Chapter 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The following information supplements the information presented in the Draft EIS Introduction to Chapter Three, Affected Environment and Environmental Consequences, found on pages 3.1 through 3.7. All information in the introduction to Chapter Three of the Draft EIS, including methods and assumptions, definitions, resource protection measures, etc. are still valid and were applied to the analysis in this Supplement. Some information from the Draft EIS related to the oil and gas leasing availability decision is summarized here to provide context and to help readers understand the analysis included in this Supplement and how it relates to the Draft EIS.

Note that due to the narrow geographic scope of this Supplement (GSGP area only), this analysis is based on a subset of the complete, reasonable range of management alternatives developed for the entire planning area as presented jointly in this Supplement and the Draft LMP/EIS; therefore, the range of proposed management presented in this Supplement does not represent the full range of alternatives or impacts.

Oil and Gas Analysis and Decision Stages

One of the decisions being made in the plan that is supported by this environmental impact statement is the Leasing Availability Decision. This decision identifies the lands that are available for lease and how those lands will be stipulated. The decision focuses on the impacts of making lands available for lease that are currently not leased. This is the first of three analysis stages for oil and gas leasing, exploration and development. At this first stage of analysis—identification of lands available for lease—the timing and location of project-specific actions is unknown, and the relationship between cause (future actions) and effect (impact on resources) is not always known or quantifiable. Therefore, the analysis of impacts is based on "projected development assumptions". If the lands made available for lease are leased, there will be another environmental review to approve the location of an exploratory well before the lease holder can drill the well (stage two). After a lessee has an exploratory and confirmation well, they can submit an application for permit to drill (APD) (i.e., to develop the lease). Before field development is authorized there will be further environmental analysis and the SJPLC may require a Plan of Development (stage three). During this third analysis stage, project specific information (well and road locations) is available and can be used for analysis of impacts. As a result, the impact analysis at the third stage is more specific and refined.

Analysis of Impacts and Plan Decisions Related to Currently Leased Lands

As stated earlier, lands already held under lease are subject to the lease stipulations (i.e., the lease terms and conditions) attached to them under the current BLM Resource Management Plan (1985) or USFS Land Management Plan (1983). However, when new or additional development is requested on lands already leased, the agencies review lease stipulations to determine if they are still adequate for mitigating resource impacts (i.e., stages two and three described above).

In 2010, the BLM Colorado State Office issued direction that allows for modifying surface operations or adding specific mitigation measures when supported by scientific analysis:

During Resource Management Plan (RMP) revisions/amendments, BLM Colorado will ensure all new RMPs contain language consistent with recent Interior Board of Land Appeals (IBLA) decisions (Yates Petroleum Corp., IBLA 2006-213, 2006-226 and William P. Maycock, IBLA 2008-197, 2008-200) that give BLM discretion to modify surface operations to add specific mitigation measures supported by site-specific NEPA analysis undertaken during the development phase on existing leases (CO-2010-028).

This guidance gives the agency discretion to ensure that future development on already leased lands complies with the resource direction identified in the Land and Resource Management Plan. Any additional mitigation measures would be needed to be justifiable, still provide reasonable access for the lease holder and would be incorporated in a site-specific document (not as part of this leasing availability decision). For example, if there is core Gunnison Sage Grouse habitat within a parcel that was leased prior to adopting this revised Plan, Conditions of Approval (COA) may be required for any new development on that parcel. The COA to protect Gunnison Sage Grouse habitat must be supported by Plan direction and site-specific NEPA analysis at the APD or Field Development stage of analysis. Specific to Gunnison Sage Grouse, the Draft LMP incorporates the direction of the Rangewide Conservation Plan for Gunnison Sage Grouse, which specifies the conditions for when to apply TLs or surface restrictions (see Draft LMP, Part Three starting on page 267). The new standards and guidelines for air quality analyzed and proposed in this Supplement provide another example of mitigation measures that may be applied as COA for new development on lands currently held under lease.

In the Draft EIS and in this Supplement, the potential resource impacts from development that could occur on already leased lands are addressed under the Cumulative Impacts section. The analysis of impacts for development on leased and unleased lands is general and based on a set of assumptions described below. As described above, more specific analysis will occur during the development stage.

Assumptions used for Analysis of Impacts

In order to determine what lands should be available for lease, the agencies use a set of assumptions to analyze the potential impacts that could occur if lands were made available for lease and leased. Assumptions are based on the RFD scenario for oil and gas development, including expected trends, demands, and the likelihood of resource development. Assumptions do not constrain or define management; they are based on observations, historical trends, and professional judgment. The assumptions presented below are based on best available information to date (July 2010) and are for analysis purposes only; they should not be confused with an actual project proposal.

The structure of the impact analysis in this chapter is the same as it was in the Draft EIS for direct, indirect and cumulative effects. For oil and gas development this includes analyzing future development on unleased lands as a direct and indirect effect. Cumulative effects are based on the effects from past, present and foreseeable future actions. Cumulative effects for oil and gas development include the direct and indirect effects (i.e., future development on unleased lands), future development on currently leased lands, and development on adjacent state and private lands.

Surface Disturbance Assumptions for Gothic Shale Well sites

Gross surface disturbance for activities related to well sites includes those surface impacts that result from the construction of: (a) new well pads; (b) access roads; and (c) gas flowlines. Land impact projections are based primarily on the total number of projected one-well per pad and two-wells per pad locations anticipated within the GSGP area. Forty-four percent (44%) of the development is projected to be on single well/pad locations and 56% projected on two wells/pad locations.

Well Pad Surface Disturbance:

- One well per pad well sites = 2.5 acres each
- Two wells per pad well sites = 3.0 acres each

Access Road Disturbance:

- 0.5 mile per pad (or 2,640') distance with a 40' right of way width = 2.4 acres each
- Associated flowlines will be co-located in access road right of ways = 0 acres of surface disturbance
- All proposed road construction or reconstruction must be in compliance with the LMP road density guidelines, which could require decommissioning of other roads in order to not exceed density guidelines.

Total Well-site related Disturbance (include well pads, access roads and flowlines):

- One well/pad well sites = 4.9 acres each
- Two wells/pad well sites = 5.4 acres each

Surface Disturbance Assumptions for Additional Infrastructure

- One major gas transmission pipeline may be needed as the GSGP develops and is assumed to be located on private surface land.
- Gathering pipelines, compressor stations, and gas processing plants may be needed and are assumed to be located on public (60%) and private surface (40%) land and parallel to an existing pipeline corridor in the area. Sixty percent (60%) or 275 acres of the 455 total acres needed are assumed to be located on public lands.

Water Assumptions

- A typical GSGP well would use 100,000 barrels (4,200,000 gallons) of water to drill, fracture and complete the well. No water would be obtained from public lands. All water would be purchased by the gas companies from private sources. There would be a 40% water recycle rate, meaning that 60,000 barrels would be required on average per well after the first well is supplied.

Disposal of Waste Water and Fracing Material Assumptions

- No evaporative pits would be authorized on public lands.
- At a minimum, waste water would be disposed of according to EPA and Colorado Department of Public Health and Environment (CDPHE) standards.

Table S-3.0.1 presents the number of wells that would be developed and associated land disturbance under each of the action alternatives. In the environmental consequences analysis that follows, direct and indirect effects are estimated on the basis of the number of GSGP wells that would be developed on lands that would be available for lease but not currently leased. Table S-3.0.2 presents the well statistics used in the cumulative effects analysis. This table provides a general template of the extent of past and projected gas development that is analyzed in and adjacent to the study area, including development of gas on private lands to the west of the GSGP.

Table S-3.0.1 - Projected Gothic Shale Gas Development Statistics by Alternative on Leased and Unleased Lands

WELL PADS[2]					
Projected on currently unleased lands made available and developed					
Jurisdiction	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**No Lease Alternative**
USFS	291	281	276	286	0
BLM	115	115	115	115	0
Total	**406**	**396**	**391**	**401**	**0**
Projected on currently leased lands					
Jurisdiction	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**No Lease Alternative**
USFS	70	70	70	70	70
BLM	154	154	154	154	154
Total	**224**	**224**	**224**	**224**	**224**

ACCESS ROAD MILES					
Projected on currently unleased lands made available and developed					
Jurisdiction	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**No Lease Alternative**
USFS	145	143	138	143	0
BLM	57	57	57	57	0
Total	**202**	**200**	**195**	**200**	**0**
Projected on currently leased lands					
Jurisdiction	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**No Lease Alternative**
USFS	35	35	35	35	35
BLM	77	77	77	77	77
Total	**112**	**112**	**112**	**112**	**112**

ACRES OF DISTURBANCE					
Projected on currently unleased lands made available and developed					
Jurisdiction	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**No Lease Alternative**
USFS	1,513	1,461	1,435	1,487	0
BLM	598	598	598	598	0
Total	**2,111**	**2,060**	**2,035**	**2,085**	**0**
Projected on currently leased lands					
Jurisdiction	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**No Lease Alternative**
USFS	365	365	365	365	365
BLM	801	801	801	801	801
Total	**1,166**	**1,166**	**1,166**	**1,166**	**1,166**

[2] Note that these projections are for well pads, not wells. Wells numbers are disclosed in Chapter Two and the 2009 RFD Addendum. The number of well pads has been used for analysis of surface disturbance impacts. When needed and appropriate, well numbers are used for analysis of impacts.

Table S-3.0.2 - Projected Cumulative Development Statistics (including Draft EIS projections for the Paradox Basin and the GSGP area)

	FEDERAL LEASES Leased and Unleased Lands			PRIVATE AND STATE LEASES		
	Number of well pads	Miles of road	Total acres of disturbance	Number of well pads	Miles of road	Total acres of disturbance
Existing Wells	171	87	≈ 680	90	≈ 45	≈ 360
GSGP - Projected on Federal Leases	648	324	3,368	--	--	--
Conventional - Projected on Federal leases[3]	325	162	1,300	--	--	--
GSGP - Projected on Private and State				485	≈ 242	≈ 2,520
Conventional - Projected on Private and State				50	≈ 25	≈ 200
Infrastructure related disturbance: Major gas transmission pipeline						*455*
Infrastructure related disturbance: Gathering pipelines, compressor stations and gas processing plants			275			180
TOTAL	**1,144**	**573**	**5,623**	**625**	**312**	**3,715**

Resource and Program Areas not affected by GSGP Development

For some resources and areas, the analysis of impacts is the same as described in the Draft EIS because the areas are either not available for lease or would not be entered because they are protected with a NSO stipulation and/or plan standards and guidelines. These areas and resources include:

- Wild and Scenic Rivers
- Research Natural Areas
- National Recreation and Scenic Trails
- Wilderness Study Areas
- Areas of Critical Environmental Concern
- Scenic Byways
- Fire and Fuels

Some resources or program areas are not affected by new development projections because they occur outside of the gas shale play area or do not have a cause and effect relationship with oil and gas development. Specifically, there are no Wilderness, Inventoried Roadless Areas or Paleontological resources within the GSGP. Resources that do not have a cause and effect relationship include:

- Special Forest Products
- Solid Minerals
- Geothermal Energy
- Alternative Energy Sources
- Insects and Disease
- Lands and Special Uses
- Demographics

[3] With regard to conventional development projections, 48% would be on leased lands and 52% would be on unleased lands.