could in some cases exceed the planning quantity of 10,000 pounds for hazardous materials indicated in Title III of the Superfund Amendments and Reauthorization Act (SARA).

Water-based drilling mud and completion fluids would be recycled to the extent feasible to minimize disposal needs. Cuttings would be managed on-site and would typically be buried in the reserve pit following air-drying of the cuttings and pit contents. Should diesel fuel be used as a component of the drilling mud, the cuttings would be transported to an approved disposal site. Trash, waste paper, and garbage would be contained in a fenced cage and hauled to a commercial disposal facility as necessary. Human waste would be contained in tanks and disposed of at an approved sewage disposal facility.

Produced water would undergo separation of gas and condensate on-site and be pumped to existing XTO disposal facilities in the area. To the extent feasible, produced water would be used for mud makeup for drilling purposes and may be used in well completion processes.

All facilities containing petroleum would comply with provisions of the field-wide SPCC plan. Under the plan, all tankage containing oil, including produced water tanks and 55-gallon lube-oil drums, would be located within secondary containment structures. Liquids pipelines would be inspected on a regular basis to protect against failures and releases. All pipelines would be pneumatically or hydrostatically tested to ensure integrity prior to being put into use.

Cumulative Impacts: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under the No Action Alternative, no project-related waste would be generated. However, the project area is located within the area of the previously approved PDP project and it is very likely that oil and gas development would continue in the area.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional mitigations designed to minimize contamination from hazardous wastes include:

- The release of any chemical, oil, petroleum product, produced water, or sewage, etc, (regardless of quantity) must be reported to the Bureau of Land Management – WRFO Hazardous Materials Coordinator at (970) 878-3800.
- The reserve pit shall be lined with a liner of sufficient thickness to comply with COGCC regulation 904.

FIRE MANAGEMENT

Affected Environment: The proposed project area is located principally (80 percent) within a D4 Little Hills fire management polygon as outlined in the 2011 Northwest Colorado Fire Management Plan (NW Colorado Fire Management Unit FMO 2011). Approximately 1.2 miles (19 percent) of the proposed 6.3 miles of new or upgraded access road to the proposed North Hatch Gulch Gathering System and adjacent six wellpads occupy portions of two additional fire management polygons. The two proposed road segments are 0.5 mile of road in Section 28, T1S, R97W and 0.7 mile of road in Section 6, T2S, R96W and Section 1, T2S, R97W. These two proposed road segments are located within a B7 Piceance Creek fire management polygon (Section 28, T1S, R97W) and B8 Magnolia O&G fire management polygon (Section 6, T2S, R96W and Section 1, T2S, R97W), respectively.

Characteristic vegetation within D4 Little Hills fire management unit described by BLM mapping consists of mountain shrub, pinyon-juniper woodland, big sagebrush, and Douglas fir (NW Colorado Fire Management Unit FMO 2011). B7 Piceance Creek unit is described as supporting big sagebrush, pinyon-juniper woodland, and agricultural/residential uses. Pinyon-juniper woodland, big sagebrush, and mountain shrubs are described as the principal vegetation types providing vegetative cover within the B7 Piceance Creek unit.

Nearly all the plant communities within and in the vicinity of the proposed project area are mature with considerable fire loads (BLM 2007). Historically, most plant communities in the area have been rejuvenated by fire to maintain healthy and diverse communities.

As detailed in the PDP EA, to which this EA tiers, (BLM 2007), fires on BLM lands in the vicinity of the project area are managed under objectives and policy defined geographically by delineated fire management units B, C, and D. Within the B7 Piceance Creek unit, wildland fire is not desirable, and unplanned ignition could have negative effects on the ecosystem without mitigation. Wildland fire is desirable in C8 Lower Piceance Basin unit; however, consideration of social, political, or ecological constraints must be considered in planning burns for public and firefighter safety as well as for improved resource/ecological conditions. Fire is considered desirable in areas of D polygon with generally few to no constraints to its use; however, areas of D polygon immediately adjacent to the project area were excluded in 2008 from a "desirable" designation by the WRFO to promote firefighter and public safety. The increase of industrial activity, including natural gas drilling, oil shale development, and infrastructure construction had resulted in increased vehicle numbers and people working and/or traveling in the Piceance Basin. Fires within the excluded portions of D polygon are managed in more aggressive manner by the BLM.

Between 1985 and 2009, there have been 21 recorded wildfires within approximately one mile of the project area, of which 14 have been recorded since 2000 (BLM 2009). The size of the areas affected by fire among the 21 fires ranged from essentially zero to one acre.

Environmental Consequences:

Direct and Indirect Effects: The increase of industrial activity from infrastructure construction (pipelines, roads, and wellpads), natural gas drilling and completions, and production operations would likely conflict with the D polygon designation currently assigned to much of the land to be occupied by the Proposed Action. The proposed project would result in increased human and vehicle activity and location of additional surface facilities within the project area. Such developmental activity and facilities could restrict BLM's ability to use wildfire to achieve land management goals in the vicinity of the project area.

Increased human and vehicle activity could add to the risk of accidental fire ignition in the vicinity of the project area. Fires started accidentally during the construction, drilling/completion, and operation of the project could adversely affect land or resource management objectives for the affected vegetation communities.

Forest cover of pinyons and junipers is prominent within areas of proposed construction ROWs for pipelines and flowlines, access road ROWs, and wellpads. These trees would be largely cleared during project implementation. Specific trees within the areas to be cleared would be felled and moved to the outside edge of the disturbance boundary to form one or more stockpiles of cut tree canopies and stumps. These trees would be temporarily stockpiled along the gathering system and flowline ROWs as the salvaged trees would be moved back onto the ROW as part of reclamation. Remaining trees would be cleared and cut up into four-foot lengths for pickup by the public. Tree limbs and woody brush, smaller than four inches in diameter, would be chipped and spread as mulch across the ROW. The replacement of the salvaged trees and large woody debris would not exceed 20 percent ground cover; excess material would be removed from the site.

Although the accumulation of felled trees for reclamation would be temporary for pipeline ROWs, the life-of-project accumulation of felled trees along access roads and adjacent to wellpads would result in a life-of-project condition of elevated levels of hazardous fuels until reclamation incorporates the salvaged trees into the reclaimed landscape. Hazardous fuel conditions for access roads, wellpads, and pipeline ROWs could also be worsened by vegetation removal, soils disturbance, and opportunities for noxious weeds and cheatgrass to establish on the disturbed lands, thereby increasing fuel loads. These accumulations of dead vegetative material are receptive to fire brands and spotting from wind-driven fires and can greatly accelerate the rate of fire spread. In addition to the previously noted increased risk of accidental fires ignition from increased human and vehicle activity, the accumulation of hazardous fuels in the form of felled and salvaged trees and weed/cheatgrass infestation of disturbed lands within the project area could add to fire control problems in the event of an accidental fire or wildfire.

During construction and for the life of the proposed wells, fire management may have little choice, but to suppress all fires both within and within close proximity to the project area. Any naturally occurring fire in this area would likely be suppressed while small. Areas of mature

vegetation communities adjacent to disturbance associated with the proposed project would continue a decline in diversity of plant species.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Selection of the No Action Alternative would result in no change to existing fire management conditions and no impacts from the proposed project.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations supportive of fire management measures that are protective of firefighter and public safety include:

- XTO will equip construction equipment operating with internal combustion engines with approved spark arresters.
- Fire-fighting equipment (long-handled round-point shovel and dry-chemical fire extinguisher) will be required on motor vehicles and equipment operating on construction, drilling, and production operations.
- XTO and contractor work crews will be instructed to take immediate action to suppress accidental, localized fires, and will contact the local fire management agency immediately, if such actions can be conducted without danger to human life.
- Construction practices will be designed to create defensible space around above ground structures as outlined on the Firewise website (www.firewise.org).
- Fuels if piled should be spaced to reduce hazardous buildup.
- When working on lands administered by the BLM WRFO, notify Craig Interagency Dispatch (970-826-5037) in the event of any fire.
- The reporting party will inform the dispatch center of fire location, size, status, smoke color, aspect, fuel type, and provide their contact information.
- The reporting party, or a representative of, should remain nearby, in a safe location, in order to make contact with incoming fire resources to expedite actions taken towards an appropriate management response.
- The applicant and contractors will not engage in any fire suppression activities outside the approved project area. Accidental ignitions caused by welding, cutting, grinding, etc. will be suppressed by the applicant only if employee safety is not endangered and if the fire can be safely contained using hand tools and portable hand pumps. If chemical fire

extinguishers are used the applicant must notify incoming fire resources on extinguisher type and the location of use.

- Removed trees cut and left for visitors will not be piled so as to cause a fire hazard. Wood piles should be spaced at least 50 ft. apart and not piled to exceed 10 ft x 10 ft by 3ft.
- Natural ignitions caused by lightning will be managed by Federal fire personnel.

SOCIAL AND ECONOMIC CONDITIONS

Affected Environment: The Proposed Action represents a subset of the environmental impacts associated with oil and gas development in the vicinity of the project area which were analyzed in the Piceance Development Project EA (CO-110-2005-219-EA). For that analysis, a detailed investigation of existing social and economic conditions, and impacts from construction of the Piceance Development Project was conducted. Socioeconomic parameters were evaluated using the most recent data available, usually in the 2003-2005 time period. Because of the depth of the prior analysis, the socioeconomic analysis for this document has been limited to a review of the discussion in the PDP EA and updating parameters which have changed since issuance of the Decision Record.

Local Economy - Total employment in Rio Blanco County has continued the increase displayed from 2000 to 2003. Statistics from the Colorado Department of Local Affairs (CDLA) indicate an increase in jobs in the county of 531 between 2003 and 2009, a change of 14 percent, to a total of 4,263. Much of this change was a result of increases in the mining sector, including oil and gas employment. Mining sector jobs in the county increased from 541 in 2003 to 866 in 2009, a 60 percent increase, after peaking at 1,001 jobs in 2008. In 2009, the mining sector (largely oil and gas, but also including nahcolite mining) represented 20.4 percent of the total jobs in the county, a 41 percent increase from 14.5 percent of total jobs in 2003. The 2009 drop likely reflected national economic conditions and a slowing of activity in the oil and gas sector. Over the past decade, jobs in the agriculture sector declined, those in retail trade held steady, and those in accommodation and food services showed slight increases. In the last 10 years, the county unemployment rate has been fairly steady at 3 to 5 percent (CDLA 2011, Rio Blanco County 2011).

Per capita income has continued to increase in the county to \$48,637 in 2008, the peak year of mining sector employment (USBEA 2011). Employment in the county in 2009 was heavy in the mining (20.4 percent), government (27.2 percent), and construction (10.3 percent) sectors. Much of the construction activity has been related to increased oil and gas development activity in the county (Blankenship 2006). Per capita income in surrounding counties in 2009 (Garfield, Mesa, and Moffat) was estimated at 75 to 85 percent of the Rio Blanco County figure, likely a result of higher employment percentages in the relatively better-compensated mining, construction, and government sectors with respect to higher employment in service sectors in the other counties. These numbers indicate the importance of the mining sector, dominated by the oil and gas industry, to the county economy.

Population and Housing - Population in the county has increased fairly steadily over the past decade. Rio Blanco County population in 2000 was 5,986 (USCB 2011), with an estimated 2009 population of 6,729. The percentages of the population living in Meeker, Rangely, and unincorporated areas has not materially changed since 2003. In the last decade, housing units have increased slightly in the county and housing vacancy rates have been largely unchanged from those reported in the PDP EA (CDLA 2011).

Government Services and Tax Base - Incidents reported by the Rio Blanco Sheriff's Department have shown a sharp increase since 2005 from around 600 to approximately 1,600 in 2008, an approximate 167 percent increase. The vast majority of these contacts have been associated with traffic incidents. It is likely that increased oil and gas industry traffic on local roads has been responsible for the majority of the increase in sheriff contacts. The assessed value of property in the county has continued to increase dramatically over the last decade. The Rio Blanco County Assessor has reported a 2010 value of assessed property in the county of \$1,128.3 million. This represents a 160 percent increase above the 2005 valuation of \$434.6 million, mostly due to increased valuation on gas production. Approximately 54 percent of county property valuation is represented by the mining industry, and approximately 94 percent of this valuation is from oil and gas (\$576.1 million) (Rio Blanco County Assessor 2010).

Public Perceptions - Rio Blanco County adopted a revised master plan in January 2011. An important part of the plan was a scoping process, conducted in 2009, which surveyed public attitudes about the current state and desired future of the county and requesting input on the allocation of county expenditures. Responses to the survey indicated that the local population understands the importance of the oil and gas industry to the local economy and was generally supportive of development, while also displaying a determination to ensure that development was done so as to protect other community resources and values. Concerns were indicated about affordable housing, communication with local government, issues related to revenue sharing, dissatisfaction with some regulations and how they impact citizenry and/or the oil and gas industry, development of a more diverse economy that is not as strongly tied to the oil and gas industry, transportation issues related to road improvements and traffic levels, and a definite preference to preserve the county as a largely rural environment. There is real concern and uncertainty about the potential for oil shale development and how the county could respond to a large increase in oil shale development activities (Rio Blanco County 2011).

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: The Proposed Action represents an ongoing part of the oil and gas development programmatically analyzed in the PDP EA. Major infrastructure facilities which were included in the Proposed Action of the PDP EA have subsequently been constructed and are not a part of the present project. The site-specific facilities proposed for the current project differ from those analyzed in the PDP EA in that continuous and year-round drilling is proposed using wellpads accommodating more wells. The Proposed Action, and oil and gas development in general, can have both positive and negative socioeconomic impacts. Benefits include the increased economic activity associated with development and additional tax revenues for state, local, and national governments. Adverse impacts typically include increased demands for housing and government services, such as road maintenance and law enforcement.

Employment and Income - Implementation of the Proposed Action would result in generation of employment and resulting income from three sets of activities:

- Construction of the North Hatch Gulch pipeline and major access roads, most likely in one year;
- Construction of six wellpads plus associated access roads and wellpad-servicing natural gas and produced water flowlines. Assuming the three rig, batch-10 continuous drilling scenario envisaged in the Proposed Action, this phase of the project is anticipated to last approximately 6 to 7 years; and
- Ongoing production and maintenance operations which would last for the life of the project, an estimated 30 years.

A summary of the workforce required for construction and operation of the Proposed Action is indicated in Table 23.

Employment and income effects associated with natural gas drilling were estimated using IMPLAN economic modeling in the PDP EA socioeconomic technical report (Blankenship Consulting 2006). The modeling runs included a 3-rig scenario, such as the maximum development case considered for the Proposed Action. The IMPLAN modeling results have been modified somewhat for this analysis based on somewhat different numbers of current workers and durations for certain tasks resulting in a somewhat lower number of average annual job equivalents (AJEs).

Table 23. Project Workforce Requirements

Task	Number	Duration (Days)	Average Workers Daily	Task Worker-Days
PROJECT LIFE CONSTRUCTION AND RECLAMATION				
NHGP Pipeline (4.1 mis.)				
Survey and Stake	1	8	2	16
Construction	1	80	110	8,800
Main Access Roads (4.6 mis.)	1	30	25	750
Interim Reclamation	1	45	5	225
PIPELINE & ROADS TOTALS			142	9,791
Natural Gas Drilling				
Wellpads				
Survey and Stake	6	3	2	36
Access Roads (0.3 mis.)	6	3	15	270
Flowlines (0.33 mis.)	6	70	10	4,200
Wellpad Construction	6	28	8	1,344
Move On/Rig Up/Rig Down	6	21	15	1,890
Individual Wells - Drilling				
Drilling	120	20	22	52,800
Logging	120	2	4	960
Casing	120	3	17	6,120
Support	120	0	0	0

Individual Wells - Completion				
Rig up Tanks	120	3	3	1,080
Haul Sand and Water	120	5	10	6,000
Rig up Equipment & Frac Well	120	6	45	32,400
Well Pad Interim Reclamation	6	15	8	720
Well Pad Final Reclamation	6	25	8	1,200
DRILLING TOTALS (120 WELLS)			167	109,020
ANNUAL OPERATIONS				
Pipeline		LOP	6	2,100
Road & Misc. Maintenance		LOP	1	350
Wells		LOP	2	700
OPERATIONS TOTALS				3,150

LOP - Life of project is assumed to be 30 years

The IMPLAN modeling was based on a determination of average worker numbers and salaries for both direct and indirect or induced project expenditures. These salary levels (from 2005) have been adjusted upward for this analysis to account for interim year employment cost increases. Average direct annual salaries have been increased 16.4 percent based on the average of national oil and gas extraction employment cost increases 2006-2010 and west region overall employment cost increases, and calculated at \$61,742. Indirect annual salaries have been increased 13 percent from 2005 based on overall private sector employment cost increases in the western region and are estimated at \$38,686 (USBLS 2011). Using the workforce number estimates from Table 23, the total and annual employment income from the Proposed Action has been estimated in Table 24. Total project employment income effects are estimated at \$50.4 million (2010 dollars).

Table 24. Proposed Action Estimated Project and Annual Employment Income

Activity	Estimated Employment and Income Effects		
	Direct	Indirect/Induced	Total
	(\$MM)	(\$MM)	(\$MM)
PROJECT CONSTRUCTION			
NHGP Pipeline Construction	\$1.5	\$0.9	\$2.4
Main Access Roads Construction	\$0.2	\$0.1	\$0.3
Total Wells & Facilities Construction			
Wellpad, Roads, & Flowlines	\$1.3	\$0.8	\$2.1
Drilling Individual Wells	\$10.1	\$6.2	\$16.3
Completion Individual Wells	\$6.7	\$4.1	\$10.7
Production (30 yrs.)	\$16.0	NA	\$16.0
PROJECT ANNUAL			
Wells (4 yrs. / 3 Rigs)	\$4.6	\$2.8	\$7.4
Production Operations	\$0.5	NA	\$0.5
TOTAL LIFE OF PROJECT	\$37.4	\$13.0	\$50.4

Source: Blankenship Consulting 2006, adjusted by employment cost changes 2006-2010, USBLS 2011

Fiscal Effects - Fiscal impacts local governments and services, both positive and adverse, would be as previously analyzed in the PDP EA, proportional to the Proposed Action's contribution (about 11 percent) to the entire Piceance Development Project.

Other Socioeconomic Effects - As described in the PDP EA, principal effects to other economic activity sectors in the project area would be loss of some rangeland from grazing and wildlife habitat and potential disturbance to hunting and dispersed recreation, particularly during construction activities. Long-term loss of rangeland would amount to approximately three AUMS (see Rangeland section of this EA). Wildlife habitat improvements in the project vicinity, associated with the XTO/CPW Wildlife Mitigation Plan, would, to some extent, ameliorate the loss of wildlife habitat. Relocation of recreationists to other areas of Rio Blanco County would likely result in minimal net economic loss to the county. The Proposed Action would not affect nahcolite mining or oil shale research and development activities.

Implementation of the Proposed Action would result in a temporary worker influx to the county for several years during construction and drilling activities. Pipeline and main road construction activities are likely to occur over a few months and would involve up to 137 workers. Drilling and completion of wells, if done continuously with three rigs, would involve up to around 150 workers for wellpad construction, drilling, and completion activities and each task would require a maximum of about 50 employees. Wellpad and related facilities construction would last up to about two months per pad. Drilling and completion, using three rigs continuously and year-round, would be accomplished within about four years. Long-term production operations would employ up to nine workers for around 30 years. Therefore, impacts to local hotels and restaurants and to county services would be heaviest for the first four years of the project and minimal thereafter. Housing workers in local (Meeker and Rifle) hotels would have the heaviest impact on hunter accommodations during hunting seasons.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, no project-related activities would occur and no beneficial or adverse socioeconomic effects would occur. Since the project area is located within the overall development area of the Piceance Development Project, previously approved by BLM, it is likely that additional oil and gas development would continue to occur within the vicinity.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional mitigations protective of social and economic conditions have not been proposed.

FOREST MANAGEMENT

Affected Environment: Much of the project area located approximately between the 197-35A and 197-28B proposed wellpads is dominated by pinyon-juniper (PJ) woodlands. PJ woodland is composed principally of pinyon (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). The Proposed Action is located within several stand classes of PJ woodland as defined by research performed by White River Field Office personnel from 2003-2005. The stands of woodland that would be affected are broken out by classes based on age and habitat type. Dry exposure habitat type occurs primarily on south and west facing aspects. Mature PJ trees on productive exposures establish themselves as the dominant plant community on the site. Young trees tend to invade sagebrush communities over time. The PJ stands associated with the proposed disturbance are considered commercial, indicating woodlands considered as producing greater than eight cords per acre with half of the volume being pinyon (pg 3-19, White River Resource Area Draft RMP 1994). Both the young and mature stands are valuable locally as a source of firewood and posts for fence construction. Encroachment sites of young pinyon trees are valuable for Christmas tree harvest.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: The loss of PJ woodland due to project-related activities would adversely affect wildlife and avian nesting habitat. Impacts would be long-term until woodlands regenerate successfully. Following reclamation of associated disturbances, it is expected that PJ saplings would begin to invade reclaimed surfaces within 35 to 45 years and would develop to a mature stage (4a) within 75 to 200 years for pinyon and 80 to 100 years for junipers (see Vegetation section). Removal of mature and middle-aged PJ trees would reduce the potential for outbreak of woodland diseases and insect infestations. By reducing the stand size of PJ trees in areas that have invaded areas historically dominated by sagebrush and grass communities, the resulting increase in open areas and influx of herbaceous production would increase the production of preferred wildlife and livestock forage. Erosion potential would increase with the removal of vegetation, especially at sites where tree density and canopy cover has naturally decreased the understory component of grasses, shrubs, and forbs. Compliance with mitigation measures outlined for fire management would reduce the build-up of cleared woody material from the project area, reducing the likelihood of slash contributing to possible large fire events and as forest insect breeding sites.

Portions of the project area contain stands of PJ identified as, or suspected of being, old-growth (i.e. trees with an apparent age greater than 300 years and with old-growth morphology). During on-site inspections of the main pipeline ROW, these areas were noted and the pipeline ROW was adjusted to avoid certain stands.

According to satellite imagery mapping of vegetation types in the vicinity by the Colorado Division of Wildlife (CDOW 1997), approximately 55.6 acres of primarily PJ woodlands would be removed by implementation of the Proposed Action, as indicated in Table 25.

Table 25. Pinyon-Juniper Woodland Disturbance, Proposed Action

Disturbance Source	Disturbance (acres)
Main pipeline corridor	21.2
Flowlines	2.2
Main access roads	3.5
Wellpad access roads	0.7
Wellpads	28.0
TOTAL	55.6

Source: CDOW 1997

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, the proposed project would be denied, construction would not occur on BLM-administered lands, and there would be no project-related impacts. Ongoing oil and gas production operations within the PDPA would continue.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations protective of forest resources include:

- Trees shall be cut down or masticated to a stump height of six inches prior to other heavy equipment operations. Removed trees that are not needed for reclamation purposes shall be cut into four foot lengths (down to 4 inches diameter) and placed adjacent to the disturbance area so that the material is easily accessed by the public.
- Removed trees needed for reclamation purposes shall not have branches removed, to the extent feasible, and will be left intact to deter vehicular use of disturbed areas.
- Other woody material can be chipped and stockpiled for use in reclamation.
- Once the disturbance has been re-contoured and reseeded, stockpiled woody material shall be placed in the right of way to provide surface cover, not to exceed 20-30 percent cover, that allows for varied microclimatic conditions and sites for seedling protection that complement vegetation restoration.
- Wood chips can be incorporated into the top 10 inches of the topsoil to optimize soil reclamation success and deter invasive species encroachment.

RANGELAND MANAGEMENT

Affected Environment: Livestock grazing and wildlife habitat are currently the predominant land uses within the project area. Grazing allotments are areas of land where livestock operators are permitted to graze livestock and generally consist of federal rangelands; they may also include intermingled parcels of private or state lands. The BLM stipulates the type and number of livestock and period of use for each allotment. The proposed project area is located within the Hatch Gulch (#06028) and western use area of the Little Hills (#06006) grazing allotments. The Hatch Gulch allotment consists of 9,440 acres, including 8,886 federal, 204 state, and 350 private acres. Use is currently permitted entirely for fall and winter cattle grazing. The western use area of the Little Hills allotment consist of 31,374 acres, including 31,207 federal, 144 state, and 23 private acres. Use is multi-seasonal and almost entirely restricted to cattle grazing, with the exception of minor spring to fall horse grazing (BLM 2011a).

Rangeland carrying capacity is typically estimated on the basis of the Animal Unit Month (AUM). The AUM is defined as the amount of forage needed by an “animal unit” grazing for one month. The animal unit in turn is defined as one mature 1,000-pound cow and her suckling calf (43 CFR 4130.8-1 (c)). Assuming that such a cow nursing her calf will consume about 26 pounds of dry matter per day as forage, combined with a factor for tramping and waste of about 25 percent, results in an estimate of about 1,000 pounds of dry matter from forage to supply one AUM.

All White River Field Office (WRFO) grazing allotments have been placed in one of three management categories that define the intensity of management: (1) improve, (2) custodial and (3) maintain. These categories broadly define rangeland management objectives in response to an analysis of an allotment’s resource characteristics, potential, opportunities, and needs. The Hatch Gulch allotment has been categorized as a Maintain category, whereas the Little Hills allotment has been categorized as an Improve category. Allotment Management Plans have been implemented for both allotments (BLM 2011a). Permitted livestock levels for the affected use areas within these allotments are indicated in Table 26.

Table 26. Affected Grazing Allotments within the project area.

Allotment	Authorization Number	Livestock Number	Livestock Type	Period of Use	Authorized Use (AUMs)
Hatch Gulch (06028)	0501422	150	Cattle	11/01-11/30	148
		300	Cattle	12/01-12/31	306
		150	Cattle	01/01- 01/31	153
	0501419	28	Cattle	12/01-12/31	57
Little Hills (06006)	0501405	100	Cattle	6/1 - 10/30	500
		50	Cattle	4/15 - 4/30	26
		308	Cattle	5/1 - 10/30	1,853
		5	Horse	5/1 - 10/30	30
		145	Cattle	12/1 - 12/31	148

Source: BLM 2011a

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Livestock grazing during the authorized periods of use would continue throughout the duration of the project. The primary impact to the grazing resource would be short-term loss of available forage as a result of construction and production-related disturbance. Long-term loss due to physical structures replacing the pre-disturbance vegetation would be minimal.

Assuming all six wellpads, proposed roads and pipelines are developed under the Proposed Action, an estimated 191.2 federal and 1.3 state (CPW) surface acres would initially be disturbed for a total of 192.5 acres (Table 3). Following successful reclamation, the initial disturbed acre total is estimated to decrease to about 33.1 acres during the projected 30+ year life of the project (Table 3). The life-of-project acreages represent those acres of the grazing resource that would be lost due to construction of physical facilities associated with the project prior to completion of final reclamation.

The loss of the forage resource would be gradual depending on drilling schedules and actual time required to complete a well. As noted in the vegetation discussion, the initial grass-forb stage of plant succession in the PJ ecosystem provides maximum herbaceous production (Buttery and Gilliam 1983). Although temporary (10-15 years), this early seral herbaceous stage is desirable for livestock.

For this project, determination of short and long-term AUM reduction due to project implementation was based on the average current stocking ratio for the total allotment. The total land surface area of the affected allotments is approximately 40,614 acres and is currently authorized for 3,221 AUMs which results in a stocking ratio of about 12.6 acres/AUM. However it should be noted that much of these allotments are located in rugged terrain inaccessible to livestock, limited water resources and the near absence of a grass/forb understory in many of the mature/over-mature PJ stands in the area.

Initial AUM reduction, based on the present stocking ratio of 12.6 acres/AUM, and the projected short-term construction disturbance of 192.5 acres would be about 15 AUMs. Following successful reclamation, the initial disturbance would be reduced to 33.1 acres for a LOP permanent AUM reduction of approximately 3 AUMs. However, some of this projected forage loss would likely not occur as successful reclaimed sites in other projects in the area have been shown to out-produce later-seral undisturbed, especially in mature PJ and sagebrush dominated sites—both in total available biomass and forage quality. Improved range carrying capacity on reclaimed lands has been observed in the upper (east) end of the Piceance Creek Unit where PJ has been cleared for pipeline and power line ROWs as well as by the outcome of past BLM PJ reduction actions.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, the proposed project would be denied and construction would not occur on BLM-administered lands. Ongoing production operations within the PDPA would continue.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations protective of rangeland resources include:

- If encountered, all fences intersected by a pipeline/road ROW would be braced to BLM specifications prior to cutting. A temporary wire gate would be constructed, and this work would take place prior to pipeline construction.
- Where installed, ensure that heavy equipment does not exceed the GVW limits of cattle guards. If necessary, a temporary wire gate would be constructed to bypass the guard in accordance with BLM specifications. The new gate would be constructed and braced to BLM specifications prior to cutting.
- Gates should be left as they are found; if open, leave open; if closed, make sure the gate is closed. This would prevent the labor-intensive effort of rounding up livestock that have trespassed to adjoining allotments or gained access to heavily-traveled roadways (e.g., CR 5). If in doubt, the gate should be closed.
- Require employees of XTO and its sub-contractors to observe reasonable speed limits within the project area to decrease the potential of vehicle/animal collisions, especially during night hours.
- Coordinate planned activities between XTO and the affected permittees during allotment periods of use.
- To promote successful reclamation and discourage establishment of weeds, fence reclaimed areas including entire pads, and necessary portions of pipelines to exclude livestock where it is apparent that livestock will access and utilize the site. Any such fencing will be built to BLM specifications. Installation, maintenance and eventual removal of the fence are the responsibility of the operator.
- Earthen trench plugs or ramps would be placed at livestock and wildlife trails intersected by the trench and the ends of open trench. Open trenches would be inspected on a regular basis for trapped animals. If wildlife is found in the trench, exit ramps would be provided and the trapped animal(s) would be coaxed out of the trench. If trapped animals are injured, XTO shall contact the local District Wildlife Manager for assistance. Pipe that has been placed in the trench would be capped at the end of each day to prevent animals (e.g., small mammals and reptiles) from entering.
- Upon completion, replace in kind all existing fences removed due to construction activities.

- Monitoring of reclamation areas will continue for the life of the project and through final reclamation.
- Final reclamation of disturbed areas will occur at the first appropriate timeframe (between September and March) after burial of pipelines or plugging the final well on the pad or as otherwise recommended in the White River Field Office Surface Reclamation Plan (WRFO SRP 2011).

FLOODPLAINS, HYDROLOGY, AND WATER RIGHTS

Affected Environment: A 100-year floodplain has been mapped within the Piceance Creek valley as well as in the lower reaches of most of the principal intermittent drainages within the vicinity of the project area. Near Hatch Gulch, the Piceance Creek floodplain averages 1,200 to 1,500 feet in width and the floodplains within the lower reaches of Lee Gulch and Hatch Gulch are 200 to 400 feet wide. Stream channels tend to be well incised within the floodplain deposits (BLM 2009). Federal Emergency Management Agency (FEMA) flood hazard mapping indicates that almost all of the project area is located outside of the 500-year flood level (FEMA 2010).

Water required for the North Hatch Gulch Project would be used for pipeline, access road, and wellpad construction; for well drilling; and for well completions, including the application of hydraulic fracturing methods. The source of fresh water for the project is two water storage ponds, the Love Ranch Fresh Water Storage Pond (Section 9, T2S, R97W) and the B&M Fresh Water Storage Pond (Section 26, T2S, R97W). Both ponds are located within the Piceance Creek valley, approximately three and five miles south of the project area, respectively. The Love Ranch Fresh Water Storage Pond is approximately 4.6 acres in size and can contain up to 29.8 ac-ft of fresh water. The B&M pond is approximately 7.6 acres in size and can contain up to 56.5 ac-ft of fresh water. Water from the B&M Pond is also stored in a nearby 12,000 barrel water tank located next to XTO's office (Section 26, T2S, R97W) and adjacent to CR 5. Adjudicated waters feeding both storage ponds and the tank are withdrawn from Piceance Creek.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Approximately 2,673 feet of road construction, 250 feet of pipeline construction, and the pig receiver facility would be located within the 100-year Hatch Gulch floodplain, a short-term disturbance of approximately 3.7 acres and a long-term disturbance of 1.8 acres. Approximately 250 feet of the main pipeline corridor would cross the Lee Gulch 100-year floodplain, a short-term disturbance of approximately 0.6 acre. The closest construction activity to Piceance Creek would be approximately 400 feet where the Northern Access Road upgrade would connect to Piceance Creek Road on the side of the road away from Piceance Creek. Sediment transport from disturbed areas should be largely controlled in accordance with provisions of the field-wide SWPP plan.

Construction of pipelines, access roads, and wellpads would require use of approximately 51,800 bbls (6.6 ac-ft) of fresh water to suppress dust and to hydrostatically test pipeline integrity during construction activities for the NHGP. The drilling of the 120 proposed wells from the six wellpads would require use of approximately 1,944,000 bbls (250.6 ac-ft) of fresh

water. In total, approximately 1,998,300 bbls (257.2 ac-ft) of fresh water would be used as part of the proposed NHGP (Table 4). The withdrawal of fresh water from Piceance Creek would represent a depletion of surface water resources, but adjudicated water rights held by XTO permit use of Piceance Creek waters. No used water would be discharged to the surface within the project area or elsewhere. Mitigation for water withdrawal impacts to the endangered Colorado River fish species has been provided for in a BLM statewide programmatic biological opinion with USFWS for oil and gas development.

Construction of pipeline facilities, including the main gathering system lines, wellpad flowlines, TUAs, and pig launcher and receiver sites; main and wellpad access roads, and wellpads during construction is expected to require approximately 39,100 bbls (5.0 ac-ft) of fresh water for dust suppression. The principal use of this fresh water would be for dust suppression within pipeline and flowline construction ROWs, access road ROWs, and wellpad surfaces and associated cuts, fills, and soil stockpiles. Water trucks would deliver the water to the facilities under construction and would apply the water to disturbed soil surfaces and road running surfaces as needed to control dust. Pipeline hydrostatic testing for gathering system pipelines and well flowlines would require approximately 12,000 bbls (1.6 ac-ft) and 650 bbls (0.08 ac-ft) of additional fresh water, respectively.

The drilling of all 120 wells would require approximately 2,160,000 bbls (278.4 ac-ft) of water. Approximately 90 percent (1,944,000 barrels, 250.6 ac-ft) of drilling water would be fresh water and delivered by truck from sources noted above. The remaining 10 percent (216,000, 27.8 ac-ft) would come from recycled water (used fresh and well-produced water). Recycled water would be conveyed to wellpads via PWDD pipelines that are part of the pipeline gathering system and wellpad flowlines.

Well completion would require approximately 26,000 barrels (3.4 ac-ft) per well or 3,120,000 barrels (402.1 ac-ft) for the proposed 120 wells. All water to be used in completions would be recycled water that would be conveyed to wellpads by the PWDD recycled water pipeline system contained within the pipeline gathering and flowline systems.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, no project-related activities would occur and no additional effects related to water use would occur. Since the project area is located within the overall development area of the Piceance Development Project, previously approved by BLM, it is likely that water use associated with additional oil and gas development would continue to occur within the vicinity of the proposed Project.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations protective of water use and management have not been identified.

REALTY AUTHORIZATIONS

Affected Environment: The Proposed Action would require federal ROWs for the main North Hatch Gulch Pipeline corridor, for construction temporary use areas, and for portions of the main access roads extending outside the Piceance Creek Unit. The vicinity of the project area contains numerous oil and gas and other linear facilities and their associated ROWs (BLM 2011).

Facilities that would be constructed during implementation of the Proposed Action would cross some existing federal ROWs. A summary of existing ROWs that would be affected by the Proposed Action is indicated in Table 28.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: Federal ROW grant applications made in connection with the Proposed Action are indicated in Table 27. In addition, federal ROWs potentially affect by the Proposed Action are included in Table 28. Other linear facilities construction would occur entirely within the Piceance Creek Unit and no federal ROW is required.

Table 27. Proposed Action Federal ROW Grant Applications

ROW Serial Number (Pending)	ROW Width (feet)	ROW Length (feet)	Short-term Disturbance (ac)	Facility Type
COC 74469	40	8,851	8.1	Off-unit main access roads
COC 74470	100	21,522	49.4	Gas pipeline & pigging stations
COC 74470-01	NA	NA	1.2	Temporary use areas
COC 74471 ¹	100	21,522	0.0	Produced water pipelines
COC 74753 ¹	100	21,522	0.0	Combined liquids pipelines

¹ Produced water and combined liquids share 100-ft ROW with gas pipeline, no additional disturbance.

Table 28. Federal Rights-of-Way Potentially Affected by the Proposed Action

ROW Serial Number	ROW Width (feet)	Facility Type	Grantee	Proposed Action Effects	Effects Location
COC 73610	Varies	Gas and Liquids Pipelines	Exxon Mobil Corp.	Access road COC 074469 (pending) crosses ROW	Sec. 28, T1S, R97W
COC 71058	Varies	Gas Pipeline	Enterprise Gas Processing LLC	Gas and liquids pipelines (COC 74470, COC 74471, and COC 74753, all pending) cross major pipeline corridor	NW NE Sec. 33, T1S, R97W
COC 71054	Varies	Gas Pipeline	Questar Pipeline Co.		
COC 63989	50	Gas Pipeline	Enterprise Products Oper. LP		
COC 62884	50	Gas Pipeline	Encana Oil & Gas (USA) Inc.		
COC 45809	50	Gas Pipeline	ETC Canyon Pipeline LLC	Flowline and main access road adjoin part of ROW	Secs. 1 & 2, T2S, R97W
COC 71054	Varies	Gas Pipeline	Questar Pipeline Co.	Flowline and main access road cross major pipeline corridor	SE NW Sec. 1, T2S, R97W
COC 63989	50	Gas Pipeline	Enterprise Products Oper. LP		
COC 62884	50	Gas Pipeline	Encana Oil & Gas (USA) Inc.		
COC 45806	50	Gas Pipeline	ETC Canyon Pipeline LLC		
COC 73610	Varies	Gas and Liquids Pipelines	Exxon Mobil Corp.	Main access road crosses ROW	SW Sec. 6, T2S, R96W

Source: BLM 2011

The gas pipeline, produced water pipeline, and two combined liquids pipelines would be buried in a single trench at a minimum depth of four feet. XTO would need to coordinate with ROW grantees indicated in Table 28 whose facilities could be affected by implementation of the Proposed Action.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRRA RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under this alternative, no project-related activities would occur and no effects to realty authorizations would occur. Since the project area is located within the overall development area of the Piceance Development Project, previously approved by BLM, it is likely that additional oil and gas development would continue to occur within the vicinity.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations protective of existing realty authorizations include:

- XTO will coordinate with grantees of existing ROWs which will be crossed or otherwise potentially affected by implementation of the Proposed Action prior to commencing construction activities;
- XTO will notify the BLM Natural Resource Specialist 24 hours prior to commencing construction.

RECREATION

Affected Environment: The Proposed Action occurs on federal lands administered by the WRFO and also lands designated as the White River Extensive Recreation Management Area (ERMA). BLM manages the ERMA to provide for unstructured recreation activities such as hunting, dispersed camping, hiking, horseback riding, wildlife viewing and off-highway vehicle (OHV) use. There are no developed recreational facilities on BLM-administered lands in or near the project area. Recreation on public land is dispersed and takes place in an unstructured setting with few restrictions (BLM 1997).

Within and in the vicinity of the project area, regulated seasonal big game hunting is the predominate dispersed recreational activity. Game Management Unit 22 encompasses the project area and supports annual fall hunting of mule deer, elk, and bear (CDOW 2011). Seasons for archery, muzzleloading rifle, and rifle are set annually from late August to the end of December in Unit 22.

Recreational Opportunity Spectrum (ROS) classes specified within the project area include Semi-primitive Motorized (SPM), typically characterized by a natural appearing environment

with few administrative controls and low interaction among users (but evidence of other users may be present); Rooded Natural (RN), characterized by less naturalness and increased contact with other users; and Rural (R), characterized by modifications ranging from easily noticed to strongly dominant (BLM 2007c). SPM lands dominate the uplands above the Piceance Creek valley. Rural lands are located in the Piceance Creek valley including upland slopes bordering Piceance Creek. BLM-administered lands in the project area are designated as either open for OHV travel or restricted temporally due to seasonal conditions or restricted spatially to existing roads, trails, and ways. A minor segment of proposed road ROW at the far eastern end of the project area occurs within RN lands.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: For the initial approximately 17-week duration of pipeline, access road, and wellpad construction (first of six wellpads), dispersed recreational opportunities would likely be affected within portions of the project area where vehicle traffic, construction equipment activity, well drilling and completion activities are present. Traffic, noise, human activity, and dust would increase for the approximately 17-week period and could diminish or alter recreational experiences. Other ongoing oil and gas field and transportation (pipeline) development has and continues to provide a baseline of traffic, noise, human activity, and dust within lands adjacent to the project area. Most interaction between recreationists and oil and gas development personnel would occur on the existing roads, trails, and ways and on newly constructed roads where recreationists are using roads to access desirable areas, particularly hunters during the fall hunting seasons for big game species. During construction activity, most recreationists would likely seek areas away from the immediate vicinities of construction where the dispersed recreation opportunities are present and do not conflict with the NHGP development.

Should construction operations overlap with big game hunting seasons, the oil and gas development activities would likely temporarily displace target species to adjacent habitat either within or outside of the project area, but away from the areas of activity. Since hunting relies on the presence of game species and the ability of the hunters to close on the animals, hunters generally prefer relatively quiet settings. Actions disturbing the natural setting, beyond the presence of the hunters themselves, could disrupt hunting in the vicinity of the project area. Although such disturbance would adversely affect the hunting experience at that location and possibly for some portion of the surrounding area, hunters may be able to find relatively undisturbed settings within their permitted hunt unit on adjacent public lands.

Over the approximately four years of additional wellpad construction (five additional wellpads), drilling and completion operations (in batches of 10 wells at a time on each pad) for the 120 wells located on the six wellpads, dispersed recreation could be affected around those wellpads where drilling and completion operations would produce vehicle traffic, noise, and human activity in general. Such activity would be generally limited to three of the six wellpads at any point in time within the four-year period. Interaction between recreationists and oil and gas activity would be similar to that described above for construction activities. Recreationists' response to activity on the wellpads and access routes to them would likely again be similar to the self imposed displacement of recreationists away from the active wellpads as they, for example, seek big game animals who have been displaced away from lands in the immediate vicinity of the active wellpads.

During the 30 or more years of life-of-project, the production from the wells located on the six wellpads and operation of pipelines and access roads comprising the NHGP, activities would be reduced to periodic access to wellpads and maintenance of pipelines and roads. Interim reclamation of wellpads and access roads and final reclamation of pipeline corridors would reduce the extent of disturbance to 33.1 acres (17.2 percent) of the 192.5-acre initially disturbed project area. Over the life-of-project, the character of the remaining disturbed and active areas of the NHGP would generally remain less attractive to recreational users seeking relative quiet and separation from other human activity; however, the expanded road network from the construction and maintenance of new access roads could provide greater access to recreationists, including hunters, to previously less accessible areas in the vicinity of the project area.

For lands within and in the vicinity of the project area classified as SPM of the ROS classes, the classification of these lands could change to RN.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Implementation of the No Action Alternative would result in no loss of dispersed recreation potential and in no impact to recreational hunters.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional recommended mitigations protective of recreational opportunities include:

- XTO would consider modifying or limiting construction activities in the project area during the fall hunting season, specifically on the day before and the first two days of each of the four separate combined (deer/elk) seasons in October and November, should a conflict be identified by the BLM.

ACCESS AND TRANSPORTATION

Affected Environment: A network of county, BLM, and oil and gas roads provide access to the eastern and western ends of the mostly linear project area (Figure 1). These roads range in surface material from paved, to gravel, to maintained native materials, and to two-track native materials. Primary access to the project area is the Piceance Creek Road (Rio Blanco County Road (CR) 5). CR 5 can be reached from 1) Colorado State Highway 64, an east – west arterial 2-lane highway located north of the project area that connects the cities of Meeker, CO and Rangely, CO; and 2) Colorado State Highway 13, a north – south arterial 2-lane highway located east of the project area that connects the cities of Meeker, CO and Rifle, CO. Direct access to the western end of the project area would be from CR 5 via two access points; access to the eastern end would be from CR 76 on existing oil and gas and BLM roads connecting to the project area (Figure 1). CR 5 is the major thoroughfare in and out of the Piceance Basin for oil

and gas development activity in addition to private lands used for hay production and grazing, as well as oil and gas processing activity, and private residences principally along Piceance Creek. CRs 3 and 76 are county-maintained access roads used principally by oil and gas operators, grazers, and recreationists, primarily during big game fall hunting seasons.

Principal county roads providing access to the project area include:

CR 5	Piceance Creek Road
CR 3	Collins Gulch Road
CR 3A	Mobil Camp Road (connects CR 3 with CR 76)
CR 76	Lil Hills Gas Road

The above roads plus open BLM/oil and gas roads support traffic for a full range of uses: residential/ranching, recreational, BLM – management operations, federal grazing allottees, and oil and gas field development (including new wells, pipelines, and gas treatment and compression facilities) and ongoing operations and maintenance of existing facilities. The most current traffic counts for all county roads listed above with the exception of CR 3A are presented in Table 29.

Table 29. County Road Traffic within the project area*

Road	Mile Post	Mo.	Year	Date Range	Total Days	Total	ADT	Weekday Ave.
3	0.1	Sept - Oct	2010	9/28 - 10/3	6	3,863	644	778
5	0.0	Sept	2010	21 - 26	6	7,859	1,310	1,600
	18 (East of CR 3)	Sept - Oct	2010	28 - 3	6	7,468	1,245	1,527
	19 (West of CR 3)	Sept - Oct	2010	28 - 3	6	7,704	1,284	1,594
	42	Sept - Oct	2010	28 - 3	6	4,724	787	945
76	1	July	2008	24 - 28	4.25	343	81	108

* Rio Blanco County Road and Bridge Department, 2010.

Environmental Consequences of the Proposed Action:

Direct and Indirect Effects: To access pipeline and wellpad facilities of the NHGP, approximately 6.5 miles of new or improved access road would be constructed and maintained for the life-of-project. All roads would have graveled, 18-foot wide running surfaces and be designed to meet standards for BLM Local Road classification. This road design standard would be met for all project-related roads including wellpad access roads.

During an initial 17-week period of construction, as many as 80 vehicles would be used on a daily basis to provide transportation within and outside of the Project for an estimated 192 personnel. An estimated 180 vehicle roundtrips to and from the project area would occur daily during construction activities for all facilities. This level of activity would represent an anticipated maximum that would occur should pipeline, access road, and wellpad construction occur over the same period of time. After an initial 17-week period of construction, worker

numbers and associated vehicles would drop to about 117 workers associated with pipeline operations, road maintenance, and well drilling and completion for the projected four-year duration of drilling and completion activities. Vehicles would drop to about 50 with 70 roundtrips per day anticipated for the life-of-project. For post-drilling and completion actions associated with pipeline operations, road maintenance, and well production operations, vehicle trip numbers would be approximately nine roundtrips per day for the 30-year life of well and project production.

Use of the road network within the project area by heavy vehicles would be limited primarily to project mobilization and demobilization for construction and drilling/completions when heavy equipment (dozers, loaders, backhoes, side-boom tractors, drill rigs, completion rigs, frac tanks) are brought to and are taken away from the project area. Approximately 20 to 50 trips in and out of the project area by heavy, semi-tractor trailers would occur annually during the life-of-project. Daily project-related vehicle traffic would consist principally of pickups, SUVs, and heavier fuel/maintenance and water trucks. A variety of trailers would be used in addition to the motored vehicles.

The proposed new and upgraded main access roads would connect into the existing network of oil and gas and county roads. Nearly all of the initial 192-person work force and post construction work force of 117 workers would travel daily between area (Meeker, Rangely, and Rifle) homes, hotels, and motels via CR 76, CR 3, and CR 5. For the 17-week duration of initial construction, connecting oil and gas roads, CR 76, CR 3, and CR 5 could see an increase in trips which together would total approximately 180 vehicle roundtrips. CR 5 would receive all 180 roundtrips (during construction) and 70 roundtrips (post-construction) per day however the trips would likely be split between use of western/northern portion of CR 5 (west of CR 3) that connects to State Highway 64 (Rangely and Meeker) and use of the eastern portion of CR 5 (east of CR 3) that connects to State Highway 13 (Meeker, Rifle).

Based on average daily trips (ADT) in 2010 reported by Rio Blanco County for CR 5 in Table 29, the added trips for the 17-week construction period, assuming equal numbers of trips on CR 5 from State Highways 64 and 13 (west of CR 3), would increase the ADT approximately seven percent from 1,284 to 1,374 west of CR 3 and seven percent from 1,245 to 1,335 east of CR 3. Access to the project area from CR 5 up segments of CR 3 and CR 76 during construction would increase the ADT approximately 14 percent to 734 ADT for CR 3 and 83 percent to 198 ADT for CR 76.

Following the 17-week construction period, the 70 roundtrips per day projected for the estimated four-year drilling and completion period, again assuming equal split of the traffic on CR 5 west and east of CR 3, would increase ADT approximately three percent to 1,319 ADT west of CR 3 and again three percent to 1,280 ADT based on 2010 traffic counts (Table 29). Access to the eastern portion of the project area from CR 5 up segments of CR 3 and CR 76 during drilling and completion activities would increase the ADT approximately five percent to 679 ADT for CR 3 and 43 percent to 116 ADT for CR 76 over the approximately four-year period.

For the approximately 30 years of well production and use and maintenance of pipelines and access roads, vehicle traffic would be proportionally reduced for this period to an ADT representative of nine roundtrips per day to and from the project area. West and east traffic on

CR 5 would increase only 0.4 percent to 1,288.5 ADT and 0.4 percent to 1,249.5, respectively, based on 2010 traffic counts.

The increased traffic would proportionally result in an increased rate of state, county, and BLM road deterioration and need for maintenance. Increased dust levels, principally from used segments of CR 76 and from the new and upgraded road segments could also result from the increased project-related traffic. Increased traffic may also proportionally increase the accident rate. However, XTO, as a long-term active operator in the area, including having significant lease holdings and private land ownership in the project area, would continue to work with Rio Blanco County with regards to road maintenance and road safety. XTO participates in applying dust controls as defined in cooperative agreements. XTO would continue to assume their appropriate participation in supporting the county with road use and safety issues.

Cumulative Effects: As indicated in the discussion above regarding the assumptions used for the analysis of cumulative effects, the cumulative impacts from the Proposed Action would be within those analyzed by the PDP EA, to which this document tiers, and within the cumulative impacts analyzed by the WRRR RMP.

Environmental Consequences of the No Action Alternative:

Direct and Indirect Effects: Under the No Action Alternative, there would be no residual impacts to access and transportation resources from the proposed NHG Project.

Cumulative Effects: As there would be no direct or indirect effects under this alternative, there would therefore be no cumulative effects.

Mitigation Measures: Additional mitigations designed to minimize effects from increased access and use of transportation routes:

- All surface-disturbing activities shall cease when soils or road surfaces become saturated to a depth of three inches or more unless otherwise approved by the Authorized Officer.
- Roads damaged by project vehicular traffic will be maintained to their original condition by XTO.
- Project vehicles will not enter bodies of water (e.g., streams) on federal lands, except at existing crossings.
- Select trees cut during construction and stockpiled for replacement on the surface of reclaimed pipeline and road ROW and wellpads will be placed to reduce opportunity for OHV use of reclaimed lands by creating barriers to OHV activity. Signage will also be used where appropriate to warn the public against OHV activity on reclaiming disturbed lands.
- XTO will provide all drivers with a training session describing the types of wildlife species in the area that are susceptible to vehicular collisions to reduce the potential for vehicle/big-game or vehicle/raptor collisions.
- XTO will provide for the safety of the public entering the ROW. This includes, but is

not limited to, barricades for open trenches, flagmen/women with communication systems for single-lane roads without inter-visible turnouts, and attended gates for blasting operations.

- XTO will permit free and unrestricted public access to and upon the ROW for all lawful purposes except for those specific areas designated as restricted by the AO to protect the public, wildlife, livestock, or facilities constructed within the ROW.
- Construction-related traffic will be restricted to routes approved by the AO. New access roads or cross-country vehicle travel will not be permitted unless prior written approval is given by the AO. Authorized roads used by the holder will be rehabilitated or maintained when construction activities are complete as approved by the AO.
- Existing roads and trails on public lands that are blocked as the result of the construction project will be rerouted or rebuilt as directed by the AO.
- XTO will inform the AO within 48 hours of any accidents on federal lands that require reporting to the Department of Transportation as required by 49 CFR Part 195.
- Existing roads on public lands that are blocked as a result of construction-related activities associated with the Proposed Action will be rerouted or rebuilt as directed by the AO.

REFERENCES CITED:

- Armstrong, Harley and David Wolny. 1989. Paleontological Resources of Northwest Colorado: a Regional Analysis, BLM Contract CO-910-CT6-013, Museum of Western Colorado, Grand Junction, Colorado.
- Baker, W. L. 2006. Fire and Restoration of Sagebrush Ecosystems. *Wildlife Society Bulletin* 34:177–185.
- Blackgoat, Fernando. 2011. Personal Communication with Fernando Blackgoat Regarding Initial and Long-term Surface Disturbance within the Piceance Development Project, Piceance Environmental Advisor, XTO Production Company, Houston, Texas, August 9, 2011.
- Blankenship Consulting, LLC. 2006. XTO Development Piceance Development Project Environmental Assessment Socioeconomic Technical Report, Blankenship Consulting, LLC, Denver, Colorado.
- Braun, C. E. 1998. Sage grouse Declines in Western North America: What are the Problems? *Proceedings of the Western Association of State Fish and Wildlife Agencies* 78:139–156.
- Brownfield, M, T. Mercier, R. Johnson, and J. Self. 2010. Nahcolite Resources in the Green River Formation, Piceance Basin, Colorado, Digital Data Series DDS-69-Y Chapter 2, U.S. Geological Survey, Reston, Virginia.

- Business Wire. 2004. American Soda, LLP Mothballs Solution Mining and Soda Ash Production Activities, Business Wire, April 1, 2004. Online data retrieved from <http://www.thefreelibrary.com/ /print/PrintArticle.aspx?id=114825977>.
- Buttery, R.F. and Bertha C. Gilliam. 1983. Ecosystem Descriptions, Pages 43-71 in R.L. Hoover and D.L. Wills, *eds*, Managing Forested Lands for Wildlife. Colorado Division of Wildlife in cooperation with USDA Forest Service, Rocky Mountain Region, Denver, Colorado.
- Chick, Nancy. 2010. Rio Blanco County Area Background Air Pollutant Concentrations, letter from Nancy Chick, Environmental Protection Specialist, Colorado Dept. of Public Health and Environment, Denver, Co.
- Clark, T.W. and M.R. Stromberg. 1987. Mammals in Wyoming. Univ. Kansas Museum Nat. Hist. Public Ed. Series No. 10. 314p.
- Clean Air Status and Trends Network (CASTNET). 2010. CASTNET Monitor Locations and Data, U.S. Environmental Protection Agency. Online data retrieved from <http://www.epa.gov/castnet/>, November 16, 2010.
- Colorado Dept. of Natural Resources Division of Water Resources (CDWR). 2001. CDWR Division 6 GIS Data, Colorado Division of Water Resources, Denver, Colorado.
- Colorado Department of Local Affairs (CDLA). 2011. Economic and Population Data, Colorado Department of Local Affairs, Denver, Colorado. Online data retrieved from http://dola.colorado.gov/info_publications.html, January 20, 2011.
- Colorado Dept. of Public Health and Environment Air Pollution Control Division (CAPCD). 2009. Colorado Air Quality Data Report 2008, Colorado Dept. of Public Health and Environment, Denver, CO.
- Colorado Dept. of Public Health and Environment Air Pollution Control Division (CAPCD). 2010. PSD Class II Areas Protected as Class I for Sulfur Dioxide, Colorado Dept. of Public Health and Environment, Denver, CO.
- Colorado Dept. of Public Health and Environment Air Quality Control Commission (CAQCC). 2010. Colorado Air Quality Control Commission Report to the Public 2009-2010, Colorado Dept. of Public Health and Environment, Denver, CO.
- Colorado Dept. of Public Health and Environment Hazardous Materials Waste Management Division (CHMWMD). 2011. Hazardous Waste Site Locator, Online data retrieved from <http://www.cdphe.state.co.us/hm/hmmapapps.htm>, January 5, 2011.
- Colorado Dept. of Public Health and Environment Hazardous Materials Waste Management Division (CHMWMD). 2011a. Colorado Voluntary Cleanup Sites, Online data retrieved from <http://www.cdphe.state.co.us/hm/vcrabycty.pdf>, January 5, 2011.
- Colorado Dept. of Public Health and Environment Water Quality Control Commission (CWQCC). 2010. Integrated Water Quality Monitoring Assessment and Report - 2010

- Update to the 2008 305(b) Report, Colorado Dept. of Public Health and Environment, Denver, Colorado.
- Colorado Dept. of Public Health and Environment Water Quality Control Commission (CWQCC). 2011. Revisions to Regulation 37, Colorado Dept. of Public Health and Environment, Denver, Colorado.
- Colorado Division of Water Resources (CDWaR). 2008. Rio Blanco Well Data, Colorado Division of Water Resources, Denver, Colorado.
- Colorado Division of Water Resources (CDWaR). 2009. Water Diversions GIS Data, Colorado Decision Support Systems, Colorado Division of Water Resources, Denver, Colorado.
- Colorado Division of Wildlife (CDOW). 1997. Colorado Vegetation Classification Project. GIS Spatial Data, Colorado Division of Wildlife, Denver, Colorado.
- Colorado Division of Wildlife (CDOW). 2010. Wildlife GIS Spatial Data, Colorado Division of Wildlife, Denver, Colorado.
- Colorado Division of Wildlife (CDOW). 2011. Colorado Hunting Planner - 2011 & 2012 Big Game Season Dates. Colorado Division of Wildlife. Downloaded July 18, 2011 from <http://wildlife.state.co.us/RulesRegs/RegulationsBrochures/BigGame.htm>.
- Colorado Division of Wildlife (CDOW). 2011a. Colorado Herpetofaunal Atlas. Colorado Division of Wildlife. Online data retrieved from <http://ndis.nrel.colostate.edu/herpatlas/coherpatlas/>. Accessed July 2011.
- Colorado Oil and Gas Conservation Commission (COGCC). 2011. Online Oil and Gas Database, Colorado Oil and Gas Conservation Commission, Denver, Colorado. Online data retrieved from <http://cogcc.state.co.us/>, January 12, 2011.
- Colorado Weed Management Association (CWMA). 2009 (10th Ed.). Noxious Weeds of Colorado. Centennial, CO.
- Commons, M.L., R. K. Baydack, and C. E. Braun. 1999. Sage grouse Response To Pinyon-Juniper Management. Pages 238-239 in S. B. Monsen and R. Stevens, compilers. Proceedings: Ecology and Management of Pinyon-juniper Communities within the Interior West. U. S. Department of Agriculture, Forest Service, RMRS-P-9.
- Connelly, J. W. and C. E. Braun. 1997. Long-term Changes in Sage grouse *Centrocercus urophasianus* Populations in Western North America. *Wildlife Biology* 3:229–234.
- Connelly, J. W.; Braun, C. E. 1997. Long-term Changes in Sage grouse *Centrocercus urophasianus* Populations in Western North America. *Wildlife Biology*. 3: 229–234.
- Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to Manage Sage grouse Populations and their Habitats. *Wildlife Society Bulletin* 28:967–985.
- Connelly, J., S. Knick, M. Schroeder, and S. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

- Cromsigt JPMG and H. Olff. 2006 Resource Partitioning Among Savanna Grazers Mediated by Local Heterogeneity: an Experimental Approach. *Ecology* 87:1532-1541.
- Daw, S.K., S. DeStefano, and R.J. Steidl. 1998. Does Survey Method Bias the Description of Northern Goshawk Nest-site Structure? *Journal of Wildlife Management* 62: 1379–1384.
- Fitzgerald, J. P., C. A. Meaney, and D. M. Armstrong. 1994. *Mammals of Colorado*. Denver Museum of Natural History and University Press of Colorado. 467p.
- Duncan, D.C. 1976. Preliminary Geologic Map of Greasewood Gulch Quadrangle, Rio Blanco County, Colorado, Miscellaneous Field Studies Map MF-755, U.S. Geological Survey, Reston, Virginia.
- Duncan, D.C. 1976a. Preliminary Geologic Map of the Square S Ranch Quadrangle, Rio Blanco County, Colorado, Miscellaneous Field Studies Map MF-754, U.S. Geological Survey, Reston, Virginia.
- Dyer, S. J., J. P. O'Neill, S. M. Wasel, and S. Boutin. 2001. Avoidance of Industrial Development by Woodland Caribou. *Journal of Wildlife Management* 65:531–542
- Dzialak, M.R., S.M. Harju, R.G. Osborn, J. Wondzell, L.D. Hayden-Wing, J.B. Winstead, and S.L. Webb. 2011a. Prioritizing Conservation of Ungulate Calving Resources in Multiple Use Landscapes. *PLoS ONE* 6(1): e14597. doi:10.1371/journal.pone.0014597
- Dzialak, M.R., S.L. Webb, S.M. Harju, J.B. Winstead, J.J. Wondzell, J.P. Mudd, and L.D. Hayden-Wing. 2011b. The Spatial Pattern Of Demographic Performance as a Component of Sustainable Landscape Management and Planning. *Landscape Ecology* 26:775-790.
- Edge, W.D and C.L. Marcum. 1985. Movements of Elk in Relation to Logging Disturbances, *Journal of Wildlife Management* 49: 926-930.
- Edge, W.D. and C.L. Marcum. 1991 Topography Ameliorates the Effects of Roads and Human Disturbance on Elk. In: Christensen AG, Lyon LJ, Lonner TN, editors, *Proceedings of a Symposium on Elk Vulnerability*. Bozeman: Montana State University. pp 132-137.
- Ellenberger, J.H, and A.E. Byrne. 2011 Population Status and Trends of Big Game and Greater Sage-grouse along the Colorado/Wyoming State Line, National Wildlife Federation.
- Energy Information Administration (EIA). 2008. Greenhouse Gases, Climate Change, and Energy. Online data retrieved from <http://www.eia.doe.gov/bookshelf/brochures/greenhouse/Chapter1.htm>.
- Federal Emergency Management Agency (FEMA). 2010. Online Flood Hazard Mapping Data. Online data retrieved from <http://msc.fema.gov/> November 24, 2010.
- Fogg, J. and H. Hadley. 2007. Hydraulic Considerations for Pipelines Crossing Stream Channels, Technical Note 423, Bureau of Land Management National Science and Technology Center, Denver, Colorado.

- Freddy, D.J. W.M. Bronaugh, and M.C. Fowler. 1986. Responses of Mule Deer to Disturbance by Persons Afoot and Snowmobiles, *Wildlife Society Bulletin* 14:63-68.
- Friar, J.L., E.H. Merrill, H.L. Beyer, and J.M. Morales. 2008. Thresholds in Landscape Connectivity and Mortality Risks in Response to Growing Road Networks, *Journal of Applied Ecology* 45: 1504-1513.
- Goodrich, S. and B. Barber. 1999. Return Interval for Pinyon-juniper Following Fire in the Green River Corridor, Near Dutch, Utah. In: *Proceedings: Ecology and Management of Pinyon-juniper Communities within the Interior West: 1997 September 15-18; Provo, Utah. Proc. RMEA-P-9. Ogden, UT; U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.*
- Hall, William and Marjorie Smith. 1994. Geologic Map of the Northern Portion of the Piceance Creek Basin, Northwestern Colorado, *Miscellaneous Investigations Series Map I-2400, U.S. Geological Survey, Reston, Virginia.*
- Hansen, R. M., and B. L. Dearden. 1975. Winter Foods of Mule Deer in Piceance Basin, Colorado. *Journal of Range Management* 28:298–300
- Hardy, M, M. Ramey, C. Yates, and K. Nielsen. 2003. Solution Mining of Nahcolite at the American Soda Project, Piceance Creek, Colorado, Preprint 03-105, 2003 Annual Meeting, Society for Mining, Metallurgy, and Exploration, Littleton, Colorado.
- Harju, S.M., M.R. Dzialak, R.G. Osborn, L.D. Hayden-Wing, and J.W. Winstead. 2011. Conservation Planning Using Resource Selection Models: Altered Behavior in the Presence of Disturbance Changes Spatial Predictions of Resource Use. *Animal Conservation* 14: DOI 10.1111/j.1469-1795.2011.00456.x.
- Hayden-Wing Associates, LLC (HWA). 2008. Noxious Weed Inventory Report. XTO Exploration Company Piceance Creek 3D Seismic Project. HWA, Laramie, WY.
- Hayden-Wing Associates, LLC (HWA). 2009. Rare Plants and Noxious Weeds. XTO Exploration Company Piceance Creek 3D Seismic Project. HWA, Laramie, WY.
- Hayden-Wing Associates, LLC (HWA). 2010. Noxious Weed Surveys. XTO North Hatch Gulch EA, Piceance Basin, Rio Blanco County, CO, July, 2010. HWA, Laramie, WY.
- Hayden-Wing Associates, LLC (HWA). 2010a. Raptor Nest Survey: XTO North Hatch Gulch Project. Prepared for XTO Production Company, Houston, TX. 18p. + Appendices.
- Hebblewhite, M., E.H. Merrill, and T.L. McDonald. 2005. Spatial Decomposition of Predation Risk Using Resource Selection Functions: an Example in a Wolf-Elk Predator-prey System, *Oikos* 111:101-111.
- Hebblewhite, M. 2008. A Literature Review of the Effects of Energy Development on Ungulates: Implications for Central and Eastern Montana. Report prepared for Montana Fish, Wildlife and Parks, Miles City, Montana.

- Hingtgen, T. M. and W. R. Clark 1984. Small Mammal Recolonization of Reclaimed Coal Surface-mined Land in Wyoming. *Journal of Wildlife Management* 48:1255–1261.
- Hirth, D.H. 1977, *Social Behavior of White-tailed Deer in Relation to Habitat*. Wildlife Monographs 53.
- Interagency Monitoring of Protected Visual Environments (IMPROVE). 2010. IMPROVE Program Monitor Locations. Online data retrieved from <http://vista.cira.colostate.edu/improve/>.
- Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: The Physical Basis (Summary for Policymakers)*. Cambridge University Press. Cambridge, England and New York, New York. <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>
- Johnson, R.C., T.J. Mercier, M.E. Brownfield, M.P. Pantea, and J.G. Self. 2010. An Assessment of in-place Oil Shale Resources in the Green River Formation, Piceance Basin, Colorado, Digital Data Series DDS-69-Y, Chapter 1, U.S. Geological Survey, Reston, Virginia.
- Kingery, H., editor. 1998. *Colorado Breeding Birds Atlas*. Colorado Bird Atlas Partnership and the Colorado Division of Wildlife, Denver, Colorado.
- Michels, J. 2010. Personal communication with Hayden-Wing Associates regarding old-growth forest, WRFO Forestry Management Specialist, March 2010.
- Morrison, J.R., W. J.de Vergie, A. W. Alldredge, A.E. Byrne, and W.W. Andree. 1995. The Effects of Ski Area Expansion on Elk. *Wildlife Society Bulletin* 23: 481-489.
- National Atmospheric Deposition Program (NADAP). 2010. NADAP Monitor Locations and Data. Online data retrieved from <http://nadp.sws.uiuc.edu/Default.aspx>, November 16, 2010.
- Natural Diversity Information Source (NDIS). 2011. Colorado's Biological Map and Data Resource. Colorado Division of Wildlife. Online data retrieved from <http://ndis.nrel.colostate.edu/>. Accessed July 2011.
- Preisler, H.K., A.A. Ager, and M.J. Wisdom. 2006. Statistical Methods for Analyzing Responses of Wildlife to Human Disturbance, *Journal of Applied Ecology* 43:164-172.
- Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, T. C. Will. 2004. *Partners in Flight North American Landbird Conservation Plan*. Cornell Lab of Ornithology. Ithaca, NY. *Partners in Flight*. 84p.
- Rio Blanco County Assessor. 2010. 2010 Summary of Taxes, Rio Blanco County, Colorado Assessor's Office, Meeker, Colorado. Online data retrieved from http://www.co.rio-blanco.co.us/assessor/ABSTRACT_2010.pdf, January 20, 2011.

- Rio Blanco County. 2011. Rio Blanco County Master Plan (Revised), Rio Blanco County Government, Meeker, Colorado.
- Rio Blanco County Road and Bridge Department. 2010. Traffic Count Summary for Piceance Creek Roads provided by Ms. Jeni Morlan via email message dated October 5, 2010.
- Robson, S. G. and E. R. Banta. 1995. Ground Water Atlas of the United States Segment 2: Arizona, Colorado, New Mexico, and Utah, Hydrologic Investigations Atlas 730-C, U.S. Geological Survey, Reston, Virginia.
- Rost, G.R., and J.A. Bailey. 1979. Distribution of Mule Deer and Elk in Relation to Roads, *Journal of Wildlife Management* 43:634-641.
- Rotenberry, J. T., M. A. Patten, and K. L. Preston. 1999. Brewer's Sparrow (*Spizella breweri*) in A. Poole and F. Gill, editors. *The Birds of North America*, No. 390. The Birds of North America, Inc. Philadelphia, PA.
- Rowland, M.M., M.J. Wisdom, B.K. Johnson, and J.G. Kie. 2000. Elk Distribution and Modeling in Relation to Roads. *Journal of Wildlife Management*, 64: 672-684.
- Sawyer, H, R. Nielson. 2010. Mule Deer Monitoring in the Pinedale Anticline Project Area: 2010 Annual Report. Western Ecosystems Technology, Cheyenne, Wyoming.
- Sawyer, H., M. J. Kauffman, and R. M. Nielson. 2009. Influence of Well Pad Activity on Winter Habitat Selection Patterns of Mule Deer. *Journal of Wildlife Management* 73:1052–1061.
- Sawyer, H., R. M. Nielson, F. G. Lindzey, and L. L. McDonald. 2006. Winter Habitat Selection of Mule Deer Before and During Development of a Natural Gas Field. *Journal of Wildlife Management* 70:396–403.
- Seaber, Paul, F. Paul Kapinos, and George Knapp. 1987. Hydrologic Unit Maps, Water-Supply Paper 2294, U.S. Geological Survey, Reston, Virginia.
- Sheley, R., M. Manoukian, and G. Marks. 1996. Preventing noxious weed invasion. *Rangelands*. 18:100-101.
- Siders, M.S., and P.L. Kennedy. 1995. Forest Structural Characteristics of Accipiter Nesting Habitat: Is There an Allometric Relationship? *The Condor* 98: 123–132.
- Smithers, B. L. 2009. 2009 White River Field Office Raptor Inventory and Monitoring Report. Annual Report. Bureau of Land Management, White River Field Office, Meeker, Colorado. (<http://www.blm.gov/co/st/en/fo/wrfo/wildlife0.html>)
- Smithers, B. L. 2010. 2010 White River Field Office Raptor Nesting Productivity and Nest Monitoring Report for Piceance Basin, Colorado. Annual Report. Bureau of Land Management, White River Field Office, Meeker, Colorado. (<http://www.blm.gov/co/st/en/fo/wrfo/wildlife0.html>)

- Smithers, B.L. 2011. Raptor Nest Occupancy and Productivity Report for Piceance Basin, Colorado. Annual Report. Bureau of Land Management, White River Field Office, Meeker, Colorado. (<http://www.blm.gov/co/st/en/fo/wrfo/wildlife0.html>)
- Smithers, B.L. 2012. White River Field Office Diurnal Raptor Survey Protocol, Version 01/25/12. BLM, White River Field Office, Meeker, Colorado, <http://www.blm.gov/co/st/en/fo/wrfo/wildlife0.html>
- Stahl, Jenny. 2010. Class III Cultural Resource Inventory of Six Well Pads and Associated Facilities for XTO Corporation's Proposed North Hatch Gulch Project, Rio Blanco County, Colorado. Metcalf Archaeological Consultants, Inc., Eagle, Colorado. (10-54-06: SHPO #RB.LM.R1255)
- Streater, Scott. 2011. Winter Ozone Problem Confounds Regulators, Industry, WyoFile, In-depth Reporting about Wyoming People, Places, Policies, April 26, 2011. Online data retrieved from <http://wyofile.com/2011/04/winter-ozone-confound/>, September 23, 2011.
- Taylor, O. James. 1987. Hydrologic System of the Piceance Basin, *in* Oil Shale, Water Resources, and Valuable Minerals of the Piceance Basin, Colorado: The Challenge and Choices of Development, James Taylor, *ed.*, Professional Paper 1310, U.S. Geological Survey, Reston, Virginia.
- Tobin, Robert. 1987. Water Quality in the Piceance Basin, *in* Oil Shale, Water Resources, and Valuable Minerals of the Piceance Basin, Colorado: The Challenge and Choices of Development, James Taylor, *ed.*, Professional Paper 1310, U.S. Geological Survey, Reston, Virginia.
- Trijonis, J.C., Malm, W.C., Pitchford, M.L., White, W.H., Charlson, R., and Husar, R. 1990. Visibility: Existing Conditions and Historical Conditions - Causes and Effects. *National Acid Precipitation Assessment Program State of the Science and Technology Volume III*, Report 24.
- Tripp, William, Leslie Williams, David Alstatt, John Rawinski, and Clayton Spears. 1982. Soil Survey of Rio Blanco County, Colorado, Soil Conservation Service, Washington, D.C.
- U.S. Bureau of Economic Analysis (USBEA). 2011. Colorado County Personal Income and Per Capita Income, U.S. Bureau Economic Analysis, Washington, D.C. Online data retrieved from <http://www.bea.gov/regional/reis/index.htm>, January 19, 2011.
- U.S. Bureau of Labor Statistics (USBLS 2011). Western Region Labor Statistics 2005-2010. U.S. Bureau of Labor Statistics, Washington, D.C. Online data retrieved from <http://data.bls.gov/cgi-bin/surveymost?r7>, February 11, 2011.
- U.S. Bureau of Land Management (BLM). 1997. Record of Decision and Approved White River Resource Area Resource Management Plan, White River Field Office, Meeker, Colorado.

- U.S. Bureau of Land Management (BLM). 1997a. Standards for Public Land Health, Colorado State Office, Denver, Colorado. Online data retrieved from http://www.blm.gov/co/st/en/BLM_Programs/grazing/rm_stds_guidelines.html
- U.S. Bureau of Land Management (BLM). 2006. EGL Resources, Inc. Oil Shale Research, Development, and Demonstration Tract Environmental Assessment, CO-110-2006-118-EA, White River Field Office, Meeker, Colorado.
- U.S. Bureau of Land Management (BLM). 2006a. Chevron Oil Shale Research, Development, and Demonstration Environmental Assessment, CO-110-2006-120-EA, White River Field Office, Meeker, Colorado.
- U.S. Bureau of Land Management (BLM). 2006b. Shell Oil Shale Research, Development, and Demonstration Tracts Environmental Assessment, CO-110-2006-117-EA, White River Field Office, Meeker, Colorado.
- U.S. Bureau of Land Management (BLM). 2007. Environmental Assessment and Decision Record Piceance Development Project (CO-110-2005-219-EA), White River Field Office, Meeker, Colorado.
- U.S. Bureau of Land Management (BLM). 2007a. Potential Fossil Yield Classification System for Paleontological Resources on Public Lands, Instruction Memorandum 2008-009, U.S. Bureau of Land Management, Washington, D.C.
- U.S. Bureau of Land Management (BLM). 2007b. Programmatic Environmental Impact Statement Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States. Bureau of Land Management Rangeland, Soils, Water, and Air Group, BLM/WO/GI-07/018+6711. Washington. DC. Available online at www.blm.gov.
- U.S. Bureau of Land Management (BLM). 2007c. Unpublished. Recreational Opportunity Spectrum - 2007 Carat directory digital data clipped to the White River Field Office boundary in ARC/INFO.
- U.S. Bureau of Land Management (BLM). 2008. Approved Resource Management Plan Amendments/Record of Decision (ROD) for Oil Shale and Tar Sands Resources to Address Land Use Allocations in Colorado, Utah, and Wyoming and Final Programmatic Environmental Impact Statement, U.S. Bureau of Land Management, Washington, D. C.
- U.S. Bureau of Land Management (BLM). 2009. White River Field Office GIS Mapping Data, White River Field Office, Meeker, Colorado.
- U.S. Bureau of Land Management (BLM). 2009b. White River Field Office Standards for Contractor Inventories for Special Status Plant Species and Noxious Weed Affiliates, White River Field Office, Meeker, Colorado.
- U.S. Bureau of Land Management (BLM). 2009c. Colorado BLM State Director's Sensitive Species List. Online data retrieved from

- http://www.blm.gov/co/st/en/BLM_Programs/botany/Sensitive_Species_List_.html. Accessed July 2010.
- U.S. Bureau of Land Management (BLM). 2010. Geocommunicator Online Data Access, U.S. Bureau of Land Management, Denver, Colorado. Online data retrieved from <http://www.geocommunicator.gov/GeoComm/>.
- U.S. Bureau of Land Management (BLM). 2010a. Northwest Colorado Fire Program Area Fire Management Plan. NW Colorado Fire Management Unit, Craig, Colorado.
- U.S. Bureau of Land Management (BLM). 2011. General Land Office Records, U.S. Bureau of Land Management, Washington, D.C. Online data retrieved from <http://www.gloreCORDS.blm.gov/>, May 12, 2011.
- U.S. Bureau of Land Management (BLM). 2011a. Rangeland Management Data, White River Field Office, Meeker, Colorado. Online data retrieved from <http://www.geocommunicator.gov/GeoComm/>, July 13, 2011.
- U.S. Bureau of Land Management (BLM) and U.S. Forest Service (USFS). 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (*The Gold Book*), Fourth Edition, U.S. Bureau of Land Management, Denver, Colorado.
- U.S. Census Bureau (USCB). 2011. Rio Blanco County, Colorado, State and County Quick Facts, U.S. Census Bureau, Washington, D.C. Online data retrieved from <http://quickfacts.census.gov/qfd/states/08/08103/html>, January 20, 2011.
- U.S. Environmental Protection Agency (EPA). 2010. Air Quality Data for Rio Blanco and Garfield Counties, Colorado, AirData online data. Retrieved from <http://www.epa.gov/air/data/reports.html>, November 11, 2010.
- U.S. Department of Agriculture (USDA), U.S. Department of Interior (USDI), and U.S. Environmental Protection Agency (EPA). 2011. Memorandum of Understanding Regarding Air Quality Analyses and Mitigation for Federal Oil and Gas Decisions through the National Environmental Policy Act Process, Washington, D.C.
- U.S. Environmental Protection Agency (EPA). 2010a. National Ambient Air Quality Standards. Online data retrieved from <http://www.epa.gov/air/criteria.html>, November 11, 2010.
- U.S. Environmental Protection Agency (EPA). 2010b. Regulatory Actions Regarding Ground-level Ozone. Online data retrieved from <http://www.epa.gov/groundlevelozone/actions.html>, November 12, 2010.
- U.S. Environmental Protection Agency (EPA). 2011. RCRA Compliance History for Greasewood Compressor Station, Environmental History Compliance Online Database, Office of Enforcement and Compliance Assurance. Online data retrieved from <http://www.epa-echo.gov/cgi-bin/get1cReport.cgi?tool=echo&IDNumber=COR000202705> January 5, 2011.

- U.S. Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 99p.
- U.S. Forest Service (USFS). 2010. Colorado Class I Wilderness Areas. Online data retrieved from <http://www.fs.fed.us/air/co.htm>, November 12, 2010.
- U.S. Geological Survey (USGS). 2002. Assessment of Undiscovered Oil and Gas Resources of the Uinta-Piceance Province of Utah and Colorado, Digital Data Series DDS-69-B, U.S. Geological Survey, Reston, Virginia.
- U.S. Geological Survey (USGS). 2010. National Water Information System Mapper. Online data retrieved from <http://wdr.water.usgs.gov/nwisgmap/?state=co> , August 5, 2010.
- U.S. National Park Service (NPS). 2011. Access to Gaseous Pollutant and Meteorological Data, U.S. National Park Service, Washington, D.C. Online data retrieved from <http://ard-request.air-resource.com/>, September 23, 2011.
- Van Dyke, F., A. Fox, S.M. Harju, M.R. Dzialak, L.D. Hayden-Wing, and J.B. Winstead. 2011. Response of Elk to Habitat Modification near Natural Gas Development. *Journal of Wildlife Management*: In review
- Vitt, A. 2007. Trinchera Data Analysis Unit D-32, Game Management Units 85, 140, 851, Deer Management Plan. Colorado Division of Wildlife, Pueblo, Colorado.
- Volante, Ashley. 2010. Colorado Air Pollution Control Division-supplied Raw Ozone Monitor Data, Senior Environmental Engineer, XTO Production Company, Houston, Texas.
- Wallmo, O.C., and W.L. Regelin. 1981. Rocky Mountain and Intermountain Habitats. Part 1: Food Habits and Nutrition. Pages 387–398 in O. C. Wallmo, editor. *Mule and Black-tailed Deer of North America*. Wildlife Management Institute, Washington, D.C., and University of Nebraska Press, Lincoln, Nebraska, USA.
- Watkins, B.E., C.J. Bishop, E. J. Bergman, A. Bronson, B. Hale, B.F. Wakeling, Carpenter, L.H., and D.W. Lutz. 2007. Habitat Guidelines for Mule Deer: Colorado Plateau Shrubland and Forest Ecoregion. Mule Deer Working Group, Western Association of Fish and Wildlife Agencies.
- Webb, S.L., M.R. Dzialak, S.M. Harju, L.D. Hayden-Wing, and J.B. Winstead. 2011a. Influence of Land Development on Female Elk Range Use Dynamics. *Wildlife Research* 38:163-167.
- Webb, S.L., M.R. Dzialak, S.M. Harju, L.D. Hayden-Wing, and J.B. Winstead. 2011b. Effects of Human Activity on Space Use and Movement Patterns of Female Elk. *Wildlife Society Bulletin* 35: In press.
- Webb, S.L., M.R. Dzialak, J.J. Wondzell, S.M. Harju, L.D. Hayden-Wing, and J.B. Winstead. 2011c. Survival and Cause-specific Mortality of Female Rocky Mountain Elk Exposed to Human Activity. *Population Ecology* 53: 483-493.

Webb, S.L., M.R. Dzialak, R. G. Osborn, S.M Harju, J.J. Wondzell, L. D. Hayden-Wing, and J.B. Winstead. 2011d. Using Pellet Groups to Assess Response of Deer and Elk to Roads and Energy Development, *Wildlife Biology in Practice* 7:32-40.

Western Association of Fish and Wildlife Agencies (WAFWA). 2010. Conservation Guidelines to Benefit Mule Deer Affected by Oil/Gas, Wind, and Solar Energy Development, Mule Deer Working Group, Western Association of Fish and Wildlife Agencies.

Western Regional Climate Center (WRCC). 2010. Online data retrieved from <http://www.wrcc.dri.edu/CLIMATEDATA.html>, October 21, 2010.

White River Field Office (WRFO). 2012. WRFO Diurnal Raptor Survey Protocol. Version 01/25/12. BLM, White River Field Office, Meeker, Colorado. (<http://www.blm.gov/co/st/en/fo/wrfo/wildlife0.html>)

Wray, Laura, Allison Apeland, H. T. Hemborg, and Cheryl Brchan. 2002. Oil and Gas Fields Map of Colorado, Map Series 33, Colorado Geological Survey, Denver, Colorado

TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED:

Name	Organization	Subject
Blackgoat, Fernando	XTO Production	Development in the PDP EA project area subsequent to the Decision Record
Chick, Nancy	Colorado Dept. Public Health and Environment	Ambient criteria pollutant concentrations, Rio Blanco Co.
Michels, James	Bureau of Land Management, White River Field Office	Information regarding old-growth forests
Volante, Ashley	XTO Production	Raw ozone monitor data from Colorado Dept. Public Health and Environment Air Pollution Control Division

INTERDISCIPLINARY REVIEW:

Petros Environmental Group, Inc., an environmental consulting firm, with the guidance, participation, and independent evaluation of the BLM prepared this document. The BLM, in accordance with 40 CFR 1506.5 (a) and (c), is in agreement with the findings of the analysis and approves and takes responsibility for the scope and content of this document.

BLM Oversight				
Name	Title	Area of Responsibility	Initial Review	Final Review
Bob Lange	Hydrologist	Air Quality; Surface and Ground Water Quality; Floodplains, Hydrology, and Water Rights; Soils	9/13/2011	12/20/2011
Zoe Miller	Ecologist	Areas of Critical Environmental Concern; Special Status Plant Species	9/14/2011	1/17/2012
Geoffrey Haymes, Michael Selle	Archaeologist	Cultural Resources; Native American Religious Concerns; Paleontological Resources	9/10/2011	5/1/2012
Mary Taylor	Rangeland Management Specialist	Invasive, Non-Native Species; Vegetation; Rangeland Management; Prime and Unique Farmlands	8/30/2011	12/6/2011
Ed Hollowed, Lisa Belmonte	Wildlife Biologist	Migratory Birds; Special Status Animal Species; Terrestrial and Aquatic Wildlife; Wetlands and Riparian Zones	9/8/2011	12/6/2011

BLM Oversight				
Name	Title	Area of Responsibility	Initial Review	Final Review
Jim Michels	Outdoor Recreation Planner	Wilderness; Visual Resources; Access and Transportation; Recreation; Scenic Byways	8/30/2011	12/09/2011
Jim Michels	Supervisory NRS	Forest Management	8/30/2011	12/5/2011
Will Hutto	Fuels Specialist	Fire Management	9/6/2011	12/5/2011
Paul Daggett	Mining Engineer	Geology and Minerals	9/6/2011	12/5/2011
Janet Doll	Realty Specialist	Realty	10/15/2011	12/16/2011
Melissa J. Kindall	Range Technician	Wild Horse Management	8/29/2011	12/16/2011
Brett Smithers		Project Lead – Document Editor	9/03/2011	2/6/2012

Petros Environmental Group, Inc.				
Name	Title	Area of Responsibility	Initial Review	Final Review
Richard Bell	NEPA Specialist, Soils Scientist	Soils, Visual Resources; Fire Management; Forest Management; Floodplains, Hydrology, and Water Rights; Recreation, Access and Transportation	NA	NA
Joe Fetzer	Geologist	Air Quality; Geology and Minerals; Surface and Ground Water Quality; Paleontological Resources; Hazardous and Solid Wastes; Social and Economic Conditions; Realty Authorizations	NA	NA
Hayden-Wing Associates, LLC				
Larry Bennett	Senior Scientist	Rangeland; Forest Management; Vegetation	NA	NA
Matt Dzialak	Senior Scientist	Terrestrial Wildlife	NA	NA
Jennifer Hess	Wildlife Biologist	Terrestrial Wildlife; Migratory Birds; Special Status Animals	NA	NA
Lisa Martin	Senior Scientist	Invasive Species; Vegetation	NA	NA
Chad Olson	Wildlife Biologist	Terrestrial Wildlife	NA	NA
Jeff Winstead	Senior Scientist	Terrestrial Wildlife; Special Status Animals	NA	NA

ATTACHMENTS:

Figure 1: Map of the North Hatch Gulch Project

Figure 2: Ditching and Construction ROW Details

Figure 3: North Hatch Gulch Project Well Drainage Map

Figure 4: Typical Drilling Well Pad Layout

Figure 5: Production Facilities Plot Plan

Figure 9: Important Mule Deer Habitat, Vicinity of the Project Area

Appendix A - Piceance Basin Wildlife Mitigation Plan

Appendix B - Piceance Basin Wildlife Memorandum of Understanding

Appendix C - Reclamation Mitigations

Appendix D - Design Features

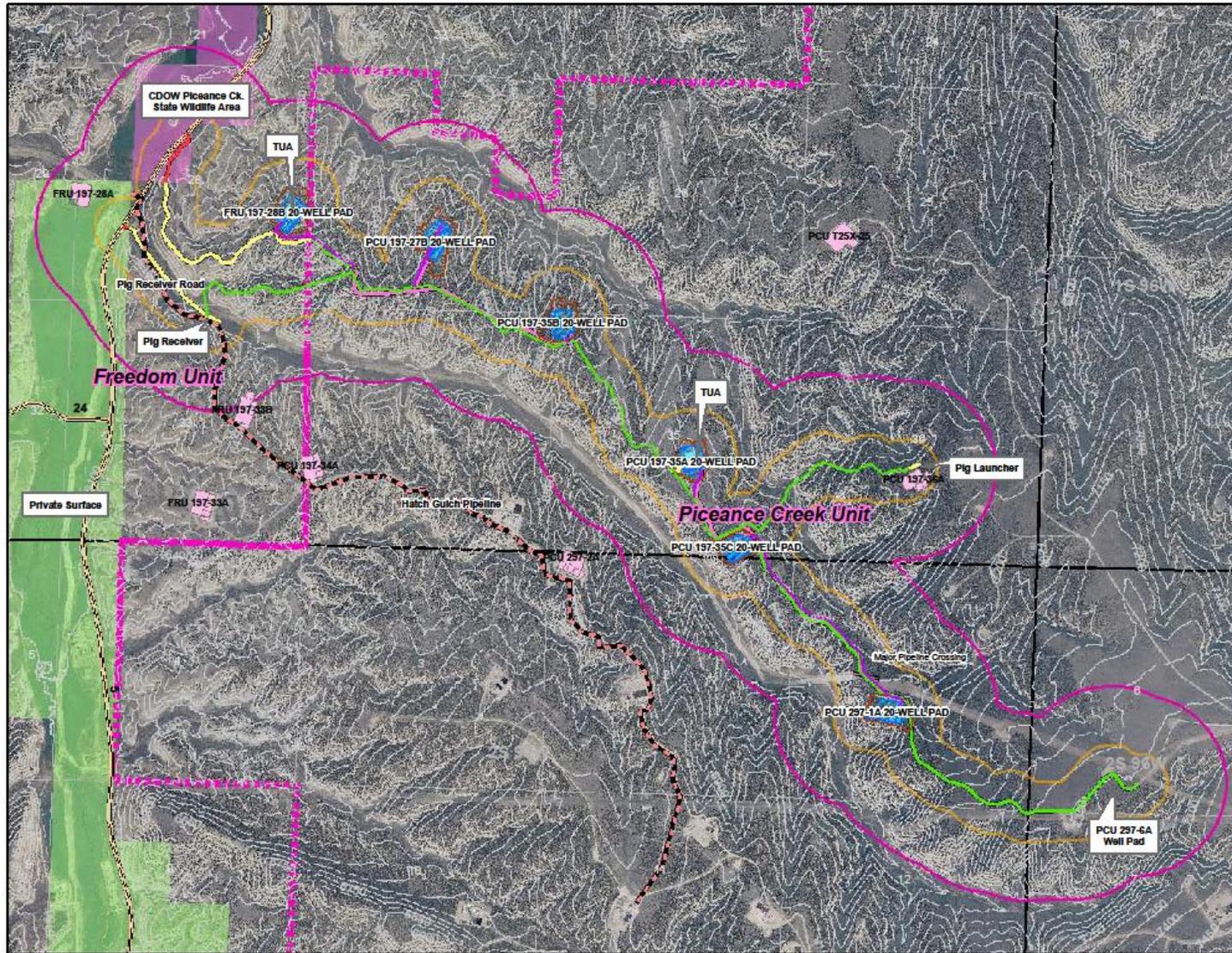


Fig. 1
Exxon Mobil Corp.
North Hatch Gulch
Project
 December 2010

- Proposed Facilities**
- Surface Sites**
- Temporary Use Areas
 - Pig Launcher/Receiver
- Pipelines**
- NHG Pipelines - ROW (1)
 - Future Wellpad Flowlines - APD (2)
- Wellpads**
- Wellpad
 - Total Disturbance
- Roads**
- Access Road - ROW
 - Access Road - Sundry
 - Access Road - Non-ELM
 - Future Wellpad Roads - APD
 - Project 200m Buffer
 - Project 600m Buffer
- Existing Facilities**
- Hatch Gulch Pipeline
 - Approved Wellpads
- Roads**
- State
 - County
 - Local
 - Private
- XDM Units**
- North Hatch Gulch Pipeline Specifications**
- (1) One 24" steel gas line
Two 6" fiberglass combined liquids line
One 6" produced water line
One 6" fiberglass combined liquids line from FRU boundary to Hatch Gulch tie-in
 - (2) One 6" or 8" fiberglass gas line
One 6" fiberglass combined liquids line
One 4" produced water distribution/disposal line

0 625 1,250 2,500 3,750 5,000

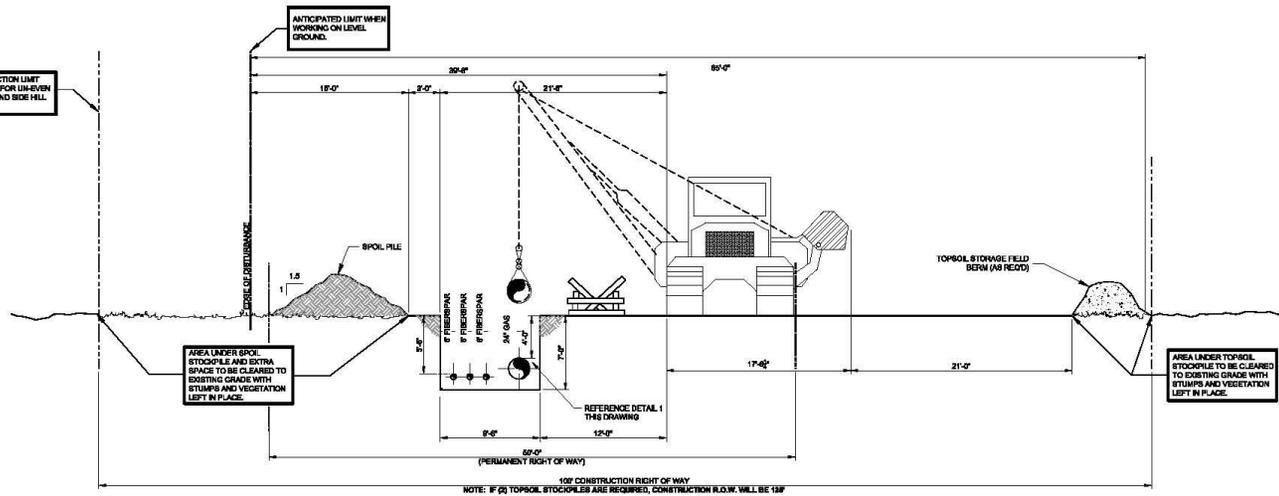


Scale in Feet

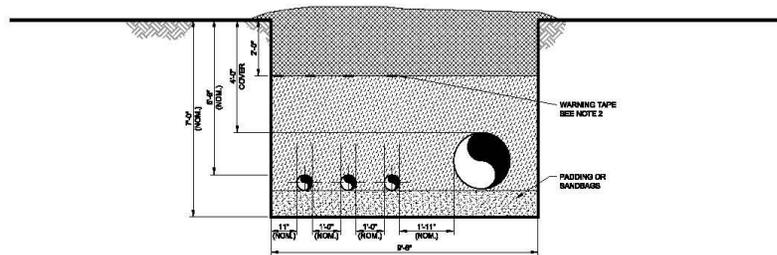
1:24,000

NAIP 2009 Imagery
50-ft Countours





DITCH DETAIL
SCALE 3/8"=1'-0"



DETAIL 1
SCALE 1/2"=1'-0"

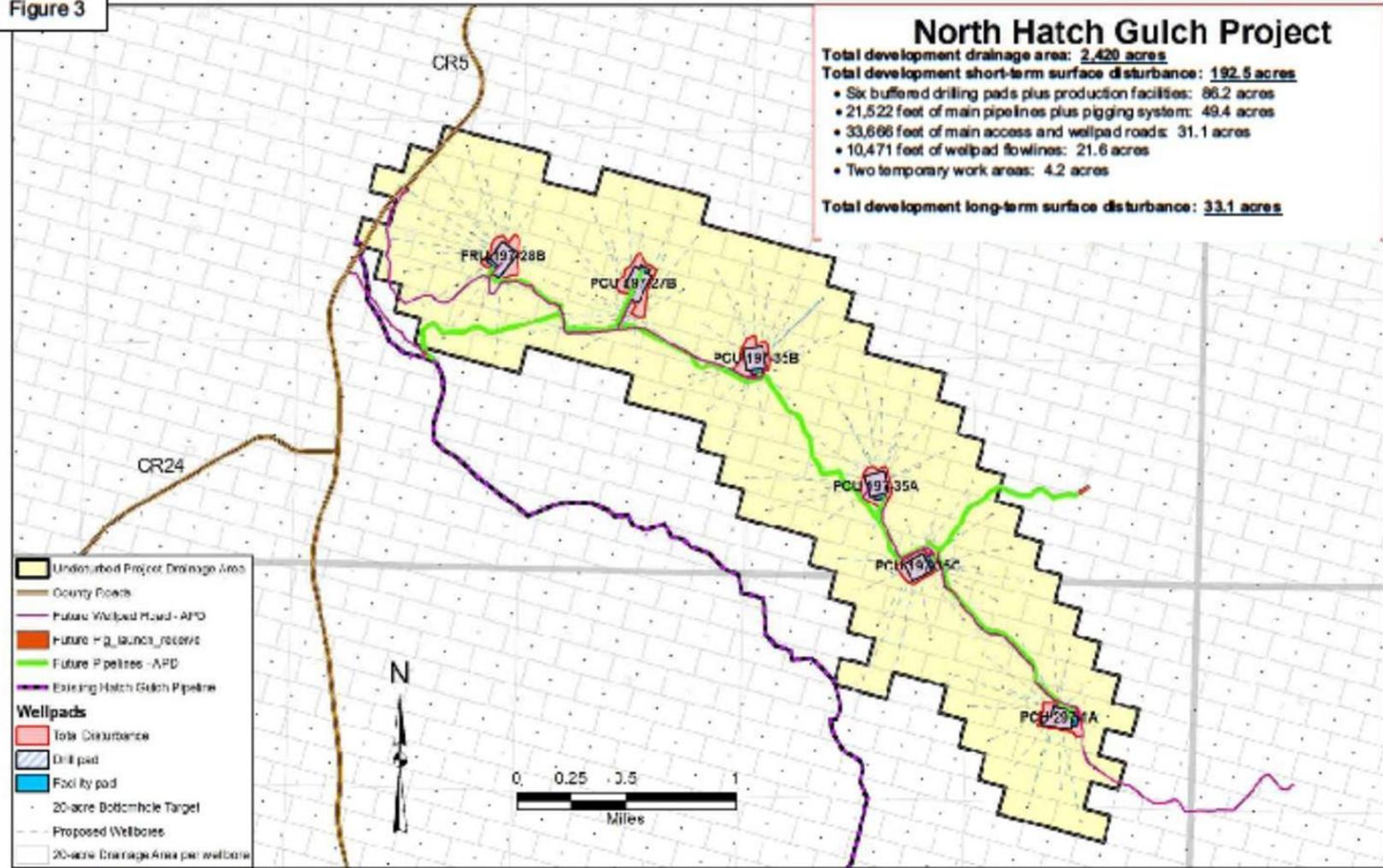
- NOTES:
- EXCAVATED MATERIAL FROM 3" GAS PIPELINE DITCH TO BE USED AS BACKFILL MATERIAL FOR 1" FIBERGLASS DITCH
 - CONTRACTOR TO FURNISH AND INSTALL COMPANY APPROVED # DETECTABLE WARNING TAPE APPROPRIATELY ANNOTATED FOR THE SPECIFIED SERVICE ABOVE EACH GAS OR LIQUIDS LINE AT A DEPTH OF 3'-0".



REVISION APPROVAL RECORD				REVISIONS				DRAWING STATUS				DRAWN		CHECKED		APPROVED FOR CONSTRUCTION		EXON MOBIL U.S. PRODUCTION		PROJECT INFO					
DISCIPLINE	BY	DATE	REV	BY	DATE	ISSUED FOR DISCUSSION	BY	CHKD	CLERK	ISSUED	REV	DATE	SIDE	PKM	DATE	DATE	APPROVED FOR CONSTRUCTION	SCALE	AS SHOWN	PREPARED BY	PROJECT NO.	DWG. NO.	FIGURE	REV	
ARCH.				A	03/23/10	ISSUED FOR DISCUSSION	CJH	MO		ISSUED	B	06/08/10			03/23/10	03/23/10				1149 DRAINAGE PREPARED BY: Rooney Engineering, Inc. 12207 E. Angstrom Road, Suite C-10 Comstock, Colorado 80112 (303) 782-2611					
CIVIL				B	05/08/10	REVISED TO SHOW SINGLE DITCH CONFIGURATION	CJH	MO		PRELIMINARY													FIGURE 2	REV B	
ELECTRICAL																									
ENVIRON.																									
GEN. ARRANG.																									
MECH.																									
STRUCTURAL																									

Check: T:\Users\jshank\22715 - 10m Gulch.dwg User: jshank Date: 05/08/10 09:44:32 AM
 UNCC

Figure 3



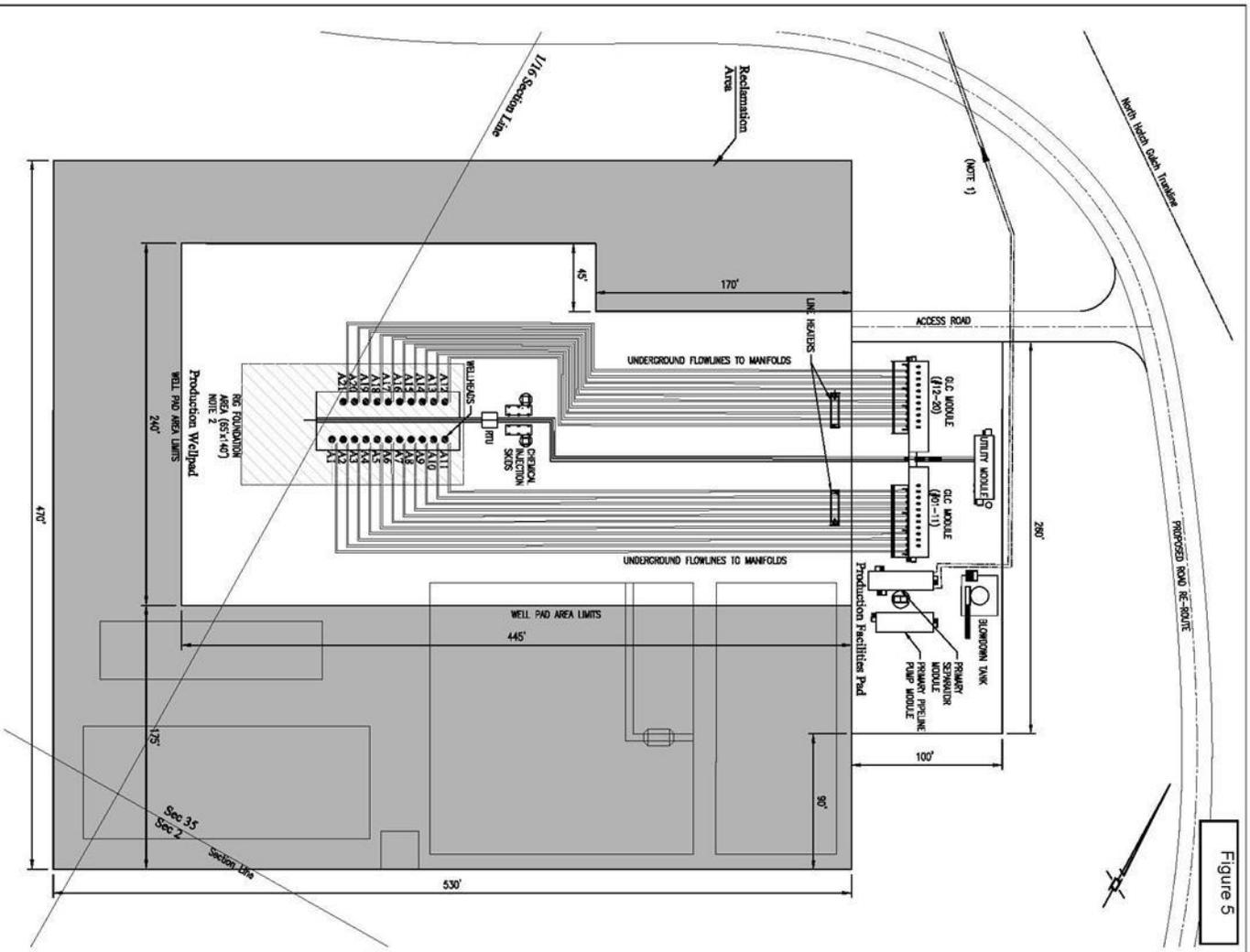
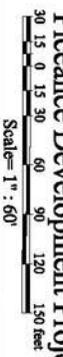


Figure 5

- NOTES:**
1. Gas and Produced Water Flowlines to Tie-in to associated trunklines. Reference PRU 197-35C Topo TD.
 2. Multiple flowline trenches to be installed outside of the indicated Rig Foundation Area.

Production Facilities Plot Plan
PCU 197-35C
Piceance Development Project



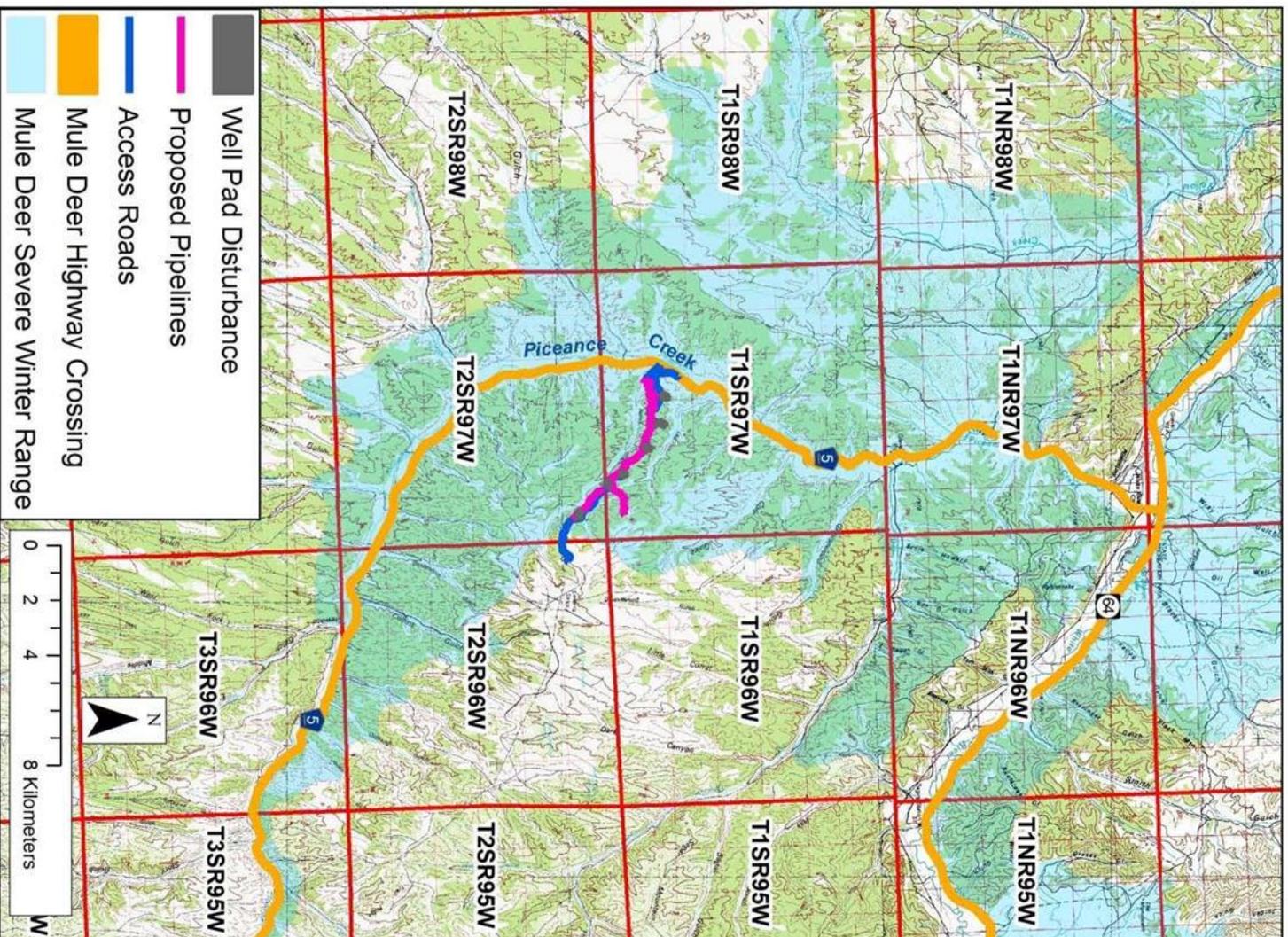
REV.	DATE	REVISION DESCRIPTION	ENG.	DRAWN	CHECKED	APPROVED
P	19 July 10	Preliminary		CEL	CEL	WFD

EXXONMOBIL

Drawn by: CEL
 Date: July 19, 2010
 Dwg No. WP197-35C-10-002

Checked by: CEL
 Scale: 1"=60'

Figure 9 Important Mule Deer Habitat, Vicinity of the Project Area



Appendix A
Piceance Basin Wildlife Mitigation Plan

PICEANCE BASIN WILDLIFE MITIGATION PLAN

INTRODUCTION

Exxon Mobil Corporation and ExxonMobil Oil Corporation (collectively EM), the Colorado Division of Wildlife (CDOW) and the Bureau of Land Management (BLM) have developed this Wildlife Mitigation Plan (WMP) for the purposes described below and enter into this WMP effective July 1, 2010. In addition to the body of this document the WMP shall also include the following exhibits.

- Exhibit A – Map of WMP Area
- Exhibit B – Best Management Practices
- Exhibit C – Potential Mitigation Measures
- Exhibit D – Conceptual Development Plan Map
- Exhibit E – Potential Pinyon-Juniper Removal / Treatment Map

BACKGROUND

The area covered by this WMP consists of approximately 150,000 acres comprised of the following EM operated federal units: Piceance Creek Unit, North Piceance Unit, Freedom Unit and the Expanded Liberty Unit. This WMP does not address any acreage operated by other companies, including without limitation XTO Energy, Inc. and Williams Production RMT Company. All of these units are located in Rio Blanco County, Colorado, and are within the area outlined in red on the map attached hereto as Exhibit A. This area shall be known as the Wildlife Mitigation Plan Area (WMP Area). BLM owns the vast majority of the surface of the land within the WMP Area.

The WMP Area includes the following sensitive wildlife habitats: greater sage-grouse production areas, an elk winter concentration area, elk production area, mule deer critical winter range, golden eagle active nest sites, and a northern goshawk active nest site, all as documented by CDOW pursuant to the 1200 Series Rules of the Colorado Oil and Gas Conservation Commission (COGCC).

The rules of COGCC require operators to either: 1) consult with CDOW with regard to Applications for Permits to Drill (APDs) and Form 2A Applications (Form 2As) that are filed with COGCC; or 2) enter into a wildlife mitigation plan approved by CDOW covering the area in which the proposed activities are to occur.

CDOW has engaged in extensive discussions with EM, in order to better understand EM's current plans for natural gas development in the WMP Area, the anticipated impact of that development, EM's best management practices (BMPs) and the possibility of implementing appropriate compensatory mitigation measures. EM has also provided shape files to CDOW that were used by CDOW to assess EM's proposed plans for operations within the WMP Area within the next 2 – 3 years. Within that timeframe EM plans to perform drilling operations from approximately 70 new well pads and to perform additional drilling operations on 24 existing well pads. Also within the next 2 – 3 years EM plans to build or improve 8.7 miles of new roads and to build 48 miles of new pipelines. The parties intend to meet on a regular basis to review and discuss supplements and/or amendments to EM's plans within the WMP Area, with EM presenting an updated plan covering the next 3 years on an annual basis, or more often if necessary, so that the WMP will remain in effect for the 30+ year prospective duration of EM's activity within the WMP Area. A conceptual development plan for the WMP Area, showing the current planned locations of drilling pads within the area, is shown in Exhibit D; but this development plan will be supplemented and/or amended by EM as appropriate to reflect the most recently available information

PURPOSE

The purpose of this WMP is to:

- Document the agreement of the parties regarding BMPs and mitigation measures to be implemented by EM that are intended to mitigate the potential impact of its operations on wildlife and habitat.
- Enable EM, as a result of its use of agreed upon BMPs and mitigation measures to engage in year-round and continuous construction, drilling, completion operations and interim reclamation activities within the WMP Area consistent with its commitment to achieve and maintain excellence in Safety, Health, and the Environment.
- Document EM's compliance with applicable COGCC rules related to wildlife, including required consultation with CDOW.
- Provide a process for ongoing communication between CDOW, BLM and EM regarding EM's planned activities within the WMP Area, the potential adverse effects on wildlife resulting from those activities, and the most efficient ways to avoid, minimize or mitigate any potential adverse effects.

AGREEMENT

Based on the information provided by EM to CDOW regarding the planned activities recited above and the mutual benefits to be derived by the parties, the signatories hereto agree as follows:

- This WMP has been developed in accordance with COGCC Rule 1202, d, 2, under which specific consultation with CDOW on individual actions is not required if CDOW approves a wildlife mitigation plan for an area in which oil and gas operations are to be conducted. For so long as this WMP is in effect, no additional consultation shall be required between EM and CDOW for any APD or Form 2A addressing EM operations that are located within the WMP Area.
- In an effort to further avoid adverse impacts, and minimize the severity and extent of unavoidable adverse impacts, all in the most cost effective and technically feasible manner possible, EM agrees to implement, to the degree such implementation is efficient and practicable, the BMPs set forth in Exhibit B.
- When circumstances, including those considerations referenced in the preceding paragraph, warrant a recommendation by CDOW to COGCC that COGCC include Conditions of Approval (COAs) in APDs and Form 2As granted to EM for operations within the WMP Area, CDOW will recommend COAs that are consistent with the BMPs set forth in Exhibit B.
- In an effort to further avoid adverse impacts, and minimize the severity and extent of unavoidable adverse impacts, all in the most cost effective and technically feasible manner possible, EM agrees to pursue the implementation, to the degree such implementation is efficient and practicable, of the mitigation measures set forth in Exhibit C.
- This WMP will be effective upon its execution by EM and CDOW. In the event BLM does not execute this WMP, it shall have no rights or obligations hereunder, and shall not be deemed a party hereto, unless and until it executes or ratifies this WMP, provided that the remaining parties may elect to include BLM in WMP meetings due to BLM ownership of the surface of the majority of the WMP Area. Whether or not BLM executes this document, EM and CDOW will work with BLM to obtain any input and/or approvals that may be required from BLM as surface owner.
- The parties hereto will meet annually to review this WMP. The first such meeting will be held within six (6) months of execution of this WMP by at least two (2) parties. At such annual meeting EM will provide a forecast of its activities within the WMP Area covering the next three (3) years, and any proposed changes to Exhibits B and C, as well as updates to the operations maps and shape files to enable CDOW to maintain the current status of the EM's plans for operations within the WMP Area. The annual WMP update will extend this WMP as modified. In addition to the annual meetings, the parties shall meet as may be necessary or appropriate to facilitate the implementation and stewardship of this WMP. The principles of adaptive management will be utilized to assess the effectiveness of ongoing BMPs and compensatory mitigation measures, and to adjust such BMPs and compensatory mitigation measures in order to make them as efficient as practicable.

- EM will be responsible for securing the participation of any contractors whose expertise may be required to implement the BMPs or mitigation measures, and will be responsible for any compensation due to such contractors.
- Nothing in this WMP shall preclude EM from voluntarily undertaking enhanced BMPs or mitigation measures and receiving appropriate credit as determined by CDOW for such enhanced measures to offset future development activities or disturbances not contemplated by this WMP. EM will advise CDOW and BLM of such efforts and attempt to address any concerns or potential improvements suggested by CDOW or BLM.
- This WMP is transferrable to another operator upon agreement by all parties who have executed the WMP

AGREED AND ACCEPTED

Signed: Ron D. Velarde Date: 8/5/10
Ron D. Velarde
Colorado Division of Wildlife
NW Regional Manager

Signed: _____ Date: _____
Jamie E. Connell
Bureau of Land Management
District Manager, NW Colorado District

Signed: Romeo Perez Date: 8/6/10
Romeo Perez
Exxon Mobil Corporation and ExxonMobil Oil Corporation
Piceance Development Project Manager

EXHIBIT A

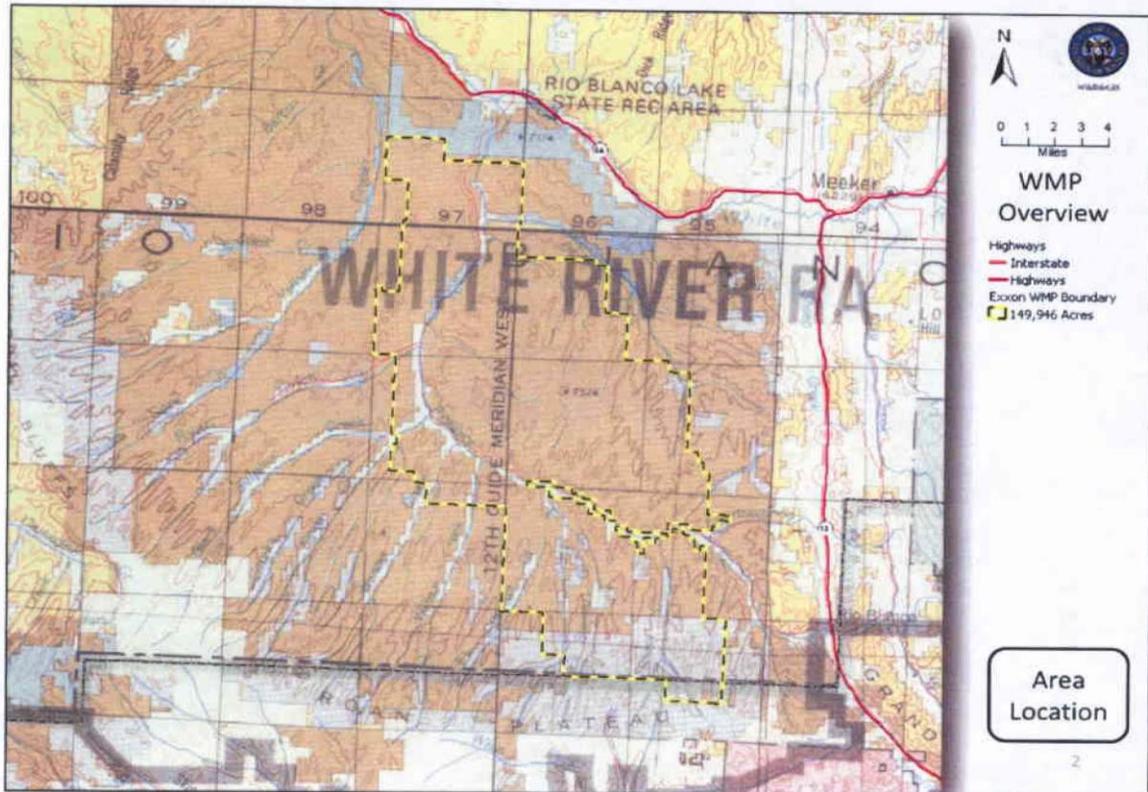


EXHIBIT B

OPERATOR AGREED BEST MANAGEMENT PRACTICES (BMPs)

In an effort to further avoid adverse impacts, and minimize the severity and extent of unavoidable adverse impacts, all in the most cost effective and technically feasible manner possible, EM agrees to implement, where and to the degree that such implementation is efficient and practicable consistent with its commitment to achieve and maintain excellence in Safety, Health, and the Environment, the BMPs set forth below.

- EM has executed an MOU Agreement with CDOW and Colorado State University to provide support and funding for wildlife and habitat studies with the intent of identifying improved BMPs to mitigate any adverse effects caused by oil and gas development within the WMP Area
- EM plans to conduct its operations on a year-round basis in order to reduce wildlife impact by minimizing surface disturbance, traffic, noise and areas disturbed
- EM is drilling multiple wells from each development pad, and intends to increase the current maximum of 10 wells per pad to a target of up to 22 wells per pad (subject to the limits imposed by topography, resource capture requirements, etc.) Increasing the number of wells per pad to 22 will decrease the resulting environmental footprint by approximately 50%
- EM is permitting and plans to implement a second produced water disposal and cuttings injection pilot well. This process minimizes flowlines and traffic
- EM plans to continue and expand its aggressive produced water management plan to include a produced water gathering and distribution system covering the core development area. The use and recycling of produced water minimizes the environmental footprint (traffic and emissions) by reducing water trucking
- EM will continue use of low emission, tier 2 powered drilling rigs until its planned conversion to gas fired electrification. The engines on these rigs significantly reduce emissions
- EM will conserve fresh water through the use of produced water for drilling in depths below fresh water sands and for fracture stimulation of wells. EM has reduced the use of fresh water by 40% as compared to early 2009 by substituting produced water for fresh water in drilling and completions
- EM will reclaim pipeline rights-of-way as soon as practicable after installation of pipe in order to avoid long-term impact
- The SCADA system (remote monitoring and control of facilities) will provide real-time information to address safety and environmental issues, while avoiding the need for vehicles and personnel to frequently monitor the wells

EXHIBIT C

MITIGATION MEASURES

In an effort to further avoid adverse impacts, and minimize the severity and extent of unavoidable adverse impacts, all in the most cost effective and technically feasible manner possible, EM agrees to pursue the implementation, to the degree such implementation is efficient and practicable consistent with its commitment to achieve and maintain excellence in Safety, Health, and the Environment, the mitigation measures and potential mitigation measures set forth below.

Mitigation Measures

- EM plans to further reduce fresh water usage, achieving a total reduction from early 2009 levels by continuing efforts to substitute produced water for fresh water in drilling and completions.
- EM plans to minimize drilling in northern and eastern North Piceance Unit, eastern Piceance Creek Unit and Expanded Liberty Unit for the next 5 years. The only wells planned for these areas in the next 5 years will be drilled to assess the natural gas resource (6 currently planned). Other wells within that timeframe may be required to maintain federal units or leases. EM will work with CDOW and BLM to explore mutually beneficial ways to minimize the number of wells that are required for unit and lease maintenance in order to reduce the severity and extent of adverse impacts.
- EM plans to reduce overall truck transportation by delivering water through pipelines and by using onsite disposal, which will reduce dust, risk of spills, traffic accidents and environmental impacts in sensitive areas.
- EM plans to pursue reduction of greenhouse gas emissions through the use of gas fired electrification for drilling and ongoing operations. Gas fired electrification reduces green house gas emissions and trucking by greatly reducing or eliminating the use of diesel fuel. For example, early projections indicate emissions for a 20 rig fleet using gas fired generators are below emissions of an 8 rig fleet with diesel generators.
- EM will move forward on a project to remove pinyon-juniper on selected BLM lands within the WMP Area in an attempt to achieve terrestrial habitat improvement designed to support resident mule deer populations. CDOW and BLM have identified areas suitable for treatment, and those areas are shown in yellow on Exhibit E. CDOW and BLM will select approximately 1,200 acres from these suitable areas for hydro-axe removal and reclamation. EM will fund this effort up to a maximum cost of \$565,000, excluding the cost of any surveys required to document NEPA compliance, which shall also be funded by EM. Such treatment and removal will commence only after completion of any required NEPA analysis. The treatments are planned to commence in 2010, assuming NEPA clearance is timely received, and will be implemented over a period of three calendar years. Approximately 100 acres will be treated in 2010, with the remaining acreage being somewhat evenly divided between 2011 and 2012. Invasive plant control and monitoring shall continue into 2013. This mule deer habitat improvement project will be carried out in coordination with other wildlife and habitat studies, including the Piceance Basin Mule Deer research project.

Potential Mitigation Measures

- EM plans to review the following mitigation measures for technical feasibility and cost-effectiveness:
 - Terrestrial habitat improvement through restoration of selected irrigated hay fields within or in close proximity to the WMP Area.
 - Purchase of transmitters for greater sage-grouse monitoring performed by CDOW through the Piceance Basin Greater Sage-grouse research project.
 - Land exchange(s) designed to consolidate CDOW acreage and provide additional hunting / fishing access
 - Riparian Studies

EXHIBIT D

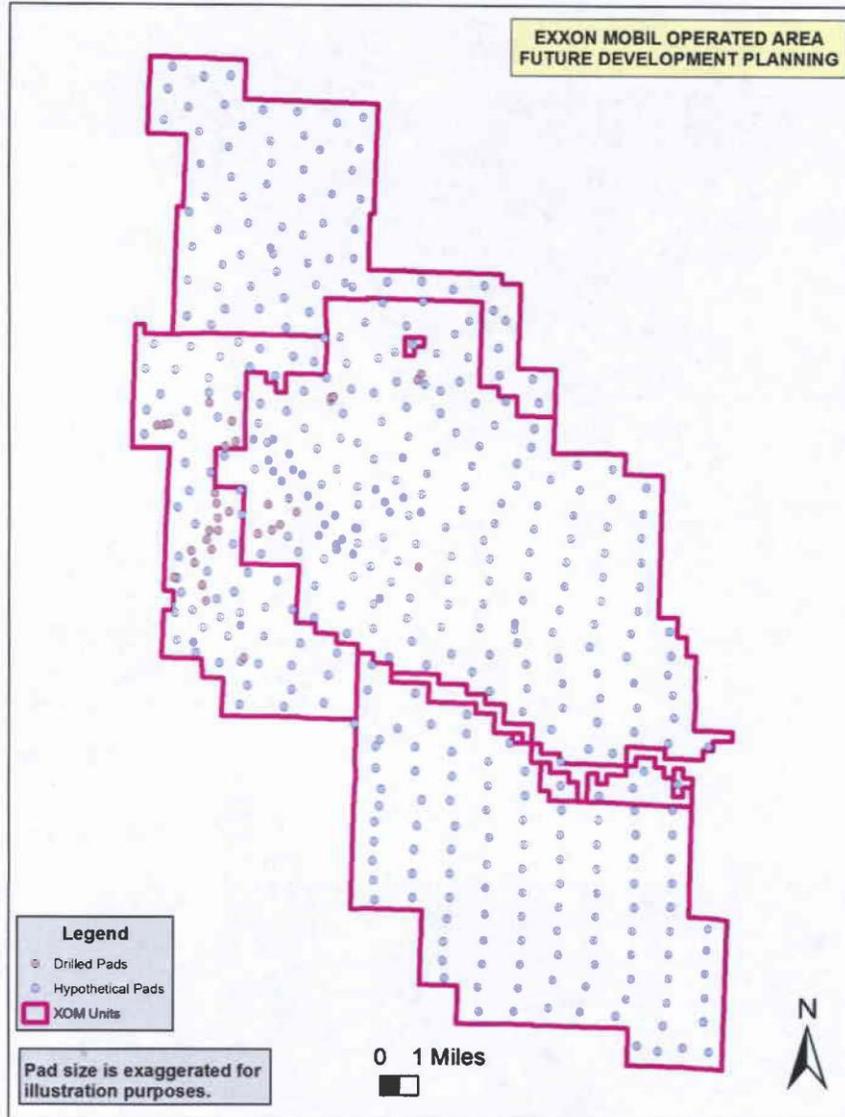
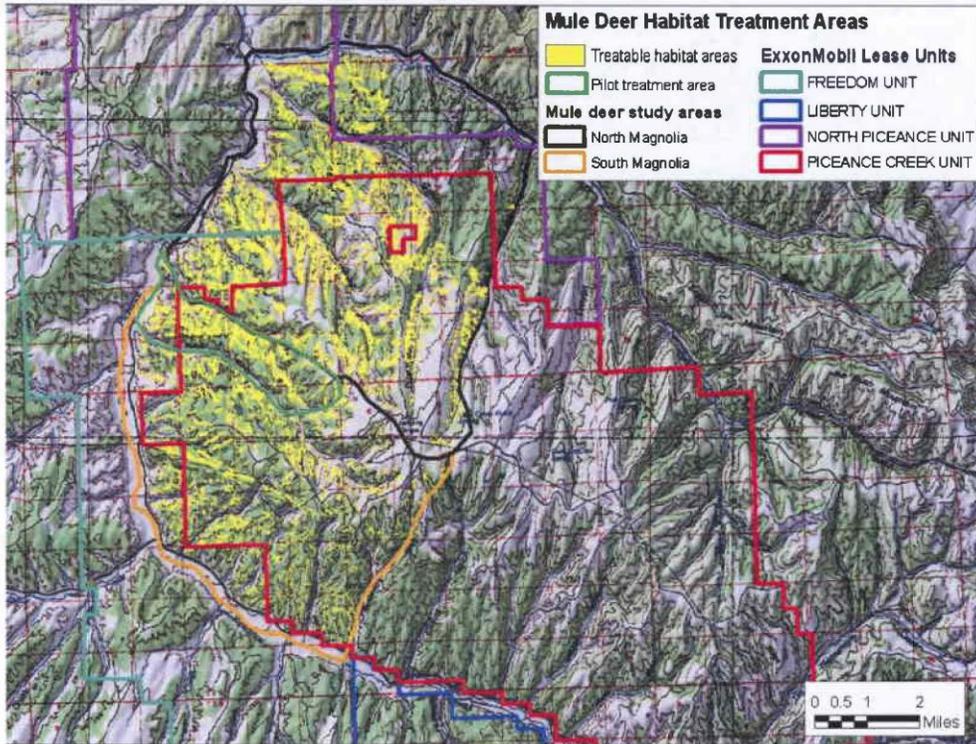


EXHIBIT E



Appendix B
Piceance Basin Wildlife Cooperative Agreement

Cooperative Agreement

Among:

Colorado Division of Wildlife

U.S. Department of Interior - Bureau of Land Management

Board of Governors of the Colorado State University
System acting by and through Colorado State University

Exxon Mobil Corporation

for the

Piceance Basin Wildlife and Habitat Studies

Rio Blanco and Garfield Counties, Colorado

TABLE OF CONTENTS

	<u>Page</u>
Preface.....	.03
1. Nature of Agreement03
2. Background.....	.03
3. Ongoing Studies.....	.04
4. Enhanced Studies.....	.04
5. Executive Committee.....	.05
6. Funding.....	.05
7. Study Approval, Notification and Payment Timing.....	.06
8. Study Coordinator.....	.06
9. CSU Subcontracts.....	.07
10. Reporting, Sharing and Publication of Studies.....	.07
11. Term of Agreement.....	.09
12. Compliance With Laws and Accuracy of Records.....	.09
13. Audit Rights.....	.09
14. Equipment.....	.10
15. Liability; Insurance.....	.10
16. Exclusive Warranty; Disclaimer.....	.10
17. Use of Tradenames and Service Trademarks.....	.10
18. Notices.....	.11
19. Miscellaneous.....	.11
EXHIBIT A (Map of Agreement Area).....	.13
EXHIBIT B (Party Contact Information).....	.14
EXHIBIT C (Subcontract Form).....	.15

Cooperative Agreement
Piceance Basin Wildlife and Habitat Studies

This Cooperative Agreement ("Agreement"), effective May 1, 2010, by and among the Colorado Division of Wildlife ("CDW"), the Bureau of Land Management ("BLM"), Board of Governors of the Colorado State University System acting by and through Colorado State University ("CSU") and Exxon Mobil Corporation ("EMC"), sets forth their agreement to jointly study the following matters ("Objectives") within the geographic area ("Study Area") set forth in Exhibit A:

The potential effects of hydrocarbon development and extraction on wildlife and their supporting habitat; and

The most efficient mitigation measures to reduce identified impacts on wildlife and associated habitat.

This Agreement sets forth a process for achieving the Objectives by:

Defining the roles and responsibilities of each Party;

Identifying ongoing studies being conducted by the Parties;

Defining the process by which studies will be proposed, approved and funded pursuant to this Agreement; and

Providing a framework for sharing of information between Parties.

CDW, BLM, CSU and EMC are herein referred to individually as "Party" and collectively as "Parties."

1. Nature of Agreement

Notwithstanding the title of this Agreement or anything to the contrary contained herein, all funding to be provided pursuant to this Agreement shall be provided by EMC. CDW, BLM and CSU shall be under no obligation to provide funding for this Agreement or to allocate their respective budgets in a manner that might benefit this Agreement.

2. Background

A. CDW and BLM are conducting ongoing studies in the Study Area ("Ongoing Studies") that have provided and continue to produce valuable information regarding the wildlife and associated habitat in this region.

B. The Parties agree that the Ongoing Studies provide the basis from which further studies ("Enhanced Studies") should be undertaken.

C. EMC has ongoing hydrocarbon development within the area of the Ongoing Studies and has expressed a willingness to provide funding to support Enhanced Studies over a multi-year period.

D. The Parties anticipate substantial benefits from a cooperative, multi-year effort to address the Objectives.

3. Ongoing Studies

A. CDW is currently conducting the following Ongoing Studies.

a. Population performance of Piceance Basin mule deer in response to natural gas resource extraction and mitigation efforts to address human activity and habitat degradation

b. Seasonal habitat mapping, mitigation assessment and monitoring of Greater Sage Grouse populations in the Parachute-Piceance-Roan Region of Western Colorado

c. Restoring energy fields for wildlife

B. BLM is currently conducting the following Ongoing Study

a. Development of a Resource Management and Monitoring Protocol for Northwest Colorado

C. It is anticipated that such Ongoing Studies can and will continue to receive funding outside of this Agreement.

4. Enhanced Studies

A. Ongoing Studies will be augmented by Enhanced Studies to be funded by EMC through this Agreement. Any Party may propose that an Enhanced Study or Ongoing Study be partially or fully funded pursuant to this Agreement, provided that if an Ongoing Study is approved by EMC for funding under this Agreement, such study shall thenceforth be considered an Enhanced Study. The Party in charge of an Enhanced Study shall be known for purposes of this Agreement as the Study Manager for such Enhanced Study. In order to be considered by the Executive Committee (see Section 5 below), the proposal must contain the following information:

- (1) Party proposing such study
- (2) Description of how the study meets the Objectives
- (3) Description of study goals and deliverables
- (4) Description of how this study relates to other studies
- (5) Entity(s) or person(s) who will perform the work
- (6) Duration of study
- (7) Requested funding, including other funding sources and amounts

B. In reviewing and recommending the Enhanced Studies to be conducted pursuant to this Agreement, the Executive Committee will consider whether the proposed study meets the following criteria as they relate to achieving the Objectives:

- (1) Peer reviewable
- (2) Science based
- (3) Efficient use of resources deployed
- (4) Focused on addressing identified issues

C. Enhanced Studies will be reviewed and recommended, modified or rejected on an annual basis. In order to be recommended as a fully or partially funded Enhanced Study, the Executive Committee must endorse the proposed study and propose that funds be allocated for such study.

5. Executive Committee

A. A committee ("Executive Committee") comprised of one (1) representative ("Representative") from each Party will be formed to direct the Enhanced Studies.

B. The Executive Committee will attempt to make all decisions by unanimous agreement of all Representatives. If unanimous agreement is not achieved within two (2) weeks of the initial vote on the matter, the Executive Committee may act with the affirmative vote of three Representatives.

C. EMC will appoint the chairman ("Chairman") of the Executive Committee. Dr. Al Maki will serve as chairman unless and until EMC provides notice to the Parties of designation of a substitute chairman.

D. The Executive Committee will meet semi-annually, or more frequently on an as-needed basis, at a location within the State of Colorado to be designated by the Chairman, unless an alternate location is approved by all committee members. The Chairman will endeavor to select dates and times that will allow participation by all the Representatives. Participation is also allowed by teleconference or other electronic means, but all Parties will make a good faith effort to convene in person. Each Representative may designate an alternate for a specific meeting by providing prior written notice to the Chairman of the designated alternate for such meeting.

6. Funding

A. Although the Ongoing Studies have received funding outside this Agreement, the Parties anticipate that partial funding for the Ongoing Studies may be provided through this Agreement, in which event such Ongoing Study shall be considered an Enhanced Study for the purposes hereof. The provisions of this Agreement shall apply only to funds and work subject to this Agreement, and this Agreement shall have no effect on funds provided from other sources.

B. The Executive Committee will make an annual recommendation to EMC regarding the total level of funding, as well as the specific Enhanced Studies to be

funded and associated funding amounts. EMC will make the final determination regarding funding for each proposed Enhanced Study in each calendar year, however it is anticipated that EMC will provide funding of up to \$1,000,000 per annum for at least 3 years assuming the studies proposed by the Executive Committee meet the Objectives and demonstrate the qualities listed in Section 3.B.

C. After EMC has approved the proposed budget for the upcoming calendar year, including any EMC revisions (the "Approved Budget"), EMC will transfer the approved funding to CSU for disbursement. Such transfer of funds to CSU for the upcoming year will occur no later than October 15 of the preceding year.

D. CSU will be responsible for disbursement of funds to each Study Manager based on the EMC Approved Budget. Such disbursements will be made by CSU through a subcontract ("Subcontract") between the Study Coordinator and the Study Managers. CSU will use its best efforts to ensure that funds are provided on a timely basis. Any payment by CSU that is not consistent with the EMC approved annual budget will be considered made by CSU and will not be charged to EMC or this Agreement. Any funds in an Approved Budget paid to CSU for allocation to the Study Managers, but not paid to Study Managers for any reason will be retained by CSU and deducted from the amount that would otherwise be paid by EMC to fund the budget for the following year unless this Agreement has terminated or no annual budget is approved for the following year, in which case the funds will be reimbursed to EMC.

7. Study Approval, Notification and Payment Timing

A. Proposed studies and requested funding to Executive Committee: July 1

B. Executive Committee recommends studies / funding: September 1

C. EMC advises other Parties of approved studies / funding: October 1

D. EMC funds upcoming annual budget for Enhanced Studies: October 15

E. CSU issues subcontracts to Study Managers: November 15

F. Subcontracts signed by Study Managers and returned to CSU: December 15

G. The dates set forth in this Section 7 are deadlines. Earlier submission or action is encouraged. All Parties recognize the need to implement these actions well before implementation of the Enhanced Studies in order to properly plan and staff the work.

8. Study Coordinator

A. CSU will coordinate and administer the Enhanced Studies and any funding of such studies pursuant to this Agreement, and in such role shall be known in this Agreement as the "Study Coordinator." CSU will be responsible for issuing Subcontracts to each Study Manager based on the EMC approved Enhanced Studies and the Approved Budget. CSU will monitor the Enhanced Studies and collaborate with the Study Managers in an effort to optimize the validity of the studies and the data resulting from the studies. EMC will compensate the Study Coordinator by paying CSU

a flat fee of \$ 33,650 per year payable on or before December 31 of the preceding year for the coordination and administrative duties associated with oversight of the Enhanced Studies to be performed in the calendar year. In the event the Study Coordinator role significantly changes, EMC and CSU will discuss an adjustment in the flat fee to be paid. In the event the EMC and CSU are unable to agree to an appropriate adjustment, CSU may elect to withdraw as Study Coordinator or EMC may name a replacement Study Coordinator. Any such change in Study Coordinator shall be effective at the end of the calendar year in which such a decision is made and communicated to the Parties.

B. Nothing contained herein shall prohibit CSU from acting as Study Manager pursuant to this Agreement. In the event CSU acts as a Study Manager, CSU will establish a separate account for the entity within CSU that will be responsible for the Enhanced Study(s) and disburse or transfer funds in a manner consistent with payments to other Study Managers.

9. CSU Subcontracts

A. Each Subcontract issued by CSU will include:

- (1) a description of the research activities to be performed
- (2) the project period for the Subcontract
- (3) the payment schedule based on the total value of the Subcontract

B. Unless explicitly stated otherwise within the Subcontract, each provision of this Agreement shall be incorporated into the subject Subcontract by reference. In the event of any conflict between the terms of this Agreement and the Subcontract, the terms of this Agreement shall take precedence.

C. The representative of Study Manager who will be responsible for conducting or supervising the research described in the Subcontract and ensuring compliance with the terms of each Subcontract will be the "Principal Investigator" designated in each individual Subcontract.

D. The CSU contact for each Subcontract shall be set forth in the Subcontract.

10. Reporting, Sharing and Publication of Studies

A. No later than March 1 of each year, each Study Manager shall report to the other Parties and the Executive Committee the results of each Enhanced Study. The Executive Committee may also elect to call a meeting of the Parties after March 1 to promote further discussion of the results of the Enhanced Studies.

B. Each Party shall have the right to publish, either jointly or individually in accordance with customary academic practice, and to present the complete details of research results. In the event of a conflict regarding the Party allowed to publish the research results, the Study Manager responsible for the research shall have the right to publish the research results or to designate the Party or Parties who will be allowed to publish the research results.

C. Notwithstanding Section 10.B. above, the Parties recognize that in certain circumstances disclosure of data gathered pursuant to this Agreement may be counterproductive. Therefore, the parties agree that:

(1) With regard to any disclosure to a technical, academic or scientific publication:

(a) such disclosure must be reviewed by all Parties, and any Party shall have the right to require a delay in publication or presentation for the purposes of protecting proprietary information or potentially patentable intellectual property. Such delay shall not exceed 90 days.

(b) any publication or release of data from the studies will be made only if such publication or release is in compliance with the following guidelines, or in the event all Parties approve a data release outside these guidelines.

(i) Publication or release of selected data from a larger sample is not permitted unless the data selected is representative of the larger sample.

(ii) The data must be from a study that has been completed or there must be a minimum of two (2) years of data contained in the publication or release.

(ii) Any conclusions, extrapolations, hypotheses, conjecture, speculation and any other comments regarding the data or study must be reviewed by all Parties prior to publication or release. If there is disagreement among Parties, authors shall have the final say on manuscript content unless it can be demonstrated that they have speculated beyond the scope of the data or violated standard scientific norms. Such delay shall not exceed 90 days.

(2) Written approval of all Parties shall be required prior to any disclosure to media other than those covered by 10.C.(1), above.

D. No Party may use the name of another Party in any form in any press release or release of information to the public regarding this Agreement without the express prior written consent of the other Party,

E. Notwithstanding anything to the contrary in this Section 10, a Party may disclose data if it has a duty to do so under applicable law, regulation, governmental order, decree, regulation or rule. If disclosure is compelled in this manner, the affected Party shall make all reasonable efforts to provide the other Parties with prompt written notice of its intent to disclose and the specific nature of the data to be disclosed prior to disclosure of the data.

11. Term of Agreement

A. Any Party may terminate its participation under this Agreement by providing written notice to the other Parties and to the Chairman of the Executive Committee. Such notice will be effective thirty (30) days after receipt of the notice by the Chairman unless the terminating Party has received funds for studies not yet completed, in which case the termination of participation will be effective only upon completion of the studies and reporting of the results of such studies in compliance with this Agreement, or upon the return of any unused funds in the event completion of the study is impractical.

B. The Parties may elect to unanimously terminate this Agreement. In such event the Parties will specify the termination date. If the Parties fail to specify a termination date, this Agreement will terminate on December 31 of the year in which the Parties agreed to terminate the Agreement.

C. If this Agreement has not otherwise terminated on or before December 31, 2014, this Agreement will terminate on that date.

12. Compliance with Laws and Accuracy of Records

A. Each Party agrees to comply with all applicable federal, state and local laws, codes, regulations, rules, and orders in the performance of this Agreement.

B. Each Party agrees that all financial settlements, billings, and reports rendered to any one or more of the Parties to this Agreement will, to the best of its knowledge and belief, reflect properly the facts about all activities and transactions undertaken pursuant to this Agreement, which data may be relied upon as being complete and accurate in any further recording and reporting made by such Party or Parties for whatever purpose.

C. Each Party agrees to notify the other Parties promptly upon discovery of any instance where such Party fails to comply with provision 12.A above or where such Party has reason to believe data covered by 12.B above is no longer accurate and complete.

13. Audit Rights

EMC shall have access, at all reasonable times, to each Study Manager's and their contractors' personnel, books, records, correspondence, instructions, plans, drawings, receipts, vouchers, financial accounts, data stored in computer files or microfiche, and memoranda of every description pertaining to studies at least partially funded pursuant to this Agreement for the sole purpose of verifying costs associated with such studies and the Study Manager's and contractors' compliance with the financial terms of the Agreement, and the Study Managers shall insure that their contracts with contractors provide for such access. Each Study Manager shall maintain supporting data and accounting records in accordance with generally accepted accounting practices. EMC, CSU and their representatives shall have the right to reproduce any of these documents. Each Study Manager shall preserve and shall cause its contractors to preserve all these documents for a period of three (3) years

after the first to occur of (a) completion the study in question, or (b) termination of the Agreement. Each Study Manager agrees to include the necessary provisions in its contracts with subcontractors that will assure access by EMC, CSU or their representatives to applicable records of contractor. Neither EMC nor CSU shall be liable for the costs incurred by a Study Manager or its contractors resulting from an audit hereunder.

14. **Equipment**

Unless otherwise provided in writing and signed by all of the affected Parties, all equipment purchased with funds provided under this Agreement for use in connection with this Agreement shall be the property of the Party purchasing such equipment, and shall be dedicated to providing services under this Agreement while this Agreement is in effect.

15. **Liability; Insurance**

Each party hereto agrees to be responsible for its own wrongful or negligent acts or omissions, or those of its officers, agents, or employees to the full extent allowed by law. Liability of CSU and CDW is at all times herein strictly limited and controlled by the provisions of the Colorado government Immunity Act, C.R.S. §§ 24-10-101, et seq. as now or hereafter amended. Nothing in this Agreement shall be construed as a waiver of the protections of said Act. Each Party represents and warrants that it will maintain any insurance required by law for the activities undertaken pursuant to this Agreement. A Party will furnish the requesting Party a certificate evidencing such insurance upon written request.

16. **Exclusive Warranty; Disclaimer**

CDW, BLM and CSU agree that all deliverables provided under this Agreement will be provided substantially in accordance with this Agreement. Research results, deliverables, reports and any additional information provided to EMC by CDW, BLM and CSU are provided strictly "as-is" without any other warranty or guaranty of any kind. All other warranties, express and implied, are hereby expressly disclaimed INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No Party shall be liable to any other Party for any indirect, special, incidental, consequential or punitive loss or damage of any kind, including but not limited to lost profits (regardless of whether or not the responsible Party knows or should know of the possibility of such loss or damages). The liability of any Party to any other Party under this Agreement shall not exceed the amount paid or payable under this Agreement to such Party.

17. **Use of Trade Names and Service Marks**

No Party obtains by this Agreement any right, title, or interest in, or any right to reproduce or to use for any purpose, the name, trade names, trade- or service marks, or logos, or copyrights of any other Party. No Party will include the name of any other Party or of any employee of that Party in any advertising, sales promotion, or other publicity matter without the prior written approval of that other Party. In the case of the CSU, prior written approval is required from the CSU Vice President for Research and

Engagement or designee. In the case of all other Parties, prior written approval is required from an authorized representative of the Party.

18. Notices

All notices and other correspondence related to this Agreement shall be in writing and shall be effective when delivered by: (i) certified mail with return receipt, (ii) hand delivery with signature or delivery receipt provided by a third party courier service (such as FedEx, UPS, etc.), (iii) fax transmission if verification of receipt is obtained, or (iv) email with confirmation of receipt, to the designated representative of the Party as indicated below. A Party may change its designated representative for notice purposes at any time by written notice to the other Parties. The initial representatives of the Parties are set forth in Exhibit B attached hereto.

19. Miscellaneous

A. This Agreement is not intended to and shall not create any rights in any person or entity who is not a Party to this Agreement.

B. Each Party to this Agreement represents that it possesses the legal authority to enter into this Agreement and that it has taken all actions required by its procedures, bylaws, and/or applicable law to exercise that authority, and to lawfully authorize its undersigned signatory to execute this Agreement and to bind it to its terms. Each person executing this Agreement on behalf of a Party represents that he or she has the authorization of the represented Party to execute this Agreement on behalf of such Party.

C. This Agreement constitutes the entire agreement between the Parties, and supersedes any previous contracts, understandings, or agreements of the Parties, whether verbal or written, concerning the subject matter of this Agreement. No amendment to this Agreement shall be valid unless it is made in writing and signed by the authorized representatives of the Parties. No amendment to a Subcontract issued pursuant to this Agreement shall be valid unless it is made in writing and signed by the authorized representatives of the Study Coordinator and the Study Manager.

D. This Agreement shall be governed by and construed under the laws of the State of Colorado, without regard to any conflicts of law rules. Any claim arising under this Agreement shall be filed and tried in a court of competent jurisdiction.

E. This Agreement shall not be assigned without the prior written consent of the other Parties, which consent shall not be unreasonably withheld or delayed, provided however, such consent shall not be required in the case of a sale or transfer to a third party of all or substantially all of a Party's business. Subject to the foregoing, this Agreement shall inure to the benefit of and be binding on the successors and permitted assigns of the Parties.

F. No waiver of any breach of any provision of this Agreement shall operate as a waiver of any other or subsequent breach thereof or of the provision itself, or of any other provision. No provision of this Agreement shall be deemed to have been waived unless such waiver is in writing and signed by the Party waiving the same.

G. If any provision of this Agreement is determined to be invalid or unenforceable in whole or in part, such invalidity or unenforceability shall attach only to such provision or part thereof and the remaining part of such provision and all other provisions hereof shall continue in full force and effect.

H. Each Party hereby affirms that no officer, employee, student or agent of another Party will during the term of this Agreement be employed, retained, paid a fee, or receive any personal compensation or consideration in connection with the obtaining, arranging, negotiation or conducting of this Agreement. Each Party further affirms that no such personal payment, compensation or consideration shall be paid or received in connection with the obtaining, arranging, negotiating or conducting of this Agreement before or after the term of this Agreement.

I. Headings are for reference and convenience only, and shall not be determinative of the meaning or the interpretation of the language of this Agreement.

J. It is understood and agreed by the Parties that the CDW, BLM and CSU are independent contractors under this Agreement, and that this Agreement is not intended and shall not be construed to create an employer/employee or a joint venture relationship between the Parties. Although bound by the terms hereof, CDW, BLM and CSU shall be free from the direction and control of any other Party in the performance of their respective activities under this Agreement, except that EMC may indicate specifications, standards, requirements, timing and deliverables for satisfaction of the respective obligations of CDW, BLM and CSU under this Agreement.

K. This Agreement shall become effective upon its execution by EMC, CDW and CSU. In the event BLM does not execute this Agreement it shall have no rights or obligations hereunder unless and until it executes or ratifies this Agreement, provided that the remaining Parties may elect to share some or all of the data generated hereunder with BLM in its capacity as the owner of lands within the Study Area.

IN WITNESS WHEREOF, the parties have executed this Agreement the day and year written below.

Colorado Division of Wildlife
Thomas E. Remington 5/13/10
date

Colorado State University
Darryl Eckert 5/12/10
date

Bureau of Land Management

date

Exxon Mobil Corporation
Ronald R. By 5/11/10 *SRM*
date

EXHIBIT "A"

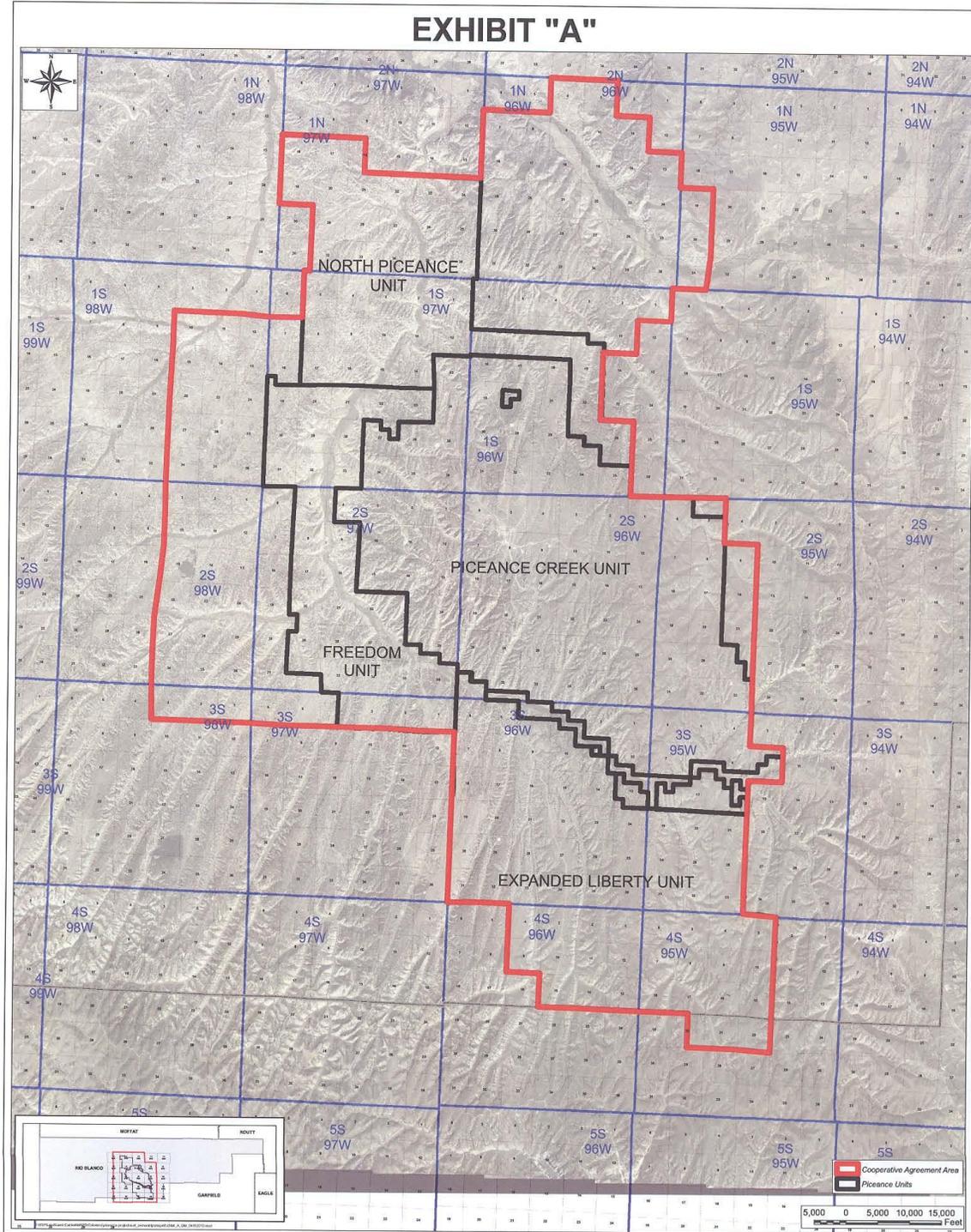


EXHIBIT B

Colorado Division of Wildlife

Terrestrial Section Manager
Colorado Division of Wildlife
317 West Prospect
Fort Collins, Co. 80526

Bureau of Land Management

Kent Walters
Bureau of Land Management, White River Field Office
220 East Market Street
Meeker, Colorado 81641

Colorado State University

Carmen Morales
Colorado State University, Office of Sponsored Programs
2002 Campus Delivery
Colorado State University
Fort Collins, CO 80523-2002

Exxon Mobil Corporation

Romeo Perez
Exxon Mobil Corporation
CORP-WGR-616
396 West Greens Road
Houston, TX 77067-4530

**Attachment 1
Subaward Agreement**

Attachment 2 Subaward Agreement	
University Contacts	Collaborator Contacts
<p>Administrative Contact</p> <p>Name: Carol Wood Address: Sponsored Programs Colorado State University Fort Collins, CO 80523-2002</p> <p>Telephone: 970-491-4878 Fax: 970-491-6147 Email: carol.wood@colostate.edu</p>	<p>Administrative Contact</p> <p>Name: Address:</p> <p>Telephone: Fax: Email:</p>
<p>Principal Investigator</p> <p>Name: Address: Colorado State University Fort Collins, CO 80523-</p> <p>Telephone: 970-491- Fax: 970-491- Email:</p>	<p>Project Director</p> <p>Name: Address:</p> <p>Telephone: Fax: Email:</p>
<p>Financial Contact</p> <p>Name: Same as Administrative Contact Address:</p> <p>Telephone: Fax: Email:</p>	<p>Financial Contact</p> <p>Name: Address:</p> <p>Telephone: Fax: Email:</p>
<p>Authorized Official</p> <p>Name: Carmen Morales Address: Sponsored Programs Colorado State University Fort Collins, CO 80523-2002</p> <p>Telephone: 970-491-1554</p>	<p>Authorized Official</p> <p>Name: Address:</p> <p>Telephone: Fax: Email:</p>

**Attachment 3
Reporting Requirements**

Annual Progress Reports are required three months prior to the end of each budget period.

A final report of the work accomplished under this Subaward, in such detail as shall be requested by UNIVERSITY, is required 60 days after the end of the project period and prior to final payment.

Annual and Final Progress Reports should be mailed to the Principal Investigator as identified in Attachment 3.

Closeout Documents:

The following documents are required 60 days after end of project period and should be sent to the Administrative Contact as identified in Attachment 3.

- Patent/Invention Certification
- Final Property Report
- Contractor's Release

Appendix C
Applicant Committed Reclamation Mitigation Measures

Appendix C

Applicant Committed Reclamation Mitigation Measures

North Hatch Gulch Project

INTRODUCTION/BACKGROUND

This reclamation plan provides an outline of remediation measures for disturbance that will result from implementation of the proposed North Hatch Gulch Project. Proposed project facilities whose construction and operation will result in vegetative cover loss or damage and soil disturbance will include pipelines for natural gas, condensate/liquids, and produced water. These pipelines will comprise a gathering system of four adjacent pipelines within a 100-foot corridor/ROW and six sets of four pipelines placed together within 90-foot wide wellpad flowline corridors/ROWS. Additional disturbance will result from construction and operation of main access roads and wellpad access roads; and from the six wellpads within the project area.

Special reclamation actions will be evaluated for design and application where site-specific conditions such as road gradients exceeding 8 percent and pipeline ROW gradients exceeding 35 percent (fragile soils). Other than slope, no other resource conditions are likely to necessitate special reclamation of project disturbances; however, the use of exclosures or fencing may be requested on a site by site basis to limit grazing impacts to re-establishing vegetation/revegetation from principally livestock. Proposed facilities will avoid T&E plant habitats.

MITIGATION MEASURES COMMON TO ALL PROJECT COMPONENTS

Pre-disturbance Noxious Invasive, Non-native Weed Inventory and Treatment

- A pre-construction survey for noxious, invasive, non-native weeds, that may be present within areas to be disturbed by construction, will be completed and locations of weed infestation will be reported to the BLM.
- Pre-disturbance treatment for areas of weed infestation will be applied to control weeds prior to construction to limit spread and to limit seed source for weeds in post-disturbance areas undergoing reclamation and revegetation with approved seed mix.
- A Pesticide Use Proposal (PUP) will be submitted to the BLM for approval prior to the use of herbicides.

Vegetation Clearing and Management

- Vegetation providing soil cover within disturbed areas, including storage piles and areas out to the cut and fill disturbance boundary, will be cleared sufficiently to allow for topsoil salvage and storage.
- Standing trees (pinyon-juniper woodland) within areas to be disturbed will be cut at 6 inches or less above ground level. Stumps will be removed where topsoil is to be salvaged; they will be placed with the stockpiled cut trees. NOTE that stumps will be left in place within pipeline ROWs where topsoil is left in place.

- Felled trees selected for use in reclamation (to be placed on disturbed areas at final reclamation to enhance vegetative and wildlife habitat, enhance visual aesthetics and to limit OHV travel), will be moved to the outside edge of the disturbance boundary to form one or more stockpiles of cut tree canopies and stumps. Use of felled trees over disturbed areas will not exceed 20-30 percent surface cover.
- Felled trees not selected for use above will be chipped and stockpiled. Chips will be incorporated into the topsoil when it is re-spread for reclamation.
- Felled trees not selected for use in reclamation will be cut in four foot lengths (down to 4 inches diameter) and placed adjacent to disturbed areas where access by the public would be available.
- Brush will be hydro-axed (larger diameter) or mowed (smaller diameter) to approximately 6 inches above ground level with chip debris left on soil surface. Woody debris from felled trees with diameters less than 4 inches will be chipped with chip debris scattered on soil surface.

Soil Removal

- To optimize the restoration of protective vegetative cover for interim or final reclamation, the disturbance footprint will be cleared of vegetation and topsoil will be salvaged and stored for redistribution.
- Where feasible, topsoil to a depth of 8 inches, or less (no less than 4 inches) depending on where the rock content of the subsoil increases markedly over the topsoil's rock content, will be bladed from above the portion of the disturbance footprint.
- Topsoil salvage will extend across the entire disturbance footprint including cuts and fills (including across approximately 30 feet of the 40-foot wide access road ROW and across the width of the 100-foot main pipeline construction ROW where slope/terrain conditions warrant surface leveling to meet constructability and safety requirements). Topsoil salvage will result in the mixing of chipped woody material and herbaceous litter into the topsoil as it is bladed.

Soil Storage

- Salvaged topsoil piles and berms will be clearly marked with signage and separation of the piles from construction and operational activity and non-topsoil materials will be maintained until final topsoil replacement. Topsoil stored in the topsoil stockpiles will be stabilized using appropriate erosion control measures and will be seeded to protect the stored topsoil from accelerated erosion.

Re-contouring and Re-spreading of Soil Materials - Interim Reclamation

- Prior to spreading the salvaged and stockpiled topsoil on road back slopes and fill slopes and portions of recontoured wellpads (thicker than 8 inches or original depth of available topsoil), site specific conditions in terms of soil stability as affected by slope steepness and length, soil erodibility, and evidence of active, or high potential of, erosion features such as pedestalling, rills, and gullies will be assessed by field monitoring. Based on field observations and experience, applicable soil stabilizing and erosion control features such as weed-free straw mulch, tackifiers, fiber blankets, wattles, and water bars will be

identified, designed, and installed at the appropriate time before, during, or after salvaged topsoil placement and seeding based again on field observations and evaluations of site-specific conditions.

- Areas receiving redistributed topsoil will then be disked or harrowed to loosen any compaction in the topsoil and to roughen the surface in preparation for seeding.
- Re-contouring, and Re-spreading of Soil Materials - Final Reclamation
- Prior to spreading of topsoil on recontoured disturbed areas, site specific conditions in terms of soil stability as affected by slope steepness and length, soil erodibility, and evidence of active, or high potential of, erosion features such as pedestalling, rills, and gullies will be assessed by field inspection/monitoring. Based on field observations and experience, applicable soil stabilizing and erosion control features such as weed-free straw mulch, tackifiers, fiber blankets, wattles, and water bars will be identified, designed, and installed at the appropriate time before, during, or after salvaged topsoil placement and seeding based on field observations and evaluations of site-specific conditions.
- Re-contoured areas will be ripped to a depth of 18 inches below finished grade (original contours) or to a shallower depth should bedrock be encountered.
- Stockpiled topsoil will be spread to a depth of approximately 8 inches, or less depending on original depth of topsoil salvaged, over stabilized disturbed areas.
- Areas receiving topsoil redistribution will be harrowed or disked to loosen the soil and to leave a roughened surface.

Re-seeding - Interim and Final Reclamation

- The roughened surface of the replaced soils will be seeded using a drill seeder along the ROW (slopes less than 10 percent) or on the contour (slopes greater than 10 percent up to 20 percent). Seed will be broadcast on slopes greater than 20 percent at double the rate of drill seeding, and raked to cover. The seed mix will be composed of certified seed and free of noxious weeds.
- Seeding will occur from October through March (during snow-free period).
- All disturbed areas will be seeded with Native Seed Mix #3 (see table below). Seed mixture rates are in Pure Live Seed (PLS) pounds (Lb) per acre. Seed will be used within 12 months of testing.
- Nitrogen fertilizer (slow release nitrogen) may be applied at the time of seeding where determined necessary by sampling, as approved by the Authorized Officer.
- Felled trees and stumps selected for use in reclamation and stored on the edge of the construction area will be brought back onto the stabilized and seeded areas and placed in a manner so to optimize vegetative habitat restoration, OHV controls, wildlife habitat conditions, and visual aesthetics.
- All reclamation activities will be supported and overseen by BLM staff and by supporting field inspectors/monitors and BLM-approved monitoring program

North Hatch Gulch Proposed Reclamation Seed Mix

Native Seed Mix #3 Modified	
Plant Species	PLS-Lbs/Acre
Western wheatgrass (Rosana)	2
Bluebunch wheatgrass (Whitmar)	2
Needle and thread	1
Indian ricegrass (Rimrock)	2
Fourwing saltbush (Wytana or VNS, northern)	1
Utah sweetvetch	3
Scarlet globemallow	1
Rocky Mountain bee plant	2

Reclamation Monitoring and Final Abandonment Approval

- The designated WRFO Natural Resource Specialist will be notified via email or by phone a minimum of 24 hours prior to beginning all reclamation activities associated with this project. Reclamation activities may include, but are not limited to, seed bed preparation that requires disturbance of surface soils, seeding, constructing exclosures (e.g., fences) to exclude livestock from reclaimed areas.
- All seed tags will be submitted via Sundry Notice (SN) to the designated Natural Resource Specialist within 14 calendar days from the time the seeding activities have ended. The SN will include the purpose of the seeding activity (i.e., seeding wellpad cut and fill slopes, seeding pipeline corridor, etc.). In addition, the SN will include the well or wellpad number associated with the seeding activity, if applicable, the name of the contractor that performed the work, his or her phone number, the method used to apply the seed (e.g., broadcast, hydro-seeded, drilled), whether the seeding activity represents interim or final reclamation, an estimate of the total acres seeded, an attached map that clearly identifies all disturbed areas that were seeded, and the date the seed was applied.
- Reclaimed areas will be monitored annually for progress toward achieving BLM standards of reclamation success. Actions will be taken to ensure that reclamation standards are met as quickly as reasonably practical and are maintained during the life of the permit.
- Periodic post-disturbance monitoring, treatment, and control of weeds will be maintained for potential infestations for the life-of-project in coordination and in compliance with BLM requirements and guidelines.
- XTO will meet with the WRFO reclamation staff in March or April of each calendar year and present a comprehensive work plan and maps for reclamation activities to be conducted during the year's upcoming growing season.
- A Reclamation Status Report will be submitted electronically via email and as a hard-copy to WRFO Reclamation Coordinator by September 30th of each year. The report will also include the well number, API number, legal description, UTM coordinates ,

project description, reclamation status, whether the wellpad or pipeline has been re-vegetated and/or re-contoured, percent of the disturbed area that has been reclaimed, method used to estimate percent area reclaimed, technique used to estimate percent area reclaimed, date seeded, photos of the reclaimed site, estimate of acres seeded, seeding method, and contact information for the person(s) responsible for developing the report. The report will be accompanied with maps and GIS data showing each discrete point, polygon, or polyline feature that was included in the report. Geospatial data shall be submitted: for each completed activity electronically to the designated BLM staff person responsible for the initial request and in accordance with WRFO geospatial data submittal standards. Internal and external review of the WRFO Reclamation Status Report, and the process used to acquire the necessary information will be conducted annually, and new information or changes in the reporting process will be incorporated into the report.

- The designated Natural Resource Specialist will be provided, within 60 days of construction completion, with geospatial data in a format compatible with the WRFO's ESRI ArcGIS Geographic Information System (GIS).
- The authorized officer will be informed when reclamation has been completed, appears to be successful, and the site is ready for final inspection.

MITIGATION MEASURES SPECIFIC TO PIPELINES AND WELLPAD FLOWLINES

Vegetation Clearing and Management

- To optimize the restoration of protective vegetative cover following pipeline construction, the pipeline construction ROW will remain undisturbed to the maximum extent possible. Where grading will be required to support safe pipeline construction, topsoil will be salvaged prior to working subsoil and substrate.
- Stumps will be left in place within pipeline ROWs where topsoil is left in place.
- Felled trees selected for subsequent placement on seeded pipeline ROW will be moved to the outside edge of the ROW (working side) to form a linear stockpile of cut canopies.

Soil Storage

- Where feasible, topsoil to a depth of 8 inches, or less (no less than 4 inches) depending on where the rock content of the subsoil increases markedly over the topsoil's rock content, will be bladed from above the trench alignment and the working surface within the construction ROW and windrowed in a linear berm on cleared but undisturbed surface of the working side of the construction ROW. The linear topsoil berm will be located within the ROW and inside of the linear stockpile of felled trees to be used in reclamation.
- As part of trench excavation for the placement of pipelines, trench spoil will be placed in a linear berm/pile along the edge of the trench on the non-working side of the ROW.

Backfilling, Re-contouring, and Re-spreading of Soil Materials - Final Reclamation

- After padding the installed pipeline(s) with appropriate materials including those available onsite [excluding topsoil and Effective Rooting Depth (ERD) soil material

(subsoil to a depth of 16 to 24 inches below the original soil surface)], spoil will be replaced in the trench above the pipe and appropriately compacted to the exposed surface.

- Disturbed surfaces (where topsoil has been salvaged) will be contoured as needed to restore slopes and surface configuration to that prior to disturbance and in a manner consistent with the surrounding landscape.
- Those subsoil and substrate materials disturbed by grading will be worked to achieve approximate original contours.
- Portions of the ROW where equipment has compacted exposed subsoil, or topsoil, where conditions did not require topsoil salvage, will be ripped to a depth of 18 inches below finished grade (original contours) or to a shallower depth where bedrock or subsoils containing rock fragments are encountered and ripping could bring rock fragments to the surface.
- Stockpiled topsoil will then be re-spread (approximately 8 inches, depending on original depth of available topsoil) over the re-contoured portion of ROW from where topsoil was salvaged. The redistribution of topsoil will be consistent with achieving approximate original contours.

MITIGATION MEASURES SPECIFIC TO MAIN AND WELLPAD ACCESS ROADS

Vegetation Clearing and Management

- Felled trees selected for subsequent placement on seeded road ROW will be moved to the outside edge of the ROW to form a linear stockpile of cut tree canopies.

Soil Storage

- Where feasible, topsoil to a depth of 8 inches, or less (no less than 4 inches) depending on where the rock content of the subsoil increases markedly over the topsoil's rock content, will be bladed from above the portion of the road ROW to be cleared and windrowed in a linear berm on non-cleared and cleared (back slope) portions of the ROW. Where cut and fill construction methods are not needed due to the mostly level nature of the land, topsoil will be salvaged from the cleared portion of the ROW and temporarily stored in a linear berm located on either side of the ROW and on a non-cleared roadside surface within the ROW.

Re-contouring and Re-spreading of Soil Materials - Interim Reclamation

- All salvaged topsoil will be spread on the stabilized back/cut and fill slopes on either side of the access road roadbed [excluding travel surface, shoulders, surface courses, and ditch(es)].
- Stockpiled topsoil will be spread to a depth greater than 8 inches, or to a depth greater than the original depth of topsoil salvage, over stabilized back slope and fill slope portions of the disturbed access road ROW. All stored topsoil will be spread over disturbed portion of the ROW outside the travel surface, shoulders, and ditches, including back and fill slopes, to prevent long-term topsoil storage in a pile/berm.

Re-contouring and Re-spreading of Soil Materials -Final Reclamation

- Prior to picking up and disposing of travel surface materials (gravels) and backfilling the back/cut slope with the excavated fill, topsoil previously spread on back slope and fill slopes will be salvaged and placed temporarily in the salvaged topsoil stockpile or berm on the edge of the ROW. The subsoil and geologic substrate fill materials will be replaced in the reverse order of excavation and the disturbed surfaces within the road ROW will be contoured as needed to restore slopes and surface configuration to that prior to disturbance and in a manner consistent with the surrounding landscape.

MITIGATION MEASURES SPECIFIC TO WELL PADS

Soil Storage [Wellpads]

- Removed topsoil will be placed into a topsoil stockpile(s) within the wellsite's disturbance boundary, adjacent to the active wellpad.
- Where feasible, topsoil will be stored in piles with thicknesses of 2 feet or less.
- Subsoil and underlying substrate will be worked through excavation/blading (cuts) and material placement (fills) to create the base for a wellpad. The working surface of the wellpad will be surfaced with gravel.

Re-contouring and Re-spreading of Soil Materials - Interim Reclamation

- Where feasible those portions of wellsites not required for production operations will be restored to original contours with fill material being moved to backfill cut slopes. Following removal of any gravel surface material, all salvaged topsoil will be spread on those portions of the wellpad to be recontoured and stabilized as part of interim reclamation. Topsoil thickness over interim reclaimed portions of the wellpads will likely exceed the 8 inches or original thickness of topsoil initially salvaged over the wellsites.
- Recontouring and the application of stabilizing and erosion control features will include any additional chiseling to 18 inches, or to a shallower depth should bedrock be encountered, that is needed to reduce subsoil/ERD compaction of the recontoured and stabilized surface prior to topsoil replacement.
- Stockpiled topsoil will be spread to a depth greater than 8 inches, or to a depth greater than the original depth of topsoil salvage, over much of the stabilized recontoured portions of wellsites. Areas of recontoured and interim reclamation close to active portions of the wellpad will receive topsoils creating a topsoil thickness greater than 8 inches that will subsequently, at wellsite abandonment, be excavated and re-spread over recontoured but formally active parts of the wellsite. The newly contoured portions of the wellsites will receive a depth of approximately 8 inches at final reclamation.

Re-contouring and Re-spreading of Soil Materials - Final Reclamation

- Prior to picking up and disposing of wellpad surfacing gravels and backfilling the back/cut slope with the excavated fill, topsoil spread on back slope and fill slopes will be salvaged and placed temporarily in the salvaged topsoil stockpile or berm. The subsoil and geologic substrate fill materials will be replaced in the reverse order of excavation and the disturbed surfaces will be contoured as needed to restore slopes and surface

configuration to that prior to disturbance and in a manner consistent with the surrounding landscape. Portions of wellsites that have undergone interim reclamation where acceptable vegetative cover has been established will not be re-disturbed during final reclamation, except where topsoil recovery and associated disturbance is necessary to reclaim wellsites as a whole, including the restoration of sites to original contours.

Appendix D
Applicant Committed Design Features

Appendix D

Applicant Committed Design Features

North Hatch Gulch Project

A number of features intended to minimize impacts to the human environment from implementation of the Proposed Action have been incorporated into the project design and are listed below. XTO has agreed to implement the following design features:

Air Quality

- All drill rigs used within the project area will comply with Environmental Protection Area (EPA) Tier two diesel or better technology.
- Water and/or chemical dust suppressants will be applied to control fugitive dust during construction activities to achieve at least a 50 percent control efficiency.
- XTO will comply with all local, state, and federal air quality regulations as well as for providing documentation to the BLM that they have done so.

Floodplains

Impacts to floodplains will be mitigated by implementing the following mitigation measures:

- Install road and pipeline crossings perpendicular to the stream channel where topographic conditions allow.
- Bury pipelines at least five feet deep in areas within the 100-year floodplain and/or use acceptable engineering practices to ensure negative buoyancy during flood events.
- BLM mitigation measures will be implemented to protect against scour and bank erosion that are described in Hydraulic Considerations for Pipeline Stream Crossings (BLM 2003b), such as burying pipelines below scour depth and using concrete-coated pipe or set-on weights.

Invasive, Non-native Species

XTO will do the following:

- Promptly recontour and revegetate all disturbed areas with the seed mix specified in APDs or ROW grants. In addition, XTO will monitor the area of the Proposed Action until final abandonment to detect the presence of noxious and invasive species, and be responsible for eradication of noxious weeds and cheatgrass using materials and methods authorized in advance by the AO.
- Upon detection of noxious, non-native, and/or invasive plant species, control their presence before seed production using materials and methods as outlined in the RMP and/or authorized in advance by the White River Field Office Manager. Application of

herbicides will occur under field supervision of an EPA certified pesticide applicator. Herbicides must be registered by the EPA and application proposals must be approved by the BLM before application. Herbicides intended for use in riparian areas will be labeled for aquatic use. Herbicide application will be in accordance with label instructions (the label is considered a legal document).

Migratory Birds

XTO will employ measures to discourage migratory bird access to, or contact with, reserve pit contents that through ingestion or exposure may result in mortality or have potential to compromise the water-repellent properties of bird plumage. Exclusion methods installed prior to placing fluids in pits may include netting, the use of flags, cannons, decoys, or other alternatives that are effective for discouraging migratory bird contact with pit contents and meet BLM's approval. XTO will notify the BLM of the method that will be used to discourage migratory bird use two weeks prior to initiation of drilling activities. The BLM-approved method will be applied within 24 hours after drilling activities have begun. All lethal and non-lethal events that involve migratory birds will be reported to a White River Field Office Petroleum Engineer Technician and the assigned Natural Resource Specialist (NRS) immediately.

Wastes, Hazardous or Solid

XTO will do the following:

- Collect and properly dispose of any solid wastes generated by the Proposed Action.
- Reuse produced water in well drilling and completion processes to the extent feasible.
- Completion fluids will be recycled.
- Provide receptacles for management of trash and construction debris generated during construction and operations.
- Manage equipment and vehicle maintenance fluids such as used oil and antifreeze managed through third-party recyclers.
- Provide county-approved septic systems, closed septic treatment packages, and portable toilets for all operations.
- Expand and continually implement the field-wide SPCC to cover new activities.
- Ensure that all construction activities are covered by Construction Stormwater Pollution Prevention Management Plans.
- Handle the use, storage, transport, and disposal of hazardous materials in accordance with applicable state and federal laws.
- Locate storage facilities on production pads to the extent feasible, make use of enhanced remote monitoring, and use fiberglass or poly pipe and tankage.

Water Quality, Surface and Ground

- XTO will be responsible for obtaining all necessary federal and state permits, and complying with the Corps of Engineers (COE) Nationwide Permit 12 conditions, Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) Minimal Industry Discharge Permit conditions as well as providing documentation to the BLM that they have done so. This documentation would include an approved Storm Water Management Plan (SWMP).
- Protection of surface water resources will be accomplished by using the COAs cited in Appendix B of the White River ROD/RMP (BLM 1997a).
- All surface-disturbing activities will strictly adhere to “Gold Book” (fourth edition) surface operating standards for oil and gas exploration and development.

Vegetation

- XTO will contact the assigned NRS, petroleum engineer (PE), or petroleum engineering technician (PET), as indicated below, 24 hours prior to the following operations:
 - construction of access road and well site (NRS, PET, PE)
 - spudding (including dry hole digger or rat-hole rig) (NRS, PET, PE)
 - running and cementing of all casing strings (PE, PET)
 - pressure testing of BOPE or any casing string (PE, PET)
 - commencing completion operations (NRS, PE, PET)
 - surface reclamation work (NRS, PE, PET)
- XTO will promptly recontour and revegetate all disturbed areas with the seed mix specified in the APD or ROW grant, monitor the ROW for a minimum of five years post-construction to detect the presence of noxious and invasive species, and be responsible for eradication of noxious weeds and cheatgrass on the ROW using materials and methods authorized in advance by the AO.
- XTO will revegetate disturbed areas as follows:
 - Distribute topsoil evenly over the location and prepare a seedbed by disking or ripping;
 - Drill seed on contour at a depth no greater than ½ inch, or, in areas that cannot be drilled, broadcast at double the seeding rate and harrow seed into the soil;
 - Use seed that is certified and free of noxious weeds. Seed certification tags will be submitted to the assigned NRS within 30 days of seeding. All seed tags will be submitted via Sundry Notice (SN), and the SN will include the associated well API number, the date(s) the seed was applied, the seeding method, acres seeded, the feature that was seeded (e.g., well pad cut and fill slopes, road corridor, working surface of pad, etc.), the seed mix number, the name and phone number for the contractor that applied the seed, and a map that clearly illustrates the areas that were seeded.
- XTO will utilize one of two options for treatment of slash from this project. A hydro-ax or other mulching machine could be used to remove the trees. The machines are capable

of shredding trees up to 12 inches in diameter and 15 feet tall as well as a mower similar to a conventional brush beater. They generally leave small branches and pieces of wood from pencil size up to bowling ball size, and the mulch will be evenly scattered across the surface. This will effectively break down the woody fuel and scatter the debris, thereby eliminating any hazardous fuel load adjacent to the new road and wellpad. The other option will be to cut trees and have them removed for firewood, posts, or other products. The branches and tops will be lopped and scattered to a depth of 24 inches or less. Should the products be left for collection by the general public, they will be piled alongside the road or pad to facilitate removal. For the pipeline, the trees should be dealt with according to forestry and wildlife stipulation. However, material brought back onto the pipeline easement will not exceed five tons/acre.

- Where there is existing ROW, new ROW will be located immediately adjacent to minimize total disturbance.

Access and Transportation

XTO will:

- Ensure that all XTO and contractor employees adhere to state and local traffic regulations.
- Coordinate with the Rio Blanco County Road and Bridge Department during transport of overweight/oversize loads.

Forestry Management

- During pad, road, and pipeline layout, consideration will be given to maintaining old-growth stands in their entirety. Old-growth stands will be those with trees containing individuals of an apparent age greater than 300 years and having old-growth stature and development.
- All trees removed in the process of construction must be purchased from the BLM.

Recreation

Impacts on recreation resources will be minimized by implementing the following operator-committed mitigation measures:

- Warnings on roads with project traffic will alert project participants and recreation visitors to each other's presence and potentially promote the avoidance of accidents.
- XTO will work with BLM to schedule initiations of road, wellpad, pipeline, gathering line, and other infrastructure construction on BLM-administered lands to reduce or minimize activity during hunting seasons. Drilling and well completion operations will not be subject to rescheduling due to the long duration and nature of these activities. XTO will work with BLM to reduce traffic from road, wellpad, pipeline, gathering line, and other infrastructure construction and other project-related activities during specified hours during hunting season.

**U.S. Department of the Interior
Bureau of Land Management
White River Field Office
220 E Market St
Meeker, CO 81641**

**Finding of No Significant Impact (FONSI)
DOI-BLM-CO-110-2010-0200-EA**

BACKGROUND: The Proposed Action for the North Hatch Gulch Project (NHGP) consists of the construction, operation, and maintenance of equipment and facilities that would support the production, transportation, and sale of natural gas and associated liquids from up to 120 natural gas wells in a project area contained within portions of XTO Corporation's Piceance Creek Unit (PCU) and Freedom Unit (FRU) federal exploration units (Figure 1). The NHGP proposal would develop 2,400 subsurface acres (20 acre down-hole spacing) from six wellpads resulting in approximately 193 acres of initial surface disturbance from pipeline, road, and well pad construction and a subsequent life-of-project surface disturbance of 33 acres following interim reclamation.

FINDING OF NO SIGNIFICANT IMPACT:

Based on the analysis of potential environmental impacts contained in the attached environmental assessment, and considering the significance criteria in 40 CFR 1508.27, I have determined that the Proposed Action will not have a significant effect on the human environment. An environmental impact statement is therefore not required.

Context

The project is a site-specific action directly involving BLM administered public lands that do not in and of itself have international, national, regional, or state-wide importance.

Intensity

The following discussion is organized around the 10 Significance Criteria described at 40 CFR 1508.27. The following have been considered in evaluating intensity for the Proposed Action:

1. Impacts that may be both beneficial and adverse. Water used for well drilling, hydrostatic testing of pipelines, and dust abatement on roads are considered water depletions from the Colorado River Basin. These depletions are considered likely to jeopardize the continued existence of the Colorado pikeminnow, as well as downstream populations of humpback chub, bonytail, and razorback sucker and result in the destruction or adverse modification of their critical habitat. However, clustering development of multi-well pads, coupled with year round drilling will reduce the overall water needed for dust abatements by minimizing surface disturbance, reducing truck traffic and rig moves. See response 9 below.

2. The degree to which the Proposed Action affects public health or safety.

There would be no impact to public health and safety.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. There would be no known impact to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas.

4. Degree to which the possible effects on the quality of the human environment are likely to be highly controversial. There are no known effects on the quality of the human environment that are likely to be highly controversial. This project was listed on the WRFO's online NEPA register on 06/15/10 and as of 05/22/12 the BLM has received no comments or inquiries.

5. Degree to which the possible effects on the quality of the human environment are highly uncertain or involve unique or unknown risk.

No highly uncertain or unknown risks to the human environment were identified during the analysis of the Proposed Action. Oil and gas development has been occurring in the area for many decades and the BLM is familiar with this type of action.

6. Degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

The Proposed Action neither establishes a precedent for future BLM actions with significant effects nor represents a decision in principle about a future consideration. Clustering and multi-well pad drilling with exceptions to seasonal closures has been utilized by the BLM working in collaboration with the CPW to research and study overall impacts to wildlife. The proposed action would aid in this research effort.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. The Proposed Action is not related to other actions with individually insignificant but cumulatively significant impacts. The purpose of preparing this EA is to ensure that BLM is addressing perceived and anticipated impacts at a larger scale rather than on a case-by-case basis.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed on the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources. The Proposed Action will not adversely affect districts, sites, highways, structures or objects listed on the National Register of Historic Places. Cultural surveys were completed and the likelihood of finding any of the features listed above appears to be low (see *Cultural Resources* section in DOI-BLM-CO-110-2010-0200-EA).

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (ESA) of 1973. Cumulative water depletions from the Colorado River Basin are considered likely to jeopardize the continued existence of the Colorado pikeminnow, as well as downstream populations of humpback chub, bonytail, and razorback sucker and result in the destruction or adverse modification of their critical habitat. In 2008, BLM prepared a Programmatic Biological Assessment (PBA) that addressed water depleting activities associated with BLM's fluid minerals program in the Colorado River Basin in Colorado, including water used for well

drilling, hydrostatic testing of pipelines, and dust abatement on roads. In response, FWS prepared a Programmatic Biological Opinion (PBO) that addressed water depletions associated with fluid minerals development on BLM lands. The PBO included reasonable and prudent alternatives which allowed BLM to authorize oil and gas wells that result in water depletion while avoiding the likelihood of jeopardy to the endangered fishes and avoiding destruction or adverse modification of their critical habitat. This project falls with the constraints of that consultation. No other TES species are affected or present.

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Neither the Proposed Action nor impacts associated with it violate any laws or requirements imposed for the protection of the environment.

SIGNATURE OF AUTHORIZED OFFICIAL:



Field Manager

DATE SIGNED:

06/01/2012

**U.S. Department of the Interior
Bureau of Land Management
White River Field Office
220 E Market St
Meeker, CO 81641**

DECISION RECORD

PROJECT NAME: North Hatch Gulch Project

ENVIRONMENTAL ASSESSMENT NUMBER: DOI-BLM-CO-2010-0200-EA

DECISION: It is my decision to approve the Proposed Action in DOI-BLM-CO-2010-0200-EA as modified with the mitigation measures listed below. The applicant has committed to specific reclamation features (Appendix C) and design features (Appendix D) that are considered part of the Proposed Action.

This decision specifically authorizes the construction, operation, and maintenance of XTO's proposed PCU 297-1A well pad, access road, and associated pipelines. This decision also specifically authorizes drilling, completion, production, and maintenance of 20 natural gas wells on the PCU 297-1A well pad.

The BLM has not yet received Applications for Permits to Drill (APDs) for the other 100 natural gas wells associated with the FRU 197-28B, PCU 197-27B, PCU 197-35B, PCU 197-35A, or PCU 197-37C well pad locations. Approval of these well pad locations, wells, access roads, and associated pipelines will occur when APDs and right-of-way applications have been submitted to the BLM, who will then conduct a site-specific NEPA review (e.g., Determination of NEPA Adequacy or Section 390 Categorical Exclusion) prior to issuing approved APDs or ROW grants.

Mitigation Measures:

1. Drilling, completion activity, construction and installation of roads, wellpads, pipelines, and related facilities, associated with the North Hatch Gulch project area will be excepted from severe winter range timing limitation stipulations for an initial four-year period beginning with the initiation of ground disturbing activity. The BLM will evaluate whether or not to grant additional years to the initial four-year exception period by reviewing the operator's annual report. By October 1st of each year, the operator will submit, via a Sundry Notice, an annual report that identifies how the operator has complied with the Conditions of Approval associated with this Decision Record. When evaluating whether or not to grant additional years to the initial exception period, the BLM will consider compliance with the Conditions of Approval as well as current environmental and regulatory conditions. While there is ultimately no limit to the number of years that the BLM may add to the initial four-year timing limitation exception, at no time will the BLM consider extending the exception more than four years out into the future.
2. No activities (construction, drilling, etc.) will be allowed within mule deer severe winter range from December 1 to April 30 to reduce adverse behavioral effects on wintering big

game (WRRRA ROD TL-08). These timing stipulations may be subject to exception/modification provisions addressed in the WRFO RMP, refer to item 1 above.

3. The proponent will install a lockable gate at the BLM-private land boundary (NAD 83, Zone 13, Northing 0218683/Easting 4425456). The gate will remain locked at all times and be maintained by the operator throughout the life of the project. It is the operator's responsibility to ensure that vehicle passage around the gate is effectively precluded.
4. For raptor species, avoid construction or forest clearing activity from February 1 through August 15, unless BLM determines raptor survey results indicate that raptor nest structures would not be impacted by the proposed activities.
5. Conduct raptor surveys during the breeding season prior to construction initiation. If a raptor nest is located, appropriate BLM timing stipulations may be applied (WRRRA ROD TL-04).
6. For all other non-raptor migratory birds, avoid ground or vegetation disturbing activity to the extent possible during the nesting season (May 15 to July 15).
7. The operator shall monitor the segment of pipeline located in the NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 36, T1S, R97W, and the SW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 28, T1S, R97W after reclamation activities have begun to identify and remediate any evidence of excessive erosion.
8. Earthen trench plugs or ramps would be placed at livestock and wildlife trails intersected by the trench and the ends of open trench. Open trenches would be inspected on a regular basis for trapped animals. If wildlife is found in the trench, exit ramps would be provided and the trapped animal(s) would be coaxed out of the trench. If trapped animals are injured, XTO shall contact the local District Wildlife Manager for assistance. Pipe that has been placed in the trench would be capped at the end of each day to prevent animals (e.g., small mammals and reptiles) from entering.
9. Raptor survey report products and survey methodology will follow established guidelines and procedures described in the WRFO Raptor Survey Protocol (<http://www.blm.gov/co/st/en/fo/wrfo/wildlife0.html>).
10. All raptor nests (e.g., stick-built structures, nest cavities, eyries, etc.), regardless of their breeding or non-breeding season status, are to be reported to WRFO NRS, Brett Smithers via phone (970.878.3818) or by E-mail (bsmithers@blm.gov; preferred) within 24 hours of the observation.
11. The following information will be provided when reporting raptor nests to BLM:
 - a. the species observed using the nest, if applicable;
 - b. UTM coordinates for each nest (recorded in NAD83, Zone 12);
 - c. the status of the nest (e.g., occupied, unoccupied, unknown)
 - d. the condition of the nest (e.g., excellent, good, poor, fallen out of tree)
 - e. the date the nest was re-visited (for known nests) or first documented (for newly found nests);

- f. brief summary describing adult and/or juvenile behavior and number of nestlings observed, if applicable;
 - g. project name and NEPA document number, if applicable.
12. If the Proposed Action is not constructed by 2013 then all suitable habitat within 600 m of disturbance must be re-surveyed for special status plant species. If special status plant species are found within 600 m of the Proposed Action, consultation with the US Fish and Wildlife Service must be initiated. Any conservation measures outlined in the biological assessment will apply to the Proposed Action. In areas where suitable BLM-sensitive plant habitat will be disturbed, thirteen-mile tongue soils must be carefully removed and stored separately from other geologic layers. When the suitable habitat areas are reclaimed, thirteen-mile tongue soils must be re-distributed separately to avoid mixing with other geologic layers, and returned to their to pre-disturbance surface exposure.
 13. Construction-related traffic will be restricted to routes approved by the AO. New access roads or cross-country vehicle travel will not be permitted unless prior written approval is given by the AO. Authorized roads used by the holder will be rehabilitated or maintained when construction activities are complete as approved by the AO.
 14. Removed trees cut and left for visitors will not be piled so as to cause a fire hazard. Wood piles should be spaced at least 50 ft. apart and not piled to exceed 10 ft x 10 ft by 3ft.
 15. Wood chips can be incorporated into the top 10 inches of the topsoil to optimize soil reclamation success and deter invasive species encroachment.
 16. Where installed, ensure that heavy equipment does not exceed the GVW limits of cattle guards. If necessary, a temporary wire gate would be constructed to bypass the guard in accordance with BLM specifications. The new gate would be constructed and braced to BLM specifications prior to cutting.
 17. Gates should be left as they are found; if open, leave open; if closed, make sure the gate is closed. This would prevent the labor-intensive effort of rounding up livestock that have trespassed to adjoining allotments or gained access to heavily-traveled roadways (e.g., CR 5). If in doubt, the gate should be closed.
 18. Surface-disturbing activities shall cease when soils or road surfaces become saturated to a depth of three inches or more unless approved by the Authorized Official (AO).
 19. To promote successful reclamation and discourage establishment of weeds, fence reclaimed areas including entire pads, and necessary portions of pipelines to exclude livestock where it is apparent that livestock will access and utilize the site. Any such fencing will be built to BLM specifications. Installation, maintenance and eventual removal of the fence are the responsibility of the operator.
 20. XTO will equip construction equipment operating with internal combustion engines with approved spark arresters.

21. Fire-fighting equipment (long-handled round-point shovel and dry-chemical fire extinguisher) will be required on motor vehicles and equipment operating on construction, drilling, and production operations.
22. Construction practices will be designed to create defensible space around above ground structures as outlined on the Firewise website (www.firewise.org).
23. When working on lands administered by the BLM WRFO, notify Craig Interagency Dispatch (970-826-5037) in the event of any fire.
24. XTO will clean up all diesel, gasoline, hydraulic fluid, or other such spills. All spill-related material will be transported to an approved disposal site. Contaminated soils will be removed and disposed of in a permitted facility or will be bioremediated in place using techniques such as excavating and mulching to increase biotic activities that would break down petrochemicals into inert and/or common organic compounds.
25. XTO will water access roads, so there is not a visible dust trail behind vehicles during construction and drilling operations to reduce soil loss (fugitive dust) and to minimize impacts to air quality and visual resources.
26. Suitable erosion control structures (e.g., water bars, sediment dams, etc.) will be installed where deemed necessary in accordance with direction from the AO.
27. If erosion features such as rilling, gullyng, piping and mass wasting occur as a result of surface disturbance associated with this project, such erosion features will be addressed immediately after the observations by contacting the AO and by submitting an erosion control plan with proposed methods, procedures, or measures designed to resolve such erosion issues.
28. Under no circumstances will topsoil, soil material below or adjacent to the trench spoils or subsoil excavated from the trench down through the ERD (Effective Rooting Depth) for the reclamation plants (Reclamation ERD) be used as padding in the trench, to fill sacks for trench breakers, or for any other use as construction material. Reclamation ERD will be a minimum of 16 inches and a maximum of 24 inches below the ground surface for all soils.
29. After pipeline construction activities are completed, the XTO will be responsible for taking measures to prevent off-road vehicle use along the pipeline ROW until reclamation has been fully successful or as directed by the AO.
30. Areas underlain by bedrock exposures of the Uinta and Green River formations should be surveyed by a BLM-permitted paleontologist prior to construction disturbance.
31. A paleontological monitor will be present prior to and during any excavation into underlying rocks of the Uinta or Green River formations.
32. XTO will be responsible for informing all persons associated with the project operations that they will be subject to prosecution for knowingly disturbing paleontological sites, or for collecting fossils.

33. Should fossil materials be discovered during any project or construction activities, XTO will immediately stop activities in the immediate area of the find that might further disturb such materials, and immediately contact the AO. Within five working days the AO will inform XTO as to whether the materials appear to be of noteworthy scientific interest and the mitigation measures XTO will likely have to undertake before the site could be used (assuming *in situ* preservation is not feasible). XTO will be responsible for mitigation cost. The AO will provide technical and procedural guidelines for mitigation and continuation of operations. XTO will be responsible for mitigation cost.
34. If fossil remains of potential scientific importance are identified during either survey or excavation, and if such remains would be damaged or destroyed by project activities, then additional mitigation may be proposed as necessary and appropriate. Additional mitigation could include collection, identification, and curation of the fossil remains and continued monitoring of ongoing surface disturbance in the area of discovery.
35. Provide all drivers with information and training describing the types of wildlife species in the area that are susceptible to vehicular collisions to reduce the potential for vehicle/big-game or vehicle/raptor collisions.
36. Vehicle collisions with raptors, sage-grouse, and all other wildlife species will be reported to the BLM-White River Field Office, the local CPW Manager, and the USFWS Grand Junction office.
37. Road access to the pig receiver site shall be constructed and maintained as a BLM resource road consisting of 12 to 14 foot wide, single-lane travelway.
38. All new surface facilities placed by the operator in the project area will be painted Juniper Green, a BLM Standard Environmental Color, or other color as directed by BLM. All aboveground facilities will be painted within six months of installation.
39. The release of any chemical, oil, petroleum product, produced water, or sewage, etc, (regardless of quantity) must be reported to the Bureau of Land Management – WRFO Hazardous Materials Coordinator at (970) 878-3800.
40. If encountered, all fences intersected by a pipeline/road ROW would be braced to BLM specifications prior to cutting. A temporary wire gate would be constructed, and this work would take place prior to pipeline construction.
41. Coordinate planned activities between XTO and the affected grazing permittees during allotment periods of use.
42. Upon completion, replace in kind all existing fences removed due to construction activities.
43. XTO will coordinate with grantees of existing ROWs which will be crossed or otherwise potentially affected by implementation of the Proposed Action prior to commencing construction activities.

44. XTO will notify the BLM Natural Resource Specialist 24 hours prior to commencing construction.
45. Roads damaged by project vehicular traffic will be maintained to their original condition by XTO.
46. Project vehicles will not enter bodies of water (e.g., streams) on federal lands, except at existing crossings.
47. Existing roads and trails on public lands that are blocked as a result of construction-related activities associated with the Proposed Action will be rerouted or rebuilt as directed by the AO.

COMPLIANCE WITH LAWS & CONFORMANCE WITH THE LAND USE PLAN

This decision is in compliance with the Endangered Species Act and the National Historic Preservation Act. It is also in conformance with the 1997 White River Record of Decision/Approved Resource Management Plan.

ENVIRONMENTAL ANALYSIS AND FINDING OF NO SIGNIFICANT IMPACT

The Proposed Action was analyzed in DOI-BLM-CO-2010-0200-EA and it was found to have no significant impacts, thus an EIS is not required.

PUBLIC INVOLVEMENT

Scoping was the primary mechanism used by the BLM to initially identify issues. Internal scoping was initiated when the project was presented to the White River Field Office (WRFO) interdisciplinary team on 02/24/2010. External scoping was conducted by posting this project on the WRFO's on-line National Environmental Policy Act (NEPA) register on 06/15/2010. No comments or inquiries were received regarding this project from the public.

RATIONALE

Analysis of the Proposed Action has concluded that there are no significant negative impacts and that it meets Colorado Standards for Public Land Health. The geographic extent and temporal scale that was used to address perceived and anticipated impacts associated with this project included the cumulative analysis of impacts to soil, air, water, wildlife and other resources that occur or that are expected to occur within the project area. This approach has resulted in a comprehensive review of perceived and anticipated impacts associated with oil and gas operations that will most likely occur in the project area in the next five years and beyond. The clustering of development and year round construction, operation, drilling, and maintenance of the FRU 197-28B, PCU 197-27B, PCU 197-35B, PCU 197-35A, PCU 197-37C, and PCU 297-1A multi-well pads (20 wells per pad) reduces the infrastructure needs including pipelines and road infrastructure compared to traditional development with seasonal wildlife restrictions. In addition, it will reduce overall direct and indirect impacts by minimizing surface disturbance, reducing truck traffic and rig moves to other geographical areas. Yearly review requirements for compliance with conditions of approval, seasonal wildlife exceptions and coordination with the Colorado Parks and Wildlife will provide opportunity for the BLM to make adjustments if warranted.

ADMINISTRATIVE REMEDIES

State Director Review

Under regulations addressed in 43 CFR 3165.3(b), any adversely affected party that contests a decision of the AO may request an administrative review, before the State Director, either with or without oral presentation. Such request, including all supporting documentation, shall be filed in writing with the BLM Colorado State Office at 2850 Youngfield Street, Lakewood, Colorado 80215 within 20 business days of the date such decision was received or considered to have been received. Upon request and showing of good cause, an extension may be granted by the State Director. Such review shall include all factors or circumstances relevant to the particular case.

Appeal

Any party who is adversely affected by the decision of the State Director after State Director review, under 43 CFR 3165.3(b), of a decision may appeal that decision to the Interior Board of Land Appeals pursuant to the regulations set out in 43 CRF Part 4.

SIGNATURE OF AUTHORIZED OFFICIAL:



Field Manager

DATE SIGNED:

06/01/2012