

# Economic Impacts of Sage-Grouse Management: Supplemental Report

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## Piceance Basin Development Analysis

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# SECTION I.

## Background & Objectives

**This report is a supplement to BBC Research & Consulting’s detailed comments on the specific economic assumptions and calculations presented in The Northwest Colorado Greater Sage-Grouse Draft Land Use Plan and EIS (Sage-Grouse EIS), published in August 2013.**

**The objective of this report is to demonstrate the potential economic consequences for Garfield County of BLM’s implementing the proposed Sage-Grouse habitat preservation plan and thus restricting the development of natural gas reserves in the Piceance Basin.**

**This presentation is not meant as a substitute analysis for the BLM’s study, but rather a demonstration of the order of magnitude economic impacts to Garfield County that were not documented or revealed in the EIS.**

It is hoped that representation presented here can illuminate the EIS’s shortcomings and the magnitude of the document’s missing information.

The Garfield County Commissioners, independent observers and consultants reviewing the Sage-Grouse EIS, have raised concerns about the reliability of the EIS document’s economic impact assessment given the lack of clarity on how oil and gas extraction—and to a lesser degree grazing and recreation—might be affected by these new management systems. The failure to acknowledge and reveal the significant consequences to Garfield County is a notable shortcoming of this document.

## SECTION II.

# Sage-Grouse EIS Background and Issues

This section summarizes the economic impact findings within the Greater Sage-Grouse EIS and associated issues raised by Garfield County reviewers.

### The Northwest Colorado Greater Sage-Grouse Draft Land Use Plan and EIS

The Northwest Colorado Greater Sage-Grouse Draft Land Use Plan and EIS (Sage-Grouse EIS) identifies the environmental and socioeconomic impacts of alternative management strategies for preserving habitat and species population for the Greater Sage-Grouse (GRSG).

The Sage-Grouse EIS document was published in August, 2013 and covers a planning area of approximately 15 million acres of public and private property across 10 counties in northwest Colorado. The Planning area is approximately 57 percent public lands. According to the document this area includes approximately 1.7 million acres of BLM-administered and National Forest System lands, and approximately 2.8 million acres of BLM-administered subsurface federal mineral estate that may lie beneath other surface ownership<sup>1</sup>.

**Habitat designations.** The Sage-Grouse EIS identifies areas of Greater Sage-Grouse habitat in northwest Colorado along a long spectrum of habitat suitability<sup>2</sup>. Designations include:

- 2.4 million acres of designated **Preliminary Priority Habitat** (PPH): areas identified as having the highest conservation value, including breeding, late brood-rearing, and winter concentration areas;
- 1.5 million acres of **Preliminary General Habitat** (PGH): seasonal or year-round habitat outside of priority habitat;
- 295,800 acres of **Linkage/Connectivity Habitat**: areas that have been identified as broader regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes.

NEPA regulations require that the BLM/USFS formulate a reasonable range of alternatives for accomplishing habitat protection and managing use of the subject BLM properties. In the Sage-Grouse EIS, the BLM offers four alternatives, A-D, which include a continuation of current management alternative (Alternative A).

Garfield County has approximately 148,000 acres of PPH property, 72,000 of PGH property, and about 7,600 acres of linkage habitat.

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<sup>1</sup> Sage-Grouse EIS Section 1.3.1 page 6.

<sup>2</sup> Acreage figures for subsurface federal mineral estate include public and private surface ownership.

**Alternatives and management practices.** NEPA regulations require the BLM to formulate a reasonable range of alternatives that offer feasible and distinct management options. In this instance, the BLM Planning Team developed one no action alternative (A) and three action alternatives (B, C, and D). Each of the action alternatives includes a collection of management strategies designed to protect Sage-Grouse habitat and the broader mission of BLM property management.

Five specific Sage-Grouse management measures were identified as potentially reducing economic use of BLM lands and subsurface resources managed by BLM. These management strategies are:

- Closure of Federal Mineral Estate Lands to Leasing;
- No Surface Occupancy (NSO) Stipulations on All or Parts of New Leases;
- Right of Way (ROW) Exclusions on Lands Needed for Road and Utility Access;
- Restrictions on Amount or Location of Surface-Disturbing Activities (Well Pads, Access Roads, Pipelines, Power Lines) on New or Existing Leases; and
- Seasonal Closures, Undergrounding of Electric Distribution Lines, Noise Abatement, Visual Screening, Higher Reclamation Costs, Specialized Fencing.

The BLM contemplates managing resources under a *disturbance cap* concept that would allow more stringent controls as habitat losses exceed certain threshold levels for identified zones of activity. This strategy would place a 5 percent cap on human disturbances on ecological sites that support sagebrush. The disturbance calculations would apply to both public and private lands, such that reduction of habitat on private property could trigger the more stringent regulatory efforts on public lands. New projects would generally not be approved if a disturbance cap for a particular zone has been exceeded. How such caps would be measured, monitored, and imposed is characterized but not specifically detailed in the EIS document.

**Acreages affected.** The Sage-Grouse EIS states that although the planning area includes private and public lands, management decisions would only apply to BLM-administered surface properties and BLM-administered federal mineral estate that may lie beneath other surface ownership within designations PPH, PGH, and linkage/connectivity habitat.

The following Figure II-1 (derived from Section 2 of the Sage-Grouse EIS) shows the acreage of habitat by designation category and the acreage closed to Fluid Mineral leasing under each Alternative. The Sage-Grouse EIS acknowledges significant economic effects associated with Sage-Grouse management strategies, principally stemming from reduced recreation, grazing, and mineral extraction activity. Under the most restrictive scenario, the anticipated effect of these actions will be to close a significant amount of public lands to fluid mineral leasing.

**Figure II-1  
Comparative Summary of Alternative (Acres)**

Resource or Resource Use	Alternative A	Alternative B	Alternative C	Alternative D
<b>GRSG Habitat Areas*</b>				
Preliminary Priority (PPH)	0	1,576,900	1,576,900	1,576,900
Preliminary General (PGH)	0	1,134,800	1,134,800	1,134,800
Linkage/Connectivity	0	181,900	181,900	181,900
<b>Fluid Mineral Leasing</b>				
Closed to Fluid Mineral Leasing	100,200	1,347,400	2,473,000	100,200

Note: \*BLM/USFS surface and federal mineral estate, including coal.

Source: Table 2.2, page 42, Sage-Grouse EIS.

Other economic use of these properties for grazing, recreation, or other mineral extraction would also be restricted.

Current federal oil and gas leases comprise 653,700 acres, or 26 percent, of the total subsurface federal mineral estate in the planning area. Unleased subsurface federal mineral estate within areas of high potential for oil and gas comprises an additional 521,600 acres, or 19 percent, of the total federal mineral estate within the planning area.

**Oil and gas drilling reductions.** Figure II-2 shows the number of anticipated oil and gas wells (20 years) completed in the Socioeconomic Planning Area for each alternative. Alternative A is a baseline scenario that assumes a continuation of current leasing and regulatory practices. Alternative A anticipates 34,694 wells, or approximately 1,734 wells per year, will be completed in the multi-county Planning Area.

**Figure II-2.  
Oil and Gas Well Numbers: 20-Year  
Forecast**

Source: Elaborated by BLM staff based on field office Reasonable Foreseeable Development Scenarios and available information. Sage-Grouse EIS, Appendix M page 35; Table M-17.

Federal, State, and Fee Surface	Anticipated Wells in Primary Study Area
Alternative A - Completed Wells	34,694
Alternative B - Completed Wells	33,091
Alternative C - Completed Wells	28,704
Alternative D - Completed Wells	33,893

Alternative C, which is the most comprehensive habitat preservation alternative, still anticipates 28,704 wells. This is a reduction of about 6,000 wells over a 20-year period in comparison with Alternative A.

**Mineral production.** Similarly, Table II-3 shows expectations of the projected quantity of oil and gas production over the 20-year forecast period on federal surface and on federal, state, and fee surface.

**Figure II-3.**  
**Projected Oil and Gas Production, 20-Year Period**

Alternative A		Alternative B		Alternative C		Alternative D	
Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)
<b>Federal Surface</b>							
52,650	17,424	38,994	15,702	27,069	12,478	45,822	16,563
<b>Federal, State, and Fee Surface</b>							
96,211	36,108	82,556	34,386	70,631	31,162	89,384	35,247

Source: Sage-Grouse EIS Table M.17

These production forecasts by alternative anticipate impacts to oil and gas production over time in similar proportions to the drilling effects shown in prior Figure II-2.

**Economic Impact.** The economic analysis published as part of the Sage-Grouse EIS (Figure II-4) offers a summary of the economic effects associated with oil and gas operations under each management scenario. Alternative A is a continuation of current practices. Alternatives B, C, and D reflect variations of increased regulation for Sage-Grouse management objectives.

As noted below, the Sage-Grouse EIS authors anticipate \$2.974 billion of oil and gas output and 19,073 jobs will be supported by oil and gas activities (average annual over 20-year forecast period) in the primary study area under current management practices (Alternative A). Under the most stringent Sage-Grouse habitat practices, the corresponding figures are \$2.108 billion in output and 13,532 jobs. This represents a loss of \$866 million in economic output and 5,541 jobs on an average annual basis.

**Table II-4**  
**Average Annual Impact of Management Actions Affecting Oil and Gas on Output, Employment, and Earnings by Alternative**

	Alternative A	Alternative B	Alternative C, Primary Study Area	Alternative D
Output (2011)	\$2,974,932,481	\$2,683,008,735	\$2,108,789,332	\$2,828,970,608
Employment	19,073	17,215	13,532	18,144
Earnings (2011)	\$1,078,265,304	\$973,088,057	\$764,866,305	\$1,025,676,680
Average Earnings per Job (2011)	\$56,533	\$56,526	\$56,522	\$56,529

Source: Greater Sage-Grouse EIS; Table 4.16 Calculated using the IMPLAN model as explained in the text and in Appendix M, Socioeconomics.

Based on known reserves and worker commuting patterns, most of this impact would occur in Garfield County. This job loss happens against an assumed backdrop of robust oil and gas development. These losses do not appear to include the lost jobs associated with operating wells. Although the Methodological Appendix M includes an explanation of the operating employment calculation process, it does not appear that the final projections are included in the EIS impact projections (see BBC specific comments).

Similarly proportioned, but more modest, economic losses are associated with grazing, recreation, and other activities restricted from access to federal lands.

## **EIS Conclusions**

In essence, the Sage-Grouse EIS suggests that even under the most aggressive habitat management option, gas production will be diminished by only about 300 wells per year, causing a reduction in employment of about 5,500 jobs (annual average). Presumably, economic losses would be largely, but not exclusively, in Garfield County.

## **Conceptual Issues Underlying Calculations of Economic Impacts**

The Draft Sage-Grouse EIS describes habitat management philosophy and general approach under each alternative, but lacks detail on how the collective management strategies contemplated would be measured, monitored, and implemented. Economic impacts are largely determined by these detailed management determinations. The Garfield County Commissioners, local officials, industry representatives, and the planning staff working on the review of the Sage-Grouse EIS have expressed concerns about the validity of the document's economic impact calculations given the lack of clarity on how oil and gas—and to a lesser degree, grazing and recreation—might be affected.

BBC has identified a number of technical issues with the Sage-Grouse economic impact analysis that have been detailed and forwarded to the BLM separately. From the broadest approach perspective, Garfield County's concerns regarding the EIS's representation of economic effects fall into four areas:

**Concentration of effects.** The Sage-Grouse EIS covers a very large geographic area and a sizeable and diverse economic base. The economic impact analysis does not recognize the concentration of effects in smaller areas within this region. The great majority of northwest Colorado oil and gas activity anticipated in the coming years will occur in the Roan Plateau area and the broader Piceance Basin, which is primarily in Garfield and Rio Blanco counties. The effects of a diminished oil and gas industry will not be spread over a large planning area as represented in the Sage-Grouse EIS analysis, but instead will be sharply focused on Garfield County and to a lesser degree Rio Blanco and Mesa counties.

**Impacts on private lands.** The BLM analysis states that only new mineral leases on public lands, or on split estates with minerals managed by BLM, will face additional regulatory constraints with more pervasive Sage-Grouse habitat management. In this area of the country, it is very common to have federal land interspersed with private lands, and for energy companies to pursue leases that have both public and private lands. Even if private lands are not the target of new regulations, in many instances it may be impossible to use these properties without crossing federal lands or using federal lands for staging and piping. While the BLM does not have the authority to restrict development on private land, they could preclude or limit project authorizations on public lands in order to compensate for habitat disturbances on private land. Consequently, decisions made on private lands might affect what the BLM can authorize on public lands. The EIS shows a

misunderstanding of the realities of public land management and its impact on private land uses.

**Impacts to existing leaseholders.** While the Sage-Grouse EIS acknowledges valid existing leaseholder rights, habitat management restrictions could in practicality undermine the development of existing leaseholds. For example, the disturbance cap concept proposed by BLM could result in the denial of projects simply because other disturbances have decreased available cap space, ultimately denying valid existing lease rights. Or conversely, activity on existing leases may quickly exceed the disturbance caps and effectively preclude development on remaining federal lands subject to Grouse management efforts.

On split-estate lands with federal minerals and private surface, BLM would apply disturbance cap restrictions to federal mineral leaseholders as lease terms and conditions of approval (COAs), regardless of ownership or lease rights on the surface property.

**Impacts on financial viability of drilling activity.** Seemingly minor changes in drilling requirements can fundamentally alter the economic viability of pursuing resource reserves. Investments in Piceance Basin are generally large scale projects that are planned and executed over many years, often decades, and typically incorporate state and federal and private lands in large multi-year drilling units. The cost of getting rigs into the area and efficiently pursuing the resource requires some predictability and flexibility so that long term operating efficiencies can be realized. Vague standards for drilling practices can be as punitive as complete prohibitions against activity. Many properties will very likely face significant new barriers to resource development, such as limitations on seasonal activities, pipeline locations, road access or changes in accepted drilling practices, any of which that will effectively reduce or eliminate drilling viability on a wide range of private and non-BLM properties.

In sum, the cumulative impact of the closures and designations in the DEIS could effectively preclude or significantly diminish energy resource development on hundreds of thousands of acres across northwest Colorado, greatly reducing the development potential of the Piceance Basin reserves, one of the major natural gas reserves areas in the country. The extent of these prospective impacts is not disclosed in the EIS document.

The following section offers an economic analysis that demonstrates the potential losses of jobs, investment and assessed value, assuming the practical impacts of the proposed new management regulations have a more restrictive combined effect than suggested or represented in the Sage-Grouse EIS.

## SECTION III.

# Illustrative Example: Economic Impacts of Reduced Oil and Gas Development on Garfield County

Some of the most promising gas resources in Colorado and in the nation as a whole are in and around the Roan Plateau and adjoining portions of the Piceance Basin, north and west of the Roan Plateau. This area also contains prime and secondary Grouse habitat subject to BLM management proposals, although the extent of such habitat is uncertain. The area contains a patchwork of private, public, and federal fee lands and contains many existing drilling leases.

This section examines the oil and gas development prospects in Garfield County and the potential property value and jobs at risk with the proposed BLM Sage-Grouse habitat management plans.

### Example of Garfield County Development Prospects

By way of example, BBC has developed an illustrative economic impact analysis that focuses on Garfield County, but uses many of the production, employment, and valuation assumptions underlying the Sage-Grouse EIS report.

**The objective of this exercise is to demonstrate the order of magnitude of economic development opportunities associated with development of the Piceance Basin and thus the potential economic value jeopardized if habitat management limits the development of these reserves.**

**Summary of impacts.** The results of this process are summarized in Figure III-1. Additional details on assumptions underlying these projections are provided in the accompanying text or in attached Appendix A.

Over a 20-year development period, approximately 25,000 wells are reasonably foreseeable in Garfield County—about 70 percent of the 34,700 wells that are projected in the Sage-Grouse EIS for northwest Colorado. Based on Sage-Grouse EIS multipliers, this level of development in year 20 would result in over \$12.3 billion in annual resource production value, 48,000 annual jobs, and nearly \$10 billion in new county assessed value. The county's current mill levy (13.66 mills) would produce over \$130 million in annual county general fund tax revenue by year 20. Applicable school, fire and special districts would have similar outsized revenue benefits.

This is the level of economic activity is put at risk by the proposed Sage-Grouse habitat management plans, a concern that is not disclosed or discussed in the Final Draft Sage-Grouse EIS.

Figure III-1 shows annual and cumulative economic impacts associated with Piceance Basin resource development. The assumptions underlying Figure III-1 are largely drawn from the EIS and described in the remainder of this report.

**Figure III-1.**  
**Potential Oil and Gas Development in the Piceance Basin and Resultant Economic Effects**

	Year 1	Year 5	Year 10	Year 15	Year 20	Cumulative
<b>Number of Wells</b>						
Annual New Wells in NW Colorado	1,750	1,750	1,750	1,750	1,750	35,000
Annual New Wells in Garfield County	<u>1,250</u>	<u>1,250</u>	<u>1,250</u>	<u>1,250</u>	<u>1,250</u>	25,000
Cumulative Wells in Garfield County	1,250	6,250	12,500	18,750	25,000	
<b>Production Value in Garfield County</b>						
Annual Value from Wells (\$millions)	\$1,409	\$5,769	\$9,176	\$11,187	\$12,375	\$170,380
Assessed Value (\$millions)	\$1,127	\$4,615	\$7,341	\$8,950	\$9,900	\$136,304
Annual County Property Tax (\$millions)	\$15	\$63	\$100	\$122	\$135	\$1,861
<b>Employment from Garfield Co Wells</b>						
<b>BLM DEIS-based</b>						
Annual Drilling and Completion	26,625	26,625	26,625	26,625	26,625	N/A
Annual Operating Jobs	<u>2,520</u>	<u>10,320</u>	<u>16,414</u>	<u>20,013</u>	<u>22,138</u>	N/A
Total Annual Jobs	29,145	36,945	43,039	46,638	48,763	N/A
<b>Leeds Statewide-based</b>						
Annual Drilling and Completion	15,998	15,998	15,998	15,998	15,998	N/A
Annual Operating Jobs	<u>2,662</u>	<u>10,902</u>	<u>17,339</u>	<u>21,140</u>	<u>23,385</u>	N/A
Total Annual Jobs	18,661	26,900	33,337	37,139	39,383	N/A
<b>2008 AGNC Study-based</b>						
Annual Drilling and Completion	8,387	8,387	8,387	8,387	8,387	N/A
Annual Operating Jobs	<u>516</u>	<u>2,581</u>	<u>5,161</u>	<u>7,742</u>	<u>10,322</u>	N/A
Total Annual Jobs	8,903	10,968	13,548	16,129	18,709	N/A

Source: BLM Sage-Grouse EIS; BBC Research & Consulting, 2013. Note: three sources of job multipliers are shown to demonstrate variations in multipliers; see text. All job estimates are by place of work (wells in Garfield County) a share of these workers will live outside the county, most likely in Mesa County.

The current value of all Garfield natural resource properties is about \$2.0 billion. The above data indicate new energy resource assessed valuations in the country could rise to nearly \$10 billion with development of the Piceance reserves. At this level of assessed value, the Garfield County general fund mill levy would produce over \$130 million per year in property tax receipts. Local school, fire and hospital districts would witness similar proportional increases.

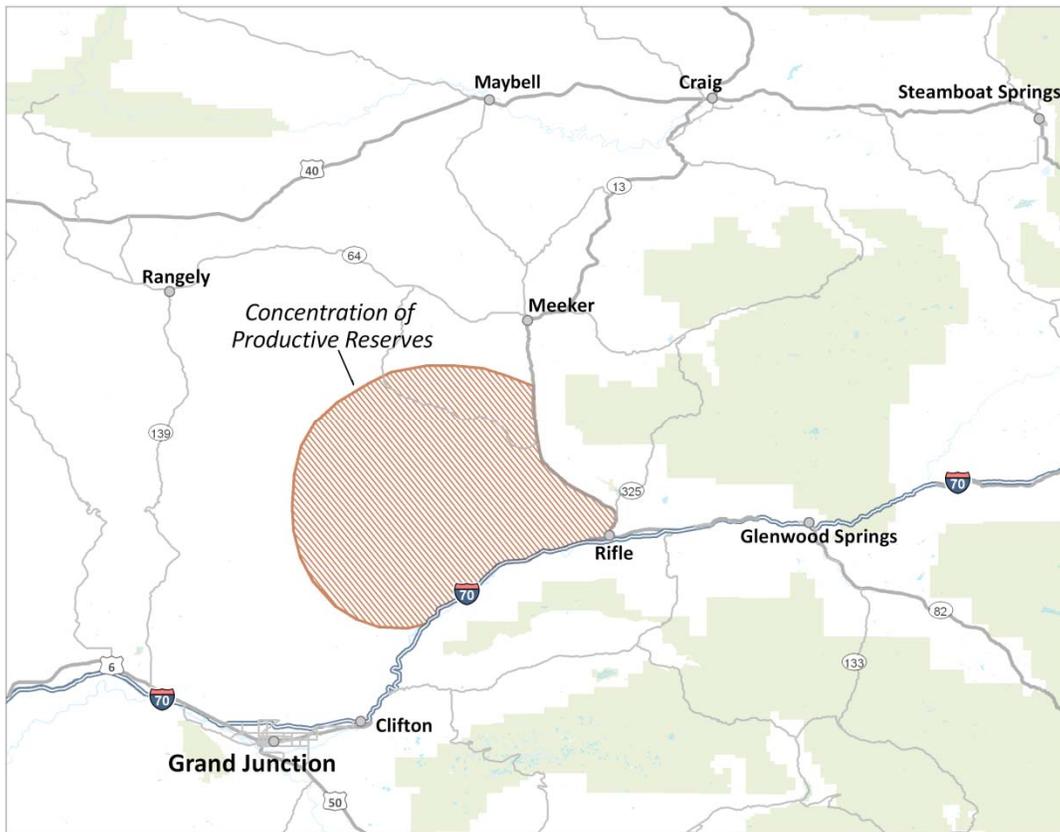
**These jobs and tax consequences, or some significant share of these estimates, are in jeopardy under all of the action scenarios in the Sage-Grouse EIS. This is the type of economic impact that the EIS is required to analyze and reveal.**

## Modeling Approach

The following offers more detail on the modeling approach and assumptions underlying the prior Figure III-1.

**Drilling activity.** Figure III-2 shows the general location of the most promising gas development prospects. The pace of future development of the region's oil and gas reserves is uncertain. Exploration and production will ultimately depend on competitive influences, regulatory practices, and natural gas prices. The projections presented here are based entirely on the drilling expectations in the Sage-Grouse EIS.

**Figure III-2.**  
**Piceance Basin Area of High Oil and Gas Production Prospects**



Source: BBC Research & Consulting

A large share of the productive mineral resource in the Piceance Basin is owned by the federal government, either as federal lands or federal mineral rights below private surface rights. Private property is interspersed throughout the area. There are multiple existing lease holders in the area, including Encana Corporation, Bill Barrett Corporation, and WPX. Private property owners in this area include Chevron, Shell, and Exxon.

**Reserves.** The amount of natural gas reserves in the Piceance Basin is uncertain. Estimates vary widely but significant reserves have been proven and are currently in development. The following are recent estimates (with references):

- 300 trillion cubic feet of natural gas in the basin (<http://oilshalegas.com/piceancebasin.html>)
- Estimates from the central part of the basin, where reserves are greatest, range from 60 to 120 billion cubic feet per square mile, decreasing nearer the edges of the basin.

(<http://gvinsider.com/2011/understanding-the-geology-of-piceance-basin-natural-gas/>).

- 200 to 300 trillion cubic feet within the basin  
([http://www.api.org/~media/Files/Policy/Exploration/Energy-Resources/SER\\_PiceanceBasin.pdf](http://www.api.org/~media/Files/Policy/Exploration/Energy-Resources/SER_PiceanceBasin.pdf))
- 300 trillion cubic feet of natural gas in the basin  
(<http://www.energyandcapital.com/articles/investing-in-the-piceance-basin/3752>)

**Development expectations.** Estimate of likely gas production in the Piceance Basin and related development activity are derived from the Sage-Grouse EIS estimates.

- According to the Sage-Grouse EIS, estimates of the number of wells drilled and the number of wells completed under the No Action Alternative (Alternative A) were based on the *number of wells expected to be drilled and completed* per year in each BLM field office's current reasonably foreseeable development scenario (Appendix M, page 34).
- As noted previously, the Sage-Grouse EIS anticipates 34,694 completed wells on "Federal State and Fee Surface" properties over the next 20 years in the full Sage-Grouse Planning Area. Approximately 70-80 percent of this activity is expected to be concentrated in Garfield and Rio Blanco counties and the Piceance Basin, suggesting about 25,000 new wells on public lands and federal fee properties in these counties. It appears that the Sage-Grouse projections do not include private lands with private minerals, but it is unclear what is intended. The Sage-Grouse EIS indicates that private lands would be subject to the development caps.
- These estimates may be conservative. There are three known levels of natural gas reserves in the Piceance Basin. Most wells have been drilled into the Mesaverde formation, but recent exploration has shown very high productivity from the deeper Upper Mancos formation, which could provide many decades of additional gas production.
- One example of the industry's interest in this area, which corroborates this level of likely drilling activity, involves Encana Corporation and Nucor Steel Company, who have entered an agreement for a joint natural gas drilling program on leased lands known as the Big Jimmy. According to the Oil and Gas Journal<sup>3</sup>, if allowed to proceed, the partners are committed to spend over \$3.6 billion, producing 3,500 wells on about 55,000 acres. This project alone could produce over 34 billion in resource value over a 20-25 year period.

For the purposes of this exercise, BBC has used the EIS projection of wells in northwest Colorado and modeled 1,250 wells per year in the primary drilling area within the Piceance Basin, which is subject to the prospective BLM restrictions. Additional wells will occur elsewhere in the

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<sup>3</sup> Confirmed by communication with Jason Oates, Group Leader Regulatory, South Rockies Business Unit Encana Oil and Gas, October, 2013.

county. This pace of well development is conservative, less than the drilling level that occurred in 2007/2008 period in Garfield County.

**Production costs and value.** Sage-Grouse EIS Appendix M, Table M-19 indicates \$2.7 million per well for drilling and completion costs. BBC has used these estimates and assumed that each well will produce about 2.5 billion cubic feet over a 20-year period, slightly less than the expectations used in the EIS. We have incorporated a production decay curve that mirrors the very high, early years' productivity and the diminishing production over time that characterizes shale gas wells. This productivity curve explains the flattening of production in later years. By year 20, the Piceance could be producing over \$12.0 billion in the market value of gas production.

**Employment.** The authors of the Sage-Grouse EIS rely on a commonly used economic impact model (IMPLAN) to forecast economic activity associated with this level of resource recovery investment and development. The Sage-Grouse EIS assumes 11.7 direct construction jobs per well and 9.6 indirect and induced jobs per well (drilling and completion but not operations) or about 21 jobs per well drilled (Appendix M, Table M21). It does not appear that the production workers were actually included in the Sage-Grouse EIS modeling.

The multipliers used in the EIS produce very high employment estimates, forecasts that strain credibility. As a check against these estimates, BBC derived additional employment ratios from the 2013 *Assessment of Colorado Oil and Gas Industry—Industrial and Fiscal Contributions in Colorado*, conducted by the Business Research Division, Leeds School of Business at the University of Colorado, 2013. In addition, BBC used its own calculations that were developed in the 2008 Energy Study for the Associated Governments of Northwest Colorado. This later study relied largely on traditional horizontal wells and likely produces lower estimates than more recent analyses that use more current information. By year 20, this new gas production could readily employ over 30,000 workers, or as many as 48,700 according to the EIS calculations

**State & federal revenues.** Oil and gas activity produces revenues accruing to the federal government (from mineral leasing on federal lands) and state government (from severance taxes and state sharing of federal lease revenues). For local governments, property taxes are the most important source of ongoing tax receipts although there are other share back provisions from federal and state resources.

The EIS takes a very broad brush approach to lost tax revenues. Property taxes in particular are unspecified by location.

**Property taxes.** Property tax revenues reflect a property's taxable assessed value and applicable tax rates. An oil and gas property's taxable assessed value is based on its production. The prior year's primary production values are assessed at 87.5 percent. Equipment, buildings, fixtures, and leasehold improvements are assessed at the commercial property assessment ratio (29% of actual value). The appropriate tax rates (mill levies) are then applied to the assessed property value.

BBC has employed the same methodology used in the EIS to calculate production related assessed valuation (annual production X market value X assessment ratio in %). We have

reduced the EIS assessment ratio for 87.6 % to 80% to reflect various allowed value adjustments. Results are shown in prior the prior Summary Table III-1 and the following Figure III-3.

The importance of property taxes to Garfield County and related service providers is readily documented below. In 2013, despite lower gas values and reduced assessed values, the energy industry represented over 70 percent of the county’s assessed value base and even higher proportions of the county’s two associated school districts and the Grand River Hospital District. Current levels of assessed value for Garfield County and oil and gas affected districts is shown in Figure III-3.

Garfield County currently has more than \$2.0 billion of assessed mineral value, but this value will diminish as well production slows. BBC’s analysis indicates that Piceance Basin drilling activity alone would push that assessed value to about \$9.9 billion.

The location of drilling versus individual district boundaries will ultimately determine which districts are beneficiaries of this increased value of Garfield County. Some districts are also subject to the Tabor Amendment, which limits realized increases in tax revenues. Property taxes from resource development are substantial. As noted above, the increase in mineral assessed value projected for this area is far in excess of the entire valuation of the existing county.

**Figure III-3.  
Current Garfield County Assessed Value**

Taxing Entity	2012 Mill Levy	2013 Oil & Gas Assessed Value	2013 Total Assessed Value	% Assessed Value Attributable to Oil & Gas	2013 Estimated Revenue Attributable to Oil and Gas
Garfield County	13.66	\$2,033,460,260.00	\$2,896,661,540.00	70.20%	\$27,766,899.85
RE-2 School District	13.76	\$851,907,900.00	\$1,115,636,270.00	76.36%	\$11,723,956.52
School District 16	6.77	\$834,285,190.00	\$900,613,910.00	92.64%	\$5,644,773.60
Town of Parachute	13.56	\$5,621,910.00	\$25,548,360.00	22.00%	\$76,244.34
City of Rifle	5.26	\$478,960.00	\$98,516,850.00	0.49%	\$2,519.81
Town of Silt	8.97	\$0.00	\$22,692,110.00	0.00%	\$0.00
Burning Mtn Fire	6.10	\$405,119,870.00	\$520,432,670.00	77.84%	\$2,472,041.45
Debeque Fire	3.93	\$337,601,310.00	\$357,706,100.00	94.38%	\$1,326,773.15
Grand Valley Fire	3.27	\$857,441,670.00	\$924,731,600.00	92.72%	\$2,801,261.94
Rfile Fire	6.10	\$379,784,460.00	\$526,060,910.00	72.19%	\$2,317,444.77
Grand River Hospital	5.60	\$2,016,732,740.00	\$2,322,671,040.00	86.83%	\$11,287,653.15

Source: Garfield County Assessor, 2013 and BBC, 2013

Production in the Piceance Basin offers an opportunity to continue the county’s well funded, low tax rate structure for many decades to come. The county’s oil and gas assessed value has the prospect of rising about five fold above current levels. Similar increases would occur in the school, hospital and fire districts and the affected municipalities.

# **APPENDIX A.**

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## **Piceance Basin Development Assumptions**

	Constant Value		Year 1	Year 5	Year 10	Year 15	Year 20
<b>Development</b>							
Annual New Wells in NW Colorado Region by Year	1,750	BLM/BBC	1,750	1,750	1,750	1,750	1,750
% of Wells in Garfield County	71%	BBC					
Annual New Wells in Garfield County			1,250	1,250	1,250	1,250	1,250
Cumulative New Operating Wells in Garfield County			1,250	6,250	12,500	18,750	25,000
Investment per Well	\$2,800,000						
<b>Production &amp; Value</b>							
Production per Well (BCF Over 20-year Life)	2.5	BBC					
Annual Production from Cumulative New Wells (BCF)			355.8	1,456.8	2,317.1	2,825.1	3,125.0
Value per MCF	\$3.96	BLM M.23					
Annual Value of Total Production (in \$millions)			\$1,409	\$5,769	\$9,176	\$11,187	\$12,375
Assessed Value (of Production Value)	80.0%	BLM	\$1,127	\$4,615	\$7,341	\$8,950	\$9,900
Annual County Property Tax (in \$millions)	13.65 Mill Levy		\$15	\$63	\$100	\$122	\$135
<b>Labor Force</b>							
<b>Using BLM DEIS Assumptions</b>							
<b>Drilling and Completion Workers per Well</b>	<b>21.3</b>	<b>BLM</b>	<b>26,625</b>	<b>26,625</b>	<b>26,625</b>	<b>26,625</b>	<b>26,625</b>
Direct	11.7	BLM	14,625	14,625	14,625	14,625	14,625
Indirect and Induced	9.6	BLM	12,000	12,000	12,000	12,000	12,000
<b>Operating Workers per BCF Production</b>	<b>7.08</b>	<b>BLM</b>	<b>2,520</b>	<b>10,320</b>	<b>16,414</b>	<b>20,013</b>	<b>22,138</b>
Direct	0.78	BLM	279	1,142	1,817	2,215	2,450
Indirect and Induced	6.30	BLM	2,241	9,178	14,598	17,798	19,688
<b>Total Employment Effect</b>			<b>29,145</b>	<b>36,945</b>	<b>43,039</b>	<b>46,638</b>	<b>48,763</b>
<b>Using Assumptions Based on 2012 Leeds Study</b>							
<b>Drilling and Completion Workers per Well</b>	<b>12.8</b>	<b>Leeds/BBC</b>	<b>15,998</b>	<b>15,998</b>	<b>15,998</b>	<b>15,998</b>	<b>15,998</b>
Direct	5.2	Leeds/BBC	6,455	6,455	6,455	6,455	6,455
Indirect and Induced	7.6	Leeds/BBC	9,543	9,543	9,543	9,543	9,543
<b>Operating Workers per BCF Production</b>	<b>7.48</b>	<b>Leeds/BBC</b>	<b>2,662</b>	<b>10,902</b>	<b>17,339</b>	<b>21,140</b>	<b>23,385</b>
Direct	3.02	Leeds/BBC	1,074	4,399	6,996	8,530	9,435
Indirect and Induced	4.46	Leeds/BBC	1,588	6,503	10,343	12,611	13,950
<b>Total Employment Effect</b>			<b>18,661</b>	<b>26,900</b>	<b>33,337</b>	<b>37,139</b>	<b>39,383</b>

Source: BBC Research & Consulting, October 2013.