COMMENTS ON THE DRAFT BUREAU OF LAND MANAGEMENT BIGHORN BASIN RESOURCE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT VOLUME II – APPENDICES

Prepared by

Bighorn Basin Local Government Cooperating Agencies

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WILDERNESS CHARACTERISTICS EVALUATION PROCESS

USED IN CONFIRMATION INVENTORY

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1. INTRODUCTION

As part of the Bureau of Land Management's (BLM) current planning efforts, the Cody and Worland Field Offices inventoried lands within the Bighorn Basin Planning Area (BBPA) to determine if they contained wilderness characteristics. The inventory identified 51 areas, comprised of 571,295 acres, classified as "Lands with Wilderness Characteristics" (LWC) (USDI 2010b). The Bighorn Basin Local Government Cooperating Agencies (LGCA), Ecosystem Research Group's (ERG) client, asked that ERG conduct an analysis and evaluation of the BLM's LWC Inventory in the BBPA. This paper documents the process used by ERG to conduct the LWC Inventory analysis and evaluation. The inventory analysis and evaluation performed by ERG is a technical review of the February 2010 BLM LWC Inventory in the BBPA. Guidelines for this process were taken from the Wilderness Act of 1964 (United States Congress 1964), ROS Users Guide of 1982 (USDA 1982), BLM's H-6310-1-Wilderness Inventory and Study Procedures (USDI 2001), Wilderness Inventory Handbook (USDI 1978), and 6300-1-Wilderness Inventory (USDI 2010a). The political and socioeconomic factors and guidelines delineated by individual counties will be addressed in this paper, but not documented within the technical inventory.

The four Wyoming counties involved in the inventory are Big Horn, Hot Springs, Park, and Washakie. Seven local conservation districts are also involved; Cody Conservation District, Hot Springs Conservation District, Meeteetse Conservation District, Powell-Clarks Fork Conservation District, Shoshone Conservation District, South Big Horn Conservation District, and the Washakie Conservation District. Each of the respective four counties has their own land use planning document. Within those documents, it is stated that no more wilderness lands shall be created. The four counties reserve a large stake in the interest of the use of their public lands. The majority of each county's revenue stream is based on the taxation of the oil and gas industry. Livestock grazing is a major occupation in the four counties and provides a source of revenue to many of its residents. The introduction of new LWCs or wilderness designations will severely affect the counties' ability to operate. It will deplete the tax base revenue for public services and will affect the livelihood of the individuals working on the land. Management actions associated with wilderness areas have proven in the past to limit the development opportunities for the oil and gas industry and the allotment improvements associated with livestock. In some cases, it could remove grazing allotments in their entirety.

For the aforementioned reasons, the technical review of the BLM's LWCs has been performed by an outside, independent contractor at the request of the LGCA. The LGCA has been intimately involved with the creation and review process of the LWC Inventory carried out by ERG.

The maps and forms associated with the LGCA's LWC inventory are included in Appendix A. Appendix B contains a table listing the dates of LGCA meetings to discuss the inventory as well as the LGCA participants who attended the meetings.

2. DEVELOPED WILDERNESS CHARACTERISTICS EVALUATION FORM

For the purpose of this analysis, ERG's specialists identified characteristics and attributes that **would not** be consistent with wilderness characteristics. These characteristics are listed below with a brief discussion as to why they are not consistent with wilderness characteristics.

2.1 ACREAGE

The size criteria contained in the BLM's 6300-1-Wilderness Inventory (USDI 2010a), which is stated as an excerpt from the Wilderness Act, is "at least 5,000 acres of land or is sufficient in size to make practicable its preservation and use in an unimpaired condition." The preceding definition was used to determine if an area was of sufficient size to contain wilderness characteristics. Also used to determine size criteria is the following set of rules from the 6300-1-Wilderness Inventory Report.

- Size: Determine if the size criteria will be satisfied for areas by meeting one of the following situations and circumstances:
    - Roadless areas with over 5,000 acres of contiguous BLM lands. State or private lands are not included in making this acreage determination.
    - Roadless areas of less than 5,000 acres of contiguous BLM lands where any one of the following apply:
        - They are contiguous with lands which have been formally determined to have wilderness or potential wilderness values. Such lands include designated Wilderness; BLM Wilderness Study Areas; U.S. Fish & Wildlife Service areas Proposed for Wilderness Designation; U.S. Forest Service (USFS) Wilderness Study Areas or areas of Recommended Wilderness; and National Park Service (NPS) areas Recommended or Proposed for Designation. They do not include NPS areas merely considered "Eligible for Wilderness Study", nor do they include USFS Roadless Areas unless they are also designated as "Recommended Wilderness" through a Forest Plan Revision.
        - It is demonstrated that the area is of sufficient size as to make practicable its preservation and use in an unimpaired condition.
        - Any roadless island of the public lands.

2.2 ACREAGE OF PRIVATE OWNERSHIP

In some cases, private lands within an inventoried area may detract from managing for wilderness characteristics. Private lands may contain constructed features and be used for agricultural or development purposes. As stated in the 6300-1-Wilderness Inventory Report, private lands are not included in making this 5,000-acre determination. BLM ownership data was used for this analysis.

2.3 AREA CONFIGURATION

The inventoried boundary may result in an area not practical to manage for wilderness characteristics. For example, a long linear area or relatively narrow linear extensions to an area boundary may be difficult to manage. In addition, external influences (such as disturbance or constructed features) would be more noticeable due to irregular boundaries. A boundary with gaps or holes for different land ownerships may not be a practical area. Also evaluated in this inventory was the opportunity to redraw boundaries to meet area configurations (excluding constructed features or other attributes not compatible with wilderness characteristics) so as to capture wilderness characteristics if they indeed exist within a portion of the inventoried area. This statement is found in the summation statement of each evaluation form. This inventory will not redraw boundaries, but simply identify if the opportunity exists.

2.4 MILES OF ROADS

Roads that are improved and maintained should not be included within an LWC inventoried area. Roads that are not considered improved and maintained, such as two-tracks, may be included but could affect the area to a degree that wilderness characteristics are no longer present. The Geographic Information Systems (GIS) roads layer used in this analysis was classified using the Historic_T and TYPE attribute columns in the BLM GIS attribute table. Roads exist in the database that have been inventoried by the BLM, but have no classification attributes defined; that is, they are blank in the database. Essentially this means that the BLM has not defined them as two-track, graded dirt road, or paved. The aforementioned roads are symbolized and categorized by ERG as "Unknown Roads." As this report was being compiled, ERG received a more extensive GIS dataset that better details the classification of the roads data. Unknown roads, labeled as such, are still found within the more extensive roads dataset. For the purpose of this evaluation and until further verified with GIS data or field ground-truthing, unknown roads are classified as roads that are maintained for public or permittee use and would detract from wilderness characteristics.

ERG consulted the following BLM 6300-1-Wilderness Inventory road definitions while inventorying lands with wilderness characteristics. When inventorying wilderness characteristics, the BLM will base road definitions from FLPMA. The language defining roadless stems from the U.S. House of Representatives Committee Report 94-1163, page 17, May 15, 1976:

> The word "roadless" refers to the absence of roads which have been improved and maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road.
>
> The BLM previously adopted and will use the sub-definitions stated below.
>
> - **"Improved and maintained" –** Actions taken physically by people to keep the road open to vehicle traffic. "Improved" does not necessarily mean formal construction. "Maintained" does not necessarily mean annual maintenance.
> - **"Mechanical means" –** Use of hand or power machinery or tools.

- **"Relatively regular and continuous use" –** Vehicular use that has occurred and will continue to occur on a relatively regular basis. Examples are: access roads for equipment to maintain a stock water tank or other established water sources, which may entail lengthy return intervals for this purpose; access roads to maintained recreation sites or facilities; or access roads to mining claims.

Regular and continuous use does not necessarily constitute a road. A route established by solely by the passage of vehicles is not considered a road by BLM definitions used in BLM Manual 6300-1-Wilderness Inventory Glossary. Maintenance of the route without mechanical means i.e. the movement of rock or dirt by hand, does not constitute "mechanical means" maintenance used in BLM road definitions. Roads only need to be maintained as warranted, not on a continuous basis. Dead end roads or "cherry stems" cannot form the boundary of an inventory area, but their presence does not remove an area from being classified as roadless.

The Big Horn Basin RMP (USDI 2010b), Appendix 19 – Comprehensive Trails and Travel Management, page 19-7 defines five maintenance levels assigned to travel routes. They range from low maintenance priority to high priority. Level 2 are typically known as two tracks and are maintained depending upon funding levels.

The "maintained depending upon funding level" is of paramount importance when evaluating wilderness characteristics, because maintenance would require mechanical equipment, thus detracting from wilderness characteristics**.**

Inconsistencies have arisen during this inventory regarding the roads data and classification. The roads classification and their relationship to assessing wilderness characteristics are not entirely clear. The statements taken from BLM documents previously cited are inconsistent on the classification of two-track roads. BLM travel management maintenance level definitions state that two-track roads are maintained when funding is available, making them roads with respect to wilderness characteristics determinations. BLM definitions cite that the fact that a road is maintained does not necessarily mean that annual maintenance is performed. Regular and continued use is considered a road by BLM definitions cited above. The same document (6300-1-Wilderness Inventory) also states, "A route that was established or has been maintained solely by the passage of vehicles would not be considered a road, even if it used on a relatively regular and continuous basis." This statement contradicts the BLM road definitions of "Improved and maintained - … Maintained does not necessarily mean annual maintenance." and "Relatively regular and continuous use" which is taken from that very same document, the 6300-1-Wilderness Inventory.

The BLM Manual 9113-Roads (U.S.Department of the Interior 1985) defines roads in the following categories:

A. Collector Roads. These Bureau roads normally provide primary access to large blocks of land, and connect with or are extensions of a public road system. Collector roads accommodate mixed traffic and serve many uses. They generally receive the highest volume of traffic of all the roads in

the Bureau road system. User cost, safety, comfort, and travel time are primary road management considerations. Collector roads usually require application of the highest standards used by the Bureau. As a result, they have the potential for creating substantial environmental impacts and often require complex mitigation procedures.

B. Local Roads. These Bureau roads normally serve a smaller area than collectors, and connect to collectors or public road systems. Local roads receive lower volumes, carry fewer traffic types, and generally serve fewer uses. User cost, comfort, and travel time are secondary to construction and maintenance cost considerations. Low volume local roads in mountainous terrain, where operating speed is reduced by effort of terrain, may be single lane roads with turnouts. Environmental impacts are reduced as steeper grades, sharper curves, and lower design speeds than would be permissible on collector roads are allowable.

C. Resource Roads. These Bureau roads normally are spur roads that provide point access and connect to local or collector roads. They carry very low volume and accommodate only one or two types of use. Use restrictions are applied to prevent conflicts between users needing the road and users attracted to the road. The location and design of these roads are governed by environmental compatibility and minimizing Bureau costs, with minimal consideration for user cost, comfort, or travel time.

Figure 1 Two-track or resource road

If resource roads are used to access resources, are two-tracks, and called two-track roads by the BLM, then they should be considered roads as defined in BLM Manual 9113 – Roads, and fall into the "Regular and Continuous Use" definition used by the BLM. The caption under Figure 1 on the BLM website reads, "BMPs reduce the amount of area disturbed for development. In some cases, two-track roads are used to lessen disturbance..." The above figure can be accessed on the following BLM website:

http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/general_information.html

The following excerpts are from the BLM Roads and Trails Terminology Report, Attachment 5 – Terms, Definitions, and Maintenance Intensity Standards" under Section "Definitions" (USDI 2006) and relate to the road versus trail classification of two-tracks.

Road: A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

Primitive Road: A linear route managed for use by four-wheel drive or high-clearance vehicles. These routes do not normally meet any BLM road design standards.

Trail: A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

Two-tracks are considered trails in the BLM GIS Transportation geodatabase and not considered roads in the BLM LWC Inventory. The attribute columns of the BLM Transportation geodatabase files CYFO_Roads (CYFO is Cody Field Office) "Comments - Truck 4 wheel" and WFO_AllRoads (WFO is Worland Field Office) "CLASS_100K - 4WD" are associated with "2-track trail" and "TWOTRACK", respectively. According to the above definitions, "trails" are generally not managed for use by four-wheel drive or high clearance vehicles.

The following chart and excerpt is from the BLM Roads and Trails Terminology Report (Figure 2).

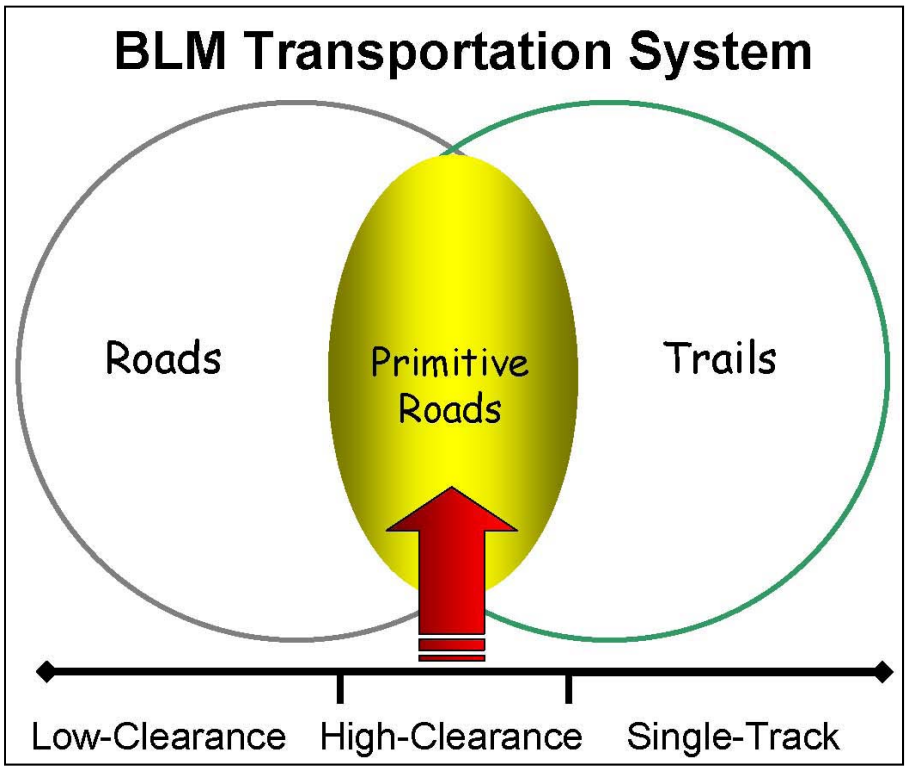
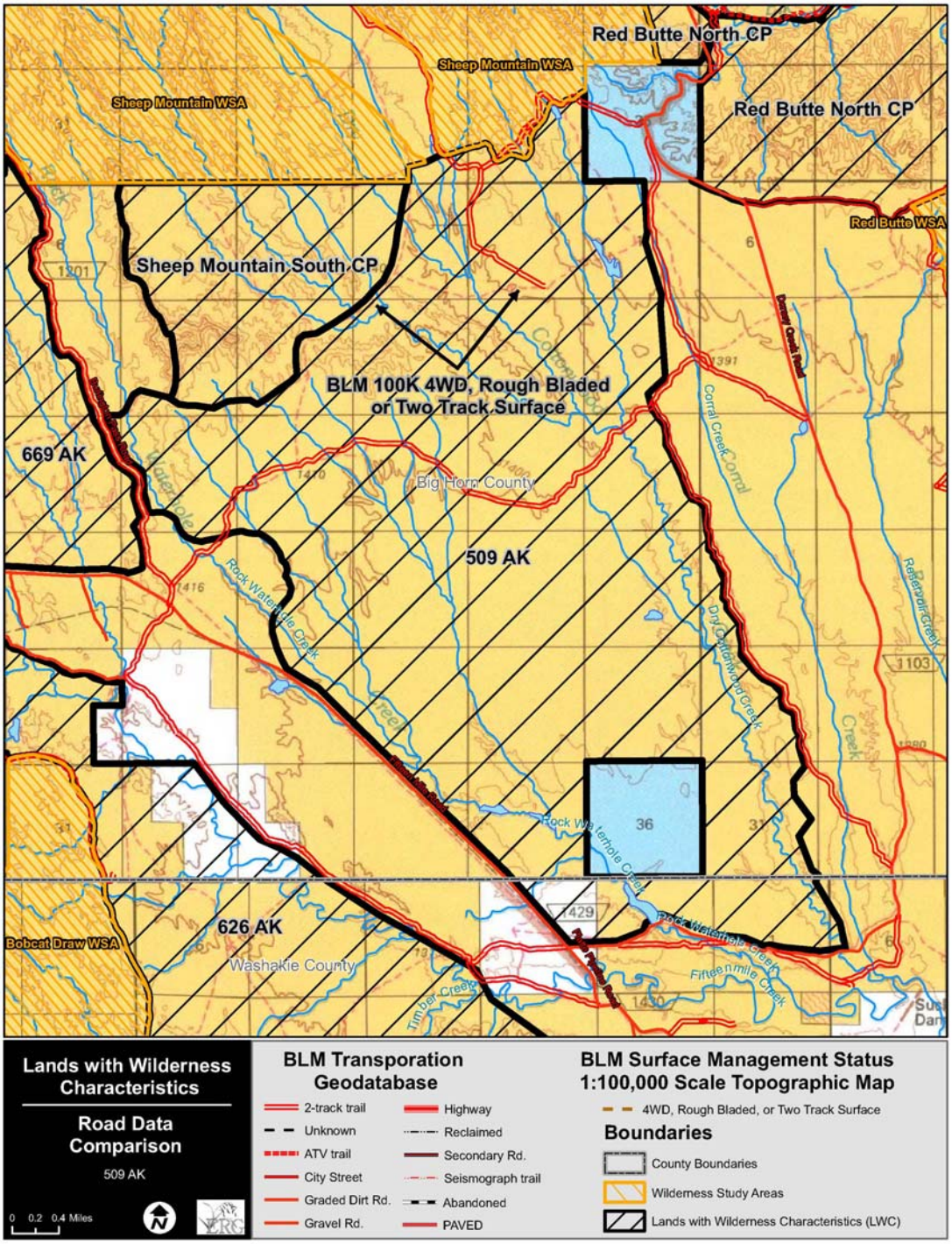


Figure 2 BLM transportation system chart

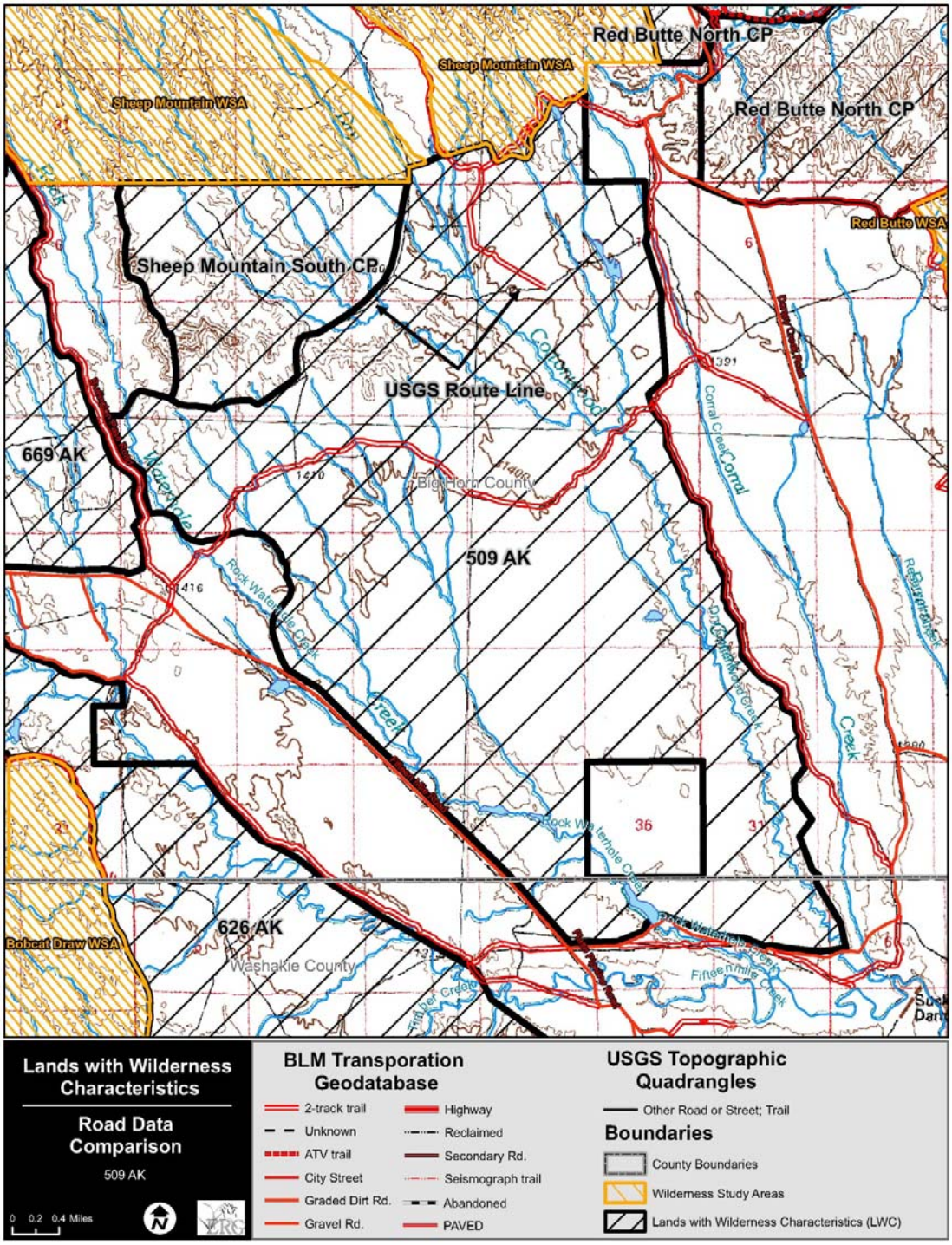
The preceding chart is found in "Objective 1 – Establish Bureau Definitions and Standards for Transportation Linear Features" under Section "Analysis" of the BLM Roads and Trails Terminology Report.

Roads and trails are identified and defined in multiple BLM manuals and documents. None of the definitions provide enough clarity to properly classify roads consistently. Research performed by other governmental agencies has identified these roads in question as "primitive roads". The BLM Transportation System chart associates "trail" with single-track. According to BLM GIS Transportation attributes, two tracks are associated with high clearance or four-wheel drive vehicles. Therefore, according the preceding sources, two-tracks should be considered "primitive roads".

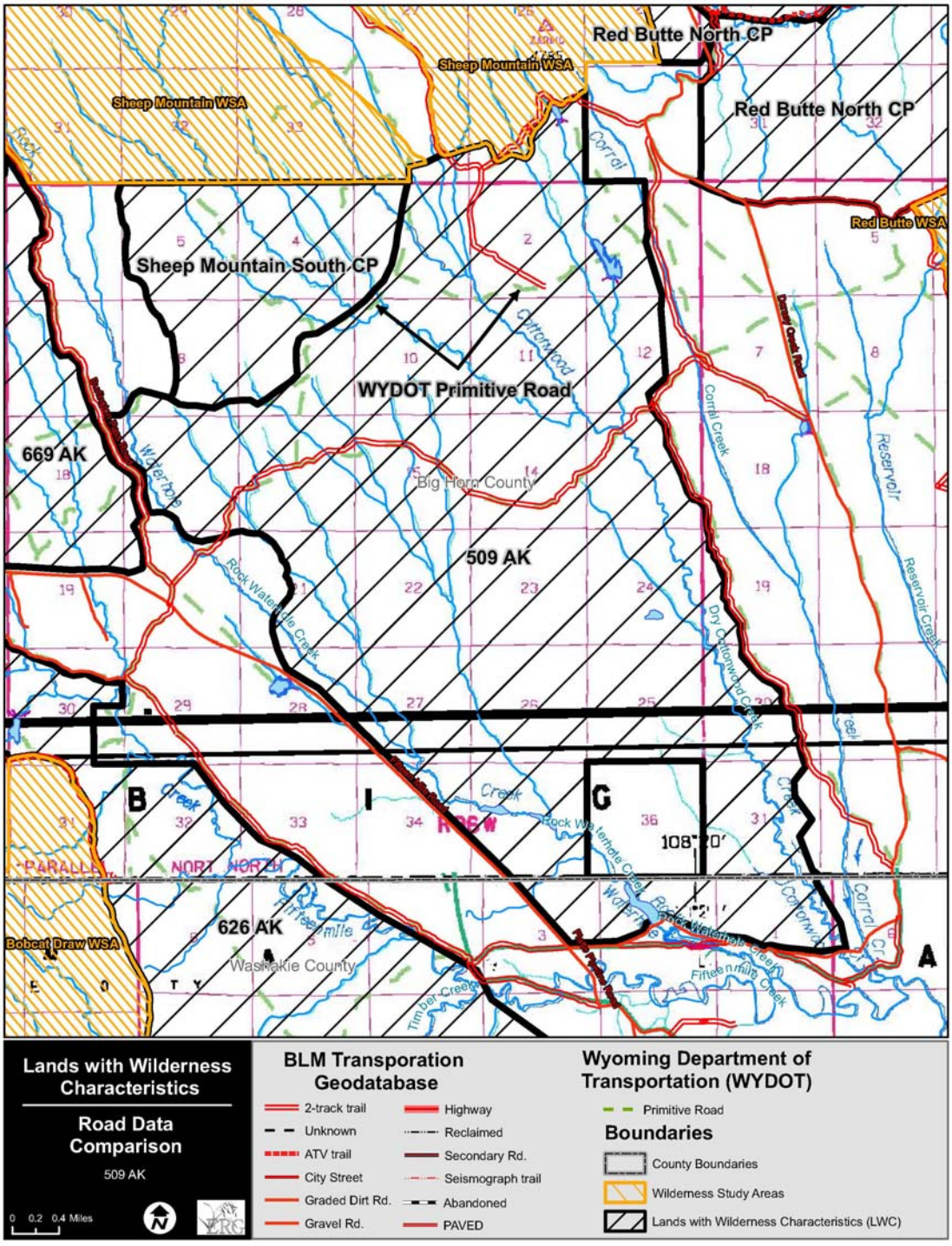
ERG has researched and cross-referenced multiple sources of roads data to accurately assess the actual amount of roads contained within the LWCs. United States Geologic Survey (USGS) Topographic Quadrangles, BLM Surface and Travel maps, BLM GIS datasets, and Wyoming Department of Transportation (WYDOT) maps and data were used in this comparison process. During the comparison process it was found that the BLM GIS Transportation GIS geodatabase is incomplete when compared to the other sources cited above. The legend for the BLM Surface maps concerning two-tracks labels them "4WD, Rough Bladed, or Two Track Surface." The USGS Quadrangle map legend describes "two-tracks" as "Other Road or Street; Trails." WYDOT classification labels them as "Primitive Roads" as defined in the legend on their maps. The following series of maps demonstrates the inconsistencies in roads data across the cited sources as compared to the BLM Transportation Geodatabase.



Map 1 Comparison of BLM Transportation Geodatabase to BLM Surface Management Status 1:100,000 Scale Topographic Map



Map 2 Comparison of BLM Transportation Geodatabase to USGS Topographic Quadrangles



Map 3 Comparison of BLM Transportation Geodatabase to Wyoming Department of Transportation

Upon review of the BLM LWC Inventory, ERG noticed that there were several comments made by BLM specialists in the form of handwritten and signed notes on the BLM's signature sheets. Within these notes, BLM specialists refer to roads as having heavy use, or being high use areas, or roads that are frequented by hunters. When these "roads" are compared to the BLM GIS roads datasets, it was determined that the roads being referred to by BLM specialists are two-track roads.

2.5 WELL ESTABLISHED MOTORIZED USE

Experience has shown with both the USFS and the BLM that once motorized use becomes well established within an area it is very difficult to change that pattern of use. Due to this fact, it is suggested that well-established motorized use in an area will not allow for the continued maintenance of wilderness characteristics, and the area should either be removed from the inventory or the boundary redrawn to exclude the motorized use area. Information regarding area-specific, well-established motorized use could be gathered through discussion with BLM personnel, allotment permittees, and county officials.

In this case, the Recreation Opportunity Spectrum (ROS) will be used for establishing motorized use in these areas. ROS GIS data was gathered from the BLM and applied to the analysis. Categories in the ROS are as follows:

- Primitive
- Modern Urban
- Roaded Natural
- Rural
- Semi-primitive Motorized
- Semi-primitive Non-motorized

Primitive areas, according to the ROS User's Guide, are those areas at least three miles from an established motorized road or trail and relate to the solitude and primitive and unconfined recreation of an area (USDA 1982). Areas of solitude and primitive and unconfined recreation are generally confined to "primitive" areas. Areas falling into the other five categories, with the exception of semi-primitive non-motorized, would detract from wilderness characteristics.

When applying a three-mile buffer to all BLM roads included in their Transportation geodatabase, there are no areas within the BBPA that can be considered primitive or areas of solitude and unconfined recreation. When selecting for only mechanically constructed and/or maintained roads in the GIS data, and buffering them by three miles, there are some primitive-like areas within the BBPA. According to the ROS Users Guide, wildernesses are generally confined to primitive areas. Mechanically constructed or maintained roads selected for in the GIS data include: highways, city streets, paved roads, secondary roads, gravel roads, and graded dirt roads. There are 315,130 acres not covered by the three-mile buffer

of constructed and maintained roads, out of 5,649,196 acres in the BBPA (5.6%). However, the BLM's ROS GIS data does not recognize any areas within the BBPA as primitive, only semi-primitive non-motorized. The acreage calculations performed by ERG only took into account areas outside the three-mile buffer for maintained roads. It did not take into account other criteria for designating primitive areas, which may explain the BLM's ROS designation of nothing more isolated than semi-primitive non-motorized (USDA 1982).

When the areas outside the three-mile buffer of constructed and/or mechanically maintained roads (primitive-like areas) are overlaid with the LWC polygons, 52,398 acres of primitive-like areas remain, out of 571,295 total acres of LWCs in the BBPA (8.9%). According to 6300-1 Wilderness Inventory, in order to designate lands as having wilderness characteristics, outstanding opportunities for solitude and/or outstanding opportunities for primitive and unconfined recreation must exist. The area must meet at least one of those two criteria. According to the ROS, and this analysis, a maximum of 8.9% within the BLM's current LWCs (depending upon the interpretation of BLM road definitions) could be defined as "primitive-like." Man-made constructed features are present in the primitive-like areas within the LWCs, which may negate the solitude and primitive and unconfined recreation opportunities.

2.6 ADJACENT TO WILDLAND-URBAN INTERFACE

In some cases, the adjacency of a wildland-urban interface (WUI) (SILVIS Lab[1]) may affect the ability to manage an area so as to protect wilderness characteristics. This may be due to the use of prescribed fire for wildfire management or other factors related to residential development in the WUI. A three-mile buffer around WUIs was used to evaluate the effects on wilderness characteristics.

2.7 PERMITTED EXISTING LEASABLE/LOCATABLE MINERAL AREAS

Existing oil and gas fields, presence of oil and gas wells (active or plugged and abandoned (Wyoming Oil and Gas Commission, 01/11/10)), oil and gas pipelines (Wyoming Pipeline Authority data), or areas where existing locatable mineral (sand and gravel) operations exist (BLM provided GIS data), or have permits to expand into, detract from wilderness characteristics.

The acreages of oil and gas leases (BLM provided GIS data) were not evaluated in the actual inventory, but are mentioned here because they are important in regards to the future management of areas with wilderness characteristics. The leases do not represent current constructed features, but may represent future constructed infrastructure and should be taken into account for future management of these areas. The counties of Wyoming and the Bighorn Basin have a vested interest in the ability to develop these

[1] SILVIS Lab maintains spatial data for conservation and sustainability. They are supported by NASA, US Forest Service, USDA, US Fish and Wildlife Service, National Science Foundation, and others. http://silvis.forest.wisc.edu/

lands from an economic standpoint. Table 1 shows the LWCs, the leasable commodity, and the acres of each lease in the BBPA.

Table 1 BBPA LWCs, Leasable Commodities, and Acres

LWC	Commodity	Acres
0008 DH	Oil & gas	397.53
0016 DH	Oil & gas	4,820.29
0048 PR	Oil & gas	2,472.07
508 AK	Oil & gas	622.20
508 TriState Gooseberry N Platte	Oil & gas	3,407.88
509 AK Dorsey Ck	Oil & gas	24,33.85
577 AK	Oil & gas	5,404.18
622 AK	Oil & gas	14,028.46
626 AK	Oil & gas	538.67
639 AK	Oil & gas	4,434.81
651 AK	Oil & gas	2,953.35
652 Lower, Upper AK	Oil & gas	5,785.57
665 CW	Oil & gas	13,273.20
668 AK	Oil & gas	1,534.73
669 AK	Oil & gas	1,240.83
676 AK, PR	Oil & gas	4,558.26
Bald Ridge	Oil & gas	3,852.27
Bobcat Draw South CP	Oil & gas	341.10
Bobcat Draw South II CP	Oil & gas	763.38
Bobcat Draw West CP	Oil & gas	4,694.88
Cedar Ridge	Oil & gas	3,305.14
Coon Creek	Oil & gas	28,066.76
Honeycombs 164 CP	Oil & gas	875.24
Honeycombs NW 107 CP	Oil & gas	1,655.46
Honeycombs South CP	Oil & gas	25,152.57
Little Dry Creek	Oil & gas	41,633.62
N. YU Bench	Oil & gas	24,291.26
Rattlesnake Mtn.	Oil & gas	33.74
Red Butte North CP	Oil & gas	7,567.07
Rough Gulch	Oil & gas	10,566.26
Whistle Creek	Oil & gas	27,539.11
Grand Total		**248,243.74**

2.8 POWER TRANSMISSION/DISTRIBUTION LINES

Power transmission or distribution lines detract from wilderness characteristics. These structures require heavy machinery to install and require maintained roads for general maintenance, thus demonstrating the presence of man.

2.9 DRILL ROWS

Finding evidence of old drill rows would indicate heavy machinery (farm equipment) has been used, thus detracting from wilderness characteristics. These areas could not be considered untrammeled by man. Data used in this inventory category is from field review of LWCs by ERG specialists.

2.10 INVASIVE PLANTS

Finding non-native plants and noxious weeds may be an indicator of presence of man and machinery. The spread of noxious weeds can be facilitated by heavy equipment, stock, ground disturbance from structure construction, or from roads open to vehicle travel. This may be used more importantly as part of a cumulative effects analysis rather than a standalone indicator detracting from wilderness characteristics. BLM data was used for this analysis.

2.11 RANGE IMPROVEMENT STRUCTURES

Range improvement structures are present on the land where stock grazing is prevalent. The structures are typically built using heavy equipment or some type of machinery. These features show evidence of man and would contradict the "imprint of man's work substantially unnoticeable" criteria from the Wilderness Act of 1964 excerpted in the 6300-1-Wilderness Inventory document.

The BLM is currently working to finish their range improvements GIS dataset. There is a gap in the GIS data that is focused around the center of the Big Horn Basin. To aid in a more complete wilderness characteristics inventory, aerial photo interpretation was used to find reservoirs. Reservoirs are obvious structures in which dams and water features can be accurately identified on aerial photography. Over 120 reservoirs and one storage facility structure was found during the photo interpretation process within the LWC polygons. Color National Agriculture Imagery Program (NAIP) Aerial Photography from 2009 was used for this process.

2.12 AREA MEETS SIZE OR NATURALNESS CRITERION

The BLM document 6300-1-Wilderness Inventory states "If an area fails to meet the size or naturalness criterion, document why the area does not meet these criteria. Document the findings" (USDI 2010a). For the original BLM LWC Inventory, this statement should have been evaluated. For the LGCA's inventory, all criteria were analyzed in full detail in order to objectively confirm or refute the BLM's inventory.

2.13 NOTES AND COMMENTS

The BLM LWC Inventory contains notes from the BLM reviewer's observations within the individual areas. Notes from the BLM inventory were included within the LGCA's inventory. Also documented here are the findings of the LGCA's review with allotment permittees in the LWCs.

2.14 NATURAL CONDITION

The natural condition of an area is part of the criteria to be assessed when evaluating wilderness characteristics according to BLM document 6300-1-Wilderness Inventory. The document defines naturalness as affected primarily by the forces of nature. In order to determine if the area is in a natural condition, it must be primarily affected by the forces of nature and man's work is substantially unnoticeable. Substantially unnoticeable man-made features are: trails, trail signs, bridges, fire towers, fire breaks, fire suppression facilities, pit toilets, fisheries enhancement facilities, fire rings, hitching posts, snow gauges, water quantity and quality measuring devices, research monitoring markers and devices, fencing, spring developments, overgrown and barely visible two-track ways, and small reservoirs.

The cumulative effects of several of these minor impacts are discussed in the 6300-1-Wilderness Inventory and the BLM is directed to assess the cumulative effects of these structures and how they affected the areas' degree of naturalness. It is important to evaluate whether the man-made features are noticeable to the average visitor. Relative to assessing human impacts is the statement, "Where there are several minor impacts, they should be evaluated for their cumulative effect on an area's apparent naturalness." This statement can be found in "Section 3 – Opportunities for Solitude or a Primitive and Unconfined Type of Recreation, Section C Boundary Delineation (USDI 2010a). The BLM has not assessed the cumulative effects of minor impacts on the apparent naturalness of any LWCs. Natural integrity and apparent naturalness are two different things according to the BLM and are defined below.

- Natural integrity refers to the presence or absence of ecosystems that are relatively unaffected by human activities.
- Apparent naturalness refers to whether or not an area looks natural to the average visitor who is not familiar with the biological composition of natural ecosystems versus human-affected ecosystems.

Caution is advised by the BLM when assessing the relatively unnoticeable works of man on naturalness. The BLM will accept some minor impacts if they are "substantially" unnoticeable and advised against an overly strict approach when assessing naturalness. Water troughs are used as an example as a minor impact and substantially unnoticeable structure. Human impacts outside the area will not be considered unless it has major significance and then should evaluated and described in the inventory for its affect on the area. The LGCA and ERG would cite a visible oil and gas field as an outside impact that would affect an area's apparent naturalness. There are multiple LWCs that are in visible proximity to oil and gas fields, and there are eight active oil and gas fields within LWC boundaries.

The "average visitor" statement used in assessing apparent naturalness is subjective. The average visitor from an urban area would have a much different perspective on an LWC than an average visitor from a rural area. The average rural visitor may know the levels of construction associated with the "minor, substantially unnoticeable impacts" such as range improvements and reservoirs, where an average visitor from the urban area may not.

ERG supplemented the naturalness criterion with the range allotment categories applied by the BLM. The health of the rangeland can be directly related to the health of the vegetation and used to assess the natural condition of the area. The BLM categorizes allotments into three categories: Category "C" Custodial, Category "M" Maintain, and Category "I" Improve. Allotments are categorized as "I" Improve for the following reasons as stated in the Preliminary Draft Bighorn Basin RMP Section 3.6.7, Livestock Grazing Management and within the Glossary (USDI 2010b):

- The present range condition is unsatisfactory and where range condition is expected to decline further.
- The present grazing management is not adequate.
- The allotment has potential for medium to high vegetative production but production is low to moderate.
- Resource conflicts/controversy with livestock grazing are evident.
- There is potential for positive economic return on public investment.
- Amount of public land involved.
- The willingness of the lessees to invest in management.
- The opportunities for constructing range improvements.
- Livestock management could be improved through water distribution.
- Seasons of use or other factors.

Acreages of Category "I" is provided in the Summation Statement of each LWC Inventory Evaluation Form. If an allotment is under a Category "I" designation, it may detract from the naturalness of the area due to possible overgrazing, thus affecting the determination of wilderness characteristics.

2.15 OPPORTUNITY FOR SOLITUDE

The BLM assesses the opportunity for solitude while evaluating wilderness characteristics. The 6300-1-Wilderness Inventory document defines "solitude" as factors that influence solitude only as they affect a visitor's opportunity to avoid the sights, sounds, and evidence of other people in the area. The BLM advises considering the sights and sounds from outside the LWC only if they are pervasive and omnipresent. There are several factors that influence solitude according to BLM guidance. They are size, configuration, topography, vegetative screening, and the ability to find seclusion. The combination of these factors is the determination upon which solitude will be made. If visitors can screen themselves

from one another via topography or vegetation then a small area may provide that solitude. Solitude can also be found in an areas lacking topography and vegetation so long as they one can avoid sights and sounds not of a wilderness nature.

2.16 OPPORTUNITY FOR PRIMITIVE OR UNCONFINED RECREATION

Evaluation of the opportunity for primitive and unconfined recreation is part of the criteria assessed when inventorying wilderness characteristics. The Oregon/Washington BLM document H-6033-1-Wilderness Inventory Maintenance defines primitive and unconfined recreation as hiking, backpacking, fishing, hunting, spelunking, horseback riding, climbing, river running, cross-country skiing, snowshoeing, dog sledding, photography, bird watching, canoeing, kayaking, sailing, sightseeing for botanical, zoological, or geological features, or other activities permitted in Wilderness areas. When making a determination for primitive and unconfined recreation, consider activities that will provide dispersed, undeveloped recreation that are not motorized and do not require facilities. Areas may possess multiple types of primitive or unconfined recreation or an outstanding quality for one form of recreation. Consider the following factors:

- Present visitor use of an area is not necessary in evaluating this criterion. The factor to be determined is whether an outstanding opportunity is present, regardless of the amount of use.
- A trail system or convenient access is not essential for an outstanding opportunity for primitive and unconfined recreation. The absence of these facilities may increase opportunities for primitive and unconfined recreation.
- The presence or absence of water is not essential for an outstanding primitive recreation opportunity.
- The presence of “challenge” and “risk” are appropriate, but not essential, for an outstanding primitive recreation opportunity to exist in an area.

2.17 SUMMATION STATEMENT

This section of the inventory form summarizes the results of the analyses described above in the preceding sections.

3. LWC INVENTORY PROCESS

3.1 EVALUATE AREAS THAT THE BLM HAS DETERMINED TO CONTAIN WILDERNESS CHARACTERISTICS

ERG used the above criteria organized into an evaluation form to assess the wilderness characteristics within each inventoried area. This step in the process involved using GIS data received from the BLM and other agencies such as the Wyoming Pipeline Authority and the Wyoming Oil and Gas Commission to analyze the specified criteria. Gaps or areas not completely covered by the GIS data were discovered. Those areas were identified as areas to be reviewed in the field.

3.2 DETERMINE WHICH AREAS WILL BE FIELD VERIFIED

From the evaluations in Step 2, ERG created a list of priority areas that either were within the GIS data gap or were found to contain wilderness characteristics. These areas were either reviewed in the field by ERG or reviewed with permittees and producers working in these areas for confirmation of wilderness characteristics. Areas that do not appear on this list were found not to contain wilderness characteristics based on one or more of the previously mentioned criteria.

3.3 FIELD VERIFICATION AND PERMITTEE REVIEW

Using the list created from Step 3, ERG visited these areas in the field to inventory structures or attributes of the areas that may enhance or detract from wilderness characteristics. GPS points were taken for each structure found in the field. The field data was incorporated into the final package, consisting of a complete confirmed inventory of wilderness characteristics within the BLM defined boundaries.

The LGCA facilitated the review of the LWCs with the allotment permittees in these areas. Permittees were presented maps and inventory evaluation forms to draw roads and structures not existing within the BLM GIS data or found during field verification and then provided comments on the findings in each respective area. This information was then incorporated into the inventory.

3.4 DEVELOP A PACKAGE FOR EACH INVENTORIED AREA, INCLUDING EVALUATION FORM, FIELD NOTES, MAPS, PHOTOGRAPHS, AND GPS DATA AS NEEDED

ERG created a document that includes a map and inventory evaluation form for each LWC identified by the BLM that outlines the LGCA's findings as they pertain to wilderness characteristics for each LWC.

3.5 REVIEW WILDERNESS CHARACTERISTICS INVENTORY WITH BIGHORN BASIN COUNTY COMMISSIONERS FOR CONFIRMATION OF FINDINGS

ERG reviewed each of the areas inventoried by the BLM with the Bighorn Basin County Commissioners to gain their input on the lands in question and allow them to confirm the findings of ERG's work on the

LGCA's LWC Inventory. The commissioners involved in the review have authenticated the inventory by signing the signature sheet attached to each evaluation form.

3.6 UPDATE GIS CALCULATIONS

ERG originally supplied the BLM with a table listing miles of roads and acreages of LWCs, along with acreages of certain criteria within that table. Since the submission of those comments, the BLM has updated their LWC shapefile and supplied that data to ERG. There were boundary changes to the LWCs in the updated data. Accordingly, these acreage differences are accounted for in this version of the LGCA LWC Inventory.

The original roads file that was used by ERG was a Bighorn Basin-wide roads layer presenting a merge of all BLM roads in the Bighorn Basin called BHB_All_Roads. This file did not contain complete and detailed roads information within the GIS attribute table. The BLM supplied ERG with a transportation geodatabase that contains a Cody Field Office and a Worland Field Office roads layer with detailed road-type information. ERG merged those two files together and used that resulting merged file for analysis in the most current version of the LGCA LWC Inventory. Changes in road miles may be found when comparing the original table comment submitted with the comment form for the Preliminary Draft Bighorn Basin Resource Management Plan Revision and the LGCA LWC Inventory.

During the February 16, 2011 LWC meeting with the LGCA, BLM, and ERG at the BLM Worland Field Office, it was discussed that ERG should acquire all of the BLM individual allotment maps in order to capture range improvements on all LWCs to supplement the GIS data. John Sanford from ERG contacted Bill Wilson, GIS Specialist in the Cody Field office (February 2011) and Mike Tietmeyer, Supervisory Range Specialist (February 2011) in the Worland Field Office. Bill Wilson commented that all the range improvements from the individual allotment maps in the Cody Field Office have been digitized into the GIS. Therefore, no maps were collected from the Cody Field Office.

Mike Tietmeyer prepared a package for ERG containing 94 individual allotments maps that overlap into LWCs. During phone conversations with Mike, ERG learned that GIS and allotment maps datasets may not match. They are in the process of combining all data into GIS to update their current datasets. John Sanford spoke with Mr. Tietmeyer concerning the differences. Discussions included the range improvement geodatabases, representing the Cody and Worland Field Offices, collected (09/09/2010) from Caleb Hiner, RMP Lead, and the gap in the dataset. Mr. Teietmeyer then mentioned the effort to update the data. He also mentioned that data from their website, the data received from Caleb Hiner, and the allotment maps may all differ from one another.

This prompted ERG to review the online GIS datasets available. These online datasets were consulted originally at the time of data collection from Caleb Hiner to discuss the completeness and type of data available. ERG discussed the incomplete list of range improvement types on the online data sources and was told by Caleb that he would get us the most up-to-date data containing all the different types of range

improvements. The data sent by Caleb contained a large gap in the range improvements data. ERG discussed this gap with Caleb Hiner and his response was that they had a technician working on completing that data and that the project was two years out in completion.

During the secondary review (March 4, 2011) of the online data by ERG, it was discovered that there were several datasets that would fill in the gap of the data sent by Caleb Hiner. The following list of online GIS data was used in an attempt to fill in the gap of the geodatabases sent by Caleb Hiner.

- Cody Field Office Gates
- Cody Field Office Exclosures
- Worland Field Office Guzzlers
- Worland Field Office Reservoir Conditions
- Worland Field Office Fences

Very careful and tedious consideration was given to the application of these ever changing, differing datasets in order to avoid showing duplicate range improvements. There were several overlaps found during the incorporation of all previously mentioned datasets and the inclusion of stakeholder review data and data collected from hand drawings on the BLM LWC Inventory maps.

3.7 INDENTIFY INCONSISTENCIES IN LANDS WITH WILDERNESS CHARACTERISTICS

The Bighorn Basin Preliminary Draft RMP (page 3-155) has disclosed that 52 LWC polygons have been inventoried. Table 3-44 on page 3-156 identifies 51 LWC polygons. The acreage identified in Table 3-44 is 539,848 acres. The most up-to-date GIS shapefile (July 7, 2010) of LWC polygons, provided by the BLM to ERG and used for mapping and analysis purposes, reports 56 areas and the total acreage as 585,427 acres. This is 45,579 more acres in the BLM's GIS data than reported in the BLM's Preliminary Draft RMP document. Table 2 documents the differences in the BLM's Preliminary Draft RMP document and the BLM's GIS data for LWC polygons.

Table 2 Comparison of LWC Acreages in the Bighorn Basin RMP and BLM GIS Shapefile

LWC	BLM Preliminary Draft RMP Acres, (Table 3-44)	BLM GIS Acres
0008 DH	6,417	6,417
0016 DH	6,186	6,186
0048 PR	8,771	8,771
005 PR	8,014	8,014
069 JW	1,056	1,056
130 JW	248	248
1535 PR	17,458	17,458

LWC	BLM Preliminary Draft RMP Acres, (Table 3-44)	BLM GIS Acres
1536 PR	10,685	10,685
31 PR	2,972	2,972
508 AK	4,035	4,035
508 TriState Gooseberry N Platte	13,464	13,464
509 AK	13,873	13,873
509 AK Dorsey Ck	4,578	4,578
516 DH	553	553
568 TS	2,491	2,491
577 AK	7,107	7,107
622 AK	29,690	29,690
626 AK	10,280	10,280
639 AK	13,921	13,921
651 AK	6,410	6,410
652 Lower, Upper AK	21,153	21,153
661 TS	743	743
665 CW	15,688	15,688
668 AK	3,435	3,435
669 AK	8,387	8,387
676 AK, PR	14,225	14,226
Alkali Creek NW CP	4,444	4,444
Bald Ridge	7,077	7,077
Bobcat Draw South CP	4,200	4,200
Bobcat Draw South II CP	7,567	7,567
Bobcat Draw West CP	5,511	5,511
Carter Mtn.	14,495	14,496
Cedar Ridge	6,364	6,364
Coon Creek	30,769	30,769
Crystal Creek	15,165	15,165
Honeycombs 164 CP	1,157	1,157
Honeycombs NW 107 CP	2,026	2,026
Honeycombs South CP	34,487	34,487
Little Dry Creek	48,929	48,929
Medicine Lodge North CP	6,322	6,322
N. YU Bench	25,097	25,097

LWC	BLM Preliminary Draft RMP Acres, (Table 3-44)	BLM GIS Acres
Owl Creek CP 1 - Citizens' Proposal - Owl Creek/Castle Rocks Wilderness	Not listed separately	4,961
Owl Creek CP 2 - Citizens' Proposal - Owl Creek/Castle Rocks Wilderness	Not listed separately	2,231
Owl Creek CP 3 - Citizens' Proposal - Owl Creek/Castle Rocks Wilderness	Not listed separately	235
Owl Creek CP Total	7,423	7,427
Painted Hills	9,182	9,182
Paintrock CP 1 - Citizens' Proposal - Paint Rock Creek Canyons Wilderness	Not listed separately	8,248
Paintrock CP 2 - Citizens' Proposal - Paint Rock Creek Canyons Wilderness	Not listed separately	561
Paintrock CP Total	8,809	8,809
Rattlesnake Mtn.	18,663	18,663
Red Butte North CP	11,777	11,777
Rough Gulch	12,508	12,508
Sheep Mountain South CP	2,172	2,172
Sheep Mountain	13,063	13,064
Trout Creek	4,514	4,514
Whistle Creek 1	Not listed separately	6,287(overlapping polygon used to track proposal methods, not to be included in total acreage)
Whistle Creek 2 - BCA (citizens) Proposal - McCullough Peaks Wilderness with Land Exchange	Not listed separately	7,845(overlapping polygon used to track proposal methods, not to be included in total acreage)
Whistle Creek 3 - BCA (citizens) Proposal - McCullough Peaks Wilderness	Not listed separately	37,727
Whistle Creek Total	6,287	51,859
Original Documented Total	**539,848**[2]	**585,427**[3]
Actual Calculated Total	**539,848**[4]	**571,295**[5]

[2] LWC total acreage recorded in Table 3-44 from the Bighorn Basin Preliminary Draft RMP.
[3] GIS acres of all 56 LWC polygons in the BLM GIS dataset.
[4] ERG calculated the acreage in Table 3-44 from the Bighorn Basin Preliminary Draft RMP in Microsoft Excel, which totaled 539,848 acres.
[5] Total acres, after removing the two overlapping polygons in the Whistle Creek LWC that were used as place holders to tract LWC proposal methods.

After reviewing the materials and making the calculations, it appears that the BLM miscalculated the original documented grand total in Table 3-44 of the Bighorn Basin Preliminary Draft FMP. Further, after making the calculations, it also appears that the LWC areas with multiple polygons were not taken into account in the BLM's Preliminary Draft RMP document.

The Owl Creek LWC has three separate polygons and will be evaluated as three separate polygons. The Paintrock CP LWC is recognized as one area in the Bighorn Basin Preliminary Draft RMP, but in the BLM GIS data is recognized as two separate, non-adjacent polygons. ERG will evaluate the two polygons separately.

The Whistle Creek LWC also contains multiple polygons in the BLM GIS data. Upon review of this area with Caleb Hiner, BLM Bighorn Basin RMP Revision Project Lead, it was determined that the multiple overlapping polygons in the GIS were used to tract proposal methods for this LWC. The largest Whistle Creek polygon of 37,727 acres is the official single polygon that represents the BLM's Whistle Creek LWC. This will change the total acreage of the BLM's LWC GIS file represented in Table 2 from 585,427 to 571,295 acres in the BLM GIS data. The official total acreage of BLM's LWC GIS file in the Bighorn Basin is 571,295. This acreage has been reviewed and recognized by the LGCA.

4. DATA QUALITY ACT, COUNCIL ON ENVIRONMENTAL QUALITY REGULATIONS, AND BLM INFORMATION QUALITY GUIDELINES

The Data Quality Act (DQA), the Council on Environmental Quality (CEQ) regulations, and the BLM Information Quality Guidelines mandate that information disseminated by the BLM be up-to-date and accurate. They require that the best available data be used to ensure accurate and objective data be disseminated. The following sections will document these regulations.

4.1 DATA QUALITY ACT

The Data Quality Act (DQA) was created by Congress in an attempt to ensure that federal agencies disseminate and use accurate information. To date, research found that the DQA is uncodified but amends the Paperwork Reduction Act of 1980. It was enacted in response to the increased use of the internet to provide quick and easy dissemination of data. Congress' intent of the DQA was to prevent the harm that occurs from the dissemination of inaccurate information.

DQA guidelines (Bisong 2011) require federal agencies to issue its own information quality guidelines. This ensures the quality, objectivity, utility, and integrity of the information it provides to the public. It also calls for agencies to establish administrative processes to allow affected parties to seek and obtain correction of the information provided by the agencies that does not comply with Office of Management and Budget (OMB) or agency guidelines. The agencies must also periodically report to the OMB the number of and nature of complaints received regarding the accuracy of the information disseminated and how the disputes were resolved.

As stated in Bisong (2011) the guidelines apply to a wide variety of information and all types of media. In the guidelines, quality encompasses utility, objectivity, and integrity. Objectivity involves both the presentation and the substance of information. The agency must identify the source of the information plus the supporting data or models used so the public may assess for itself whether there is a reason to question the objectivity. Sound research methods and supporting data must be used (Bisong 2011).

4.2 COUNCIL ON ENVIRONMENTAL QUALITY

The Council on Environmental Quality (CEQ), Sec. 1508.7 Cumulative Impact, summarizes cumulative impacts as:

> "Cumulative impact" is the impact on the environment which results from the incremental impact of the action 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.

Cumulative impacts of structures need to be evaluated in an objective and technical review of LWCs. The BLM LWC guidelines (USDI 2010a) also dictate the analysis of cumulative effects of several minor structures within LWC areas. The BLM document 6300-1-Wilderness Inventory directs the BLM to summarize the cumulative effects of several minor impacts to an area's degree of apparent naturalness.

After a detailed review of the BLM original LWC Inventory it is apparent to ERG that cumulative effects were not analyzed by the BLM. There is no report on the BLM evaluation forms that documents the cumulative effects of several minor structures with the LWCs. The BLM inventory itself did not incorporate the BLM's own GIS data for range improvements and other structures throughout the Bighorn Basin. Consequently the cumulative effects of these structures were not included in the BLM LWC Inventory.

4.3 BLM INFORMATION QUALITY GUIDELINES

The DQA requires that divisions of the United States Government, Department of the Interior, Bureau of Land Management (BLM), etc. issue their own information quality guidelines (Bisong 2011). The BLM issued their information quality guidelines on May 24, 2002 (Bureau of Land Management 2002). These guidelines apply to the information sponsored by and disseminated by the BLM. The guidelines apply to any information disseminated to the public after October 1, 2002 (Bureau of Land Management 2002). The BLM Information Quality Guidelines defines information and dissemination as follows:

> "Information" for purposes of these guidelines generally includes any communication or representation of knowledge such as facts or data, in any medium or form and therefore, generally includes material that BLM disseminates from a web page.
>
> Dissemination, for purposes of these guidelines, includes publication either electronic or written to a community or audience that BLM initiates or sponsor. BLM may clarify whether distributions of information are initiated or sponsored by BLM by using disclaimers or notices to explain the status of the information. Communication which is not directed to a community or audience (e.g., correspondence to and from an individual) is not considered "disseminated".

The BLM issued these guidelines to ensure quality of data. Quality includes objectivity, utility and integrity of disseminated information (Bureau of Land Management 2002). These definitions are as follows:

> "Utility" refers to the usefulness of the information to the intended users. "Objectivity" focuses on whether the disseminated information is being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance, is accurate, reliable, and unbiased. "Integrity" refers to the protection of information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification.

The guidelines discuss influential information and how the BLM uses an added level of scrutiny due to the potential for influential information to have a clear and substantial impact at the national level on major public and private policy related to federal lands and resource development (Bureau of Land Management 2002). It appears from the Lands with Wilderness Characteristics research, cooperation in

the Bighorn Basin Resource Management Plan Revision Project, and analysis performed by the LGCA, that the BLM LWC Inventory is influential information as it will have influence on public lands resource management decisions. The BLM's Information Quality Guidelines considers information to be influential if it contains scientific, financial, or statistical information. It will then be held to a higher standard. Influential information includes information disseminated in support of top agency actions (notices, policy documents, studies, or guidance) which requires the involvement of the Director's office, information regarding cross-bureau issues that become major cross-bureau policy, and highly controversial information used to advance BLM priorities. Therefore these LWCs should have been scrutinized much further than they originally were by the BLM.

The BLM guidelines further set standards on influential information being able to be reproducible by qualified third parties. The BLM advises that influential information should be subject to a higher standard and degree of transparency concerning data and methods to ensure reproducibility and subject to an acceptable degree of precision. The data and methods must be reproducible by a qualified third party. The degree of rigor should be scaled appropriately and all factors presented and discussed. Analytical results should have a high degree of transparency regarding:

- The source of the data used;
- The various assumptions employed;
- The analytical methods applied; and,
- The statistical procedures employed.

The results of the BLM's LWC inventory in the Bighorn Basin were not reproducible by ERG due to the BLM's lack of incorporating their own GIS datasets into their LWC Inventory as well as the BLM not taking into account other readily available information such as the locations of oil and gas wells and pipelines. The BLM guidelines discuss the use of best available data and how it will be used in making its decisions. Best available data refers to the availability of information at the time an assessment was made weighed against the needed resources and the potential delays associated with data collection in comparison of the value of the new information to improve the substance of the assessment.

The BLM LWC inventory was performed in 2009. Eddie Bateson, the Director of the Wind River/Bighorn Basin District is quoted from a February 16, 2011 meeting with the LGCA as saying the data used in the LGCA LWC Inventory was not available at the time the BLM prepared the inventory. The LGCA would like to point out that this statement may not have been entirely accurate. A review of the GIS data by ERG found the date of the Transportation (roads) GIS Geodatabase to be 2008. This data was not incorporated into the BLM LWC Inventory and it is apparent that the best available data were not used. There is no date on the range improvement GIS data.

The following excerpts are from the BLM guidelines in relation to objectivity, utility and integrity of data they disseminate.

> Objectivity is defined according to two distinct elements: presence and substance. Objectivity includes whether disseminated information is being presented in an accurate, clear, complete, and unbiased manner. BLM is also committed to ensure accurate, reliable, and unbiased information. Much of the influential information BLM disseminates is and will be subject to public review and comment prior to its final publication.
>
> That includes using third party data both to conserve costs and to ensure non-redundancy of the data collection process.
>
> It is BLM's policy that, to the extent possible, all of the information it distributes meets a basic standard of information quality and utility to the public that relies on the data.
>
> Before disseminating information to members of the public, the originating office must ensure that the information is consistent with OMB and DOI guidelines and must determine that the information is of adequate quality for dissemination. If the information is influential financial, scientific, or statistical information, then the BLM will provide a higher level of review of conclusions of the program offices and the program managers and leads are responsible for ensuring accountability for reviewing information to be disseminated to the public.

According to these excerpts the BLM LWC Inventory did not follow its own guidelines when releasing the inventory. They did not ensure the quality of the data used and made decisions based on inaccurate data. The guidelines do include using third party data to ensure objectivity of the data disseminated. Therefore acceptance of the LGCA LWC Inventory would be prudent in this situation.

The BLM guidelines provide for administrative mechanisms for affected persons to obtain the appropriate correction of the information. Most may be covered during the 90-day comment period after the release of the Draft RMP. But the fact remains that the public will be commenting on an inaccurate LWC inventory and the BLM, according to their own guidelines, should re-analyze their LWC Inventory so the public has the most up-to-date and accurate inventory possible.

Any person may request a correction of information from the BLM so long as they are the "affected" person. They have to have used, been harmed, or been affected by the information disseminated by the BLM. The BLM employs various methods of ensuring affected people can obtain corrections of information that it maintains and disseminates. Corrections can be sought when the information does not comply with BLM, Department of the Interior (DOI), or OMB Information Quality Guidelines. Methods for correction include soliciting public comments, attending public meetings, and providing opportunities to comment via BLM website or similar medium. The offices sponsoring the information are the responsible parties ensuring the quality, objectivity, utility, and integrity and provide the outlets for corrections. The BLM must review every request for correction of information unless deemed "frivolous". Frivolous requests may have been made in bad faith or without justification, deemed trivial, or would be duplicative of existing process, or burdensome to the agency. The requesting party has the right to appeal the decisions by the BLM.

5. FEDERAL REGISTER RULES AND REGULATIONS

The following excerpt is from the 14562 Federal Register / Vol. 70, No. 55 / Wednesday, March 23, 2005 / Rules and Regulations document, Sec.1610.4-3 Inventory Data and Information Collection.

> We revised the first sentence of this section to instruct Field Managers to collaborate with cooperating agencies in arranging for the collection of data and information.

According to the previous statement from the Federal Register (USDI 2005), the BLM must collaborate with the cooperating agencies to collect data and information. This includes the LWC Inventory conducted by the LGCA because the LWCs are included in the range of alternatives and management actions dictated by the Bighorn Basin Preliminary Draft RMP (USDI 2010b).

6. SUMMARY

This confirmation inventory performed by the LGCA and ERG is a comprehensive and detailed account of the criteria necessary to complete an accurate inventory of LWCs. This report clearly outlines the criteria needed to complete an LWC inventory based on the research performed by the LGCA and ERG. Multiple BLM and Congressional documents were consulted during this process to ensure that the criteria evaluated and the inventory performed met the specifications and guidelines delineated by those reference documents. According to the policy and guidelines set forth by the Unites States Government, this report, and analysis, and LWC Inventory should be incorporated by the BLM into its LWC Inventory and the Bighorn Basin Resource Management Plan Revisions.

7. REFERENCES

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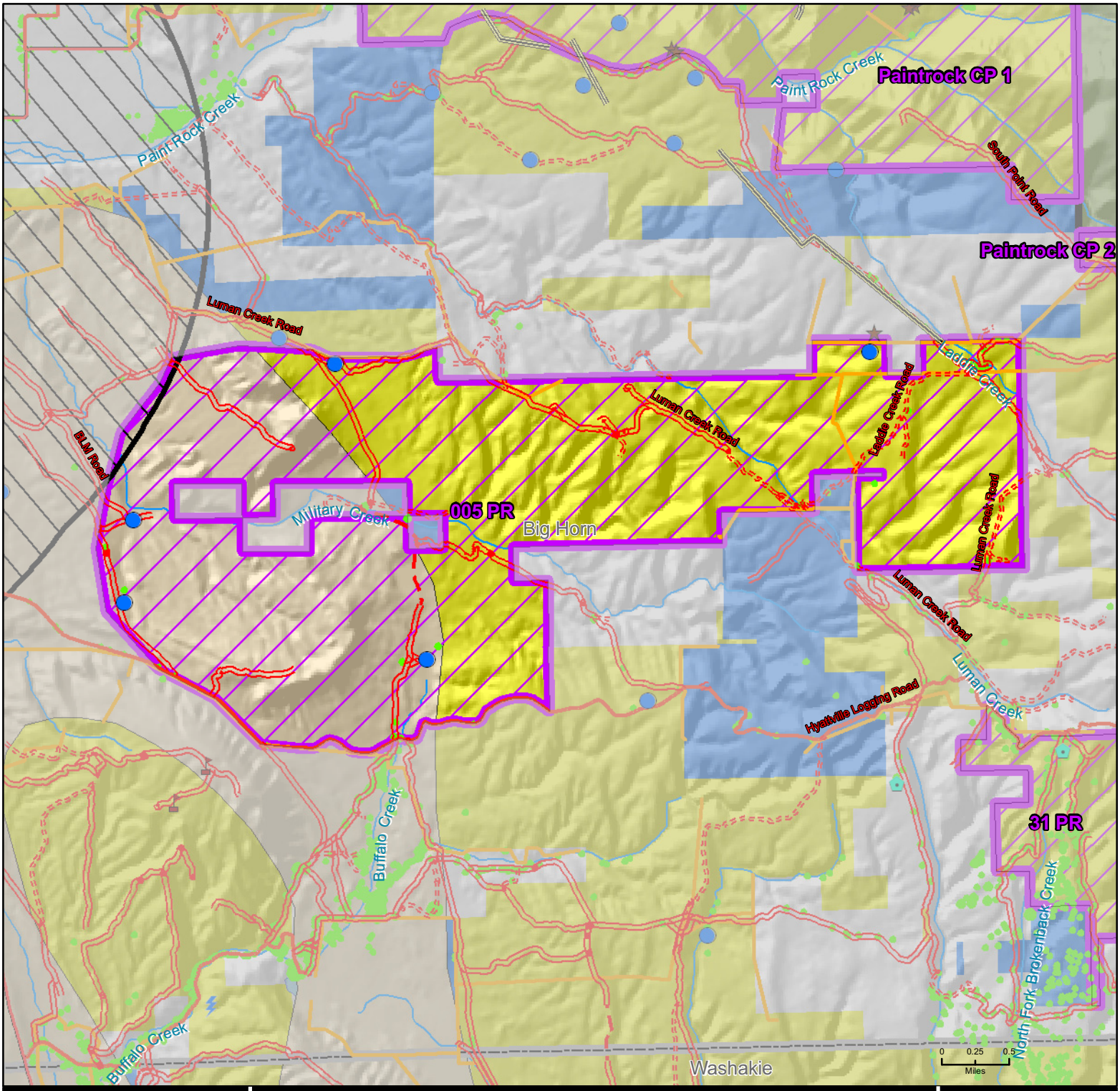
APPENDIX A

LGCA LWC INVENTORY FORM AND MAPS



Lands with Wilderness Charateristics

ERG Ecosystem Research Group www.ecosystemrg.com

005 PR

N W E S

Acres: 8014

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 005 PR **Acres:** 8,014

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Sufficient acreage but linear shape.

Miles of roads (See the road definition that is stated in Process Paper): 12.76 miles of two-track trail, 4.47 miles of ATV trail, 1.97 miles of graded dirt road, and 0.61 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 791.37 acres of roaded natural and 7,222.52 acres of semi-primitive motorized based on BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Significant overlap with existing locatable/salable mineral area.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 3.53 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 6.03 miles of fence, 2.14 miles of natural barrier, 0.03 miles of water pipeline and five reservoirs. Within region of BHB where possible GIS data gap exists, field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Has very well traveled roads. Water pipelines to troughs." (Chet Wheeless, BLM, 7/7/2009). "This area is well traveled by motor vehicles." (Aaron Kania, BLM, 7/27/2009). "Luman Creek Road, logging road, and hunting pressure compromises the characters of solitude, primitiveness, and naturalness." (Paul Rau, BLM, 7/16/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. This area contains roads, range improvement structures, motorized ROS use, significant overlap with existing locatable/salable mineral area, and it is adjacent to the wildland urban interface. There are 7,760 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. Given the shape, acreage, and dissection by roads there is no opportunity to redraw boundaries to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: 005 PR

DATE: November 5, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John Lumley (Did Make Up Session)

HOT SPRINGS CONSERVATION DISTRICT

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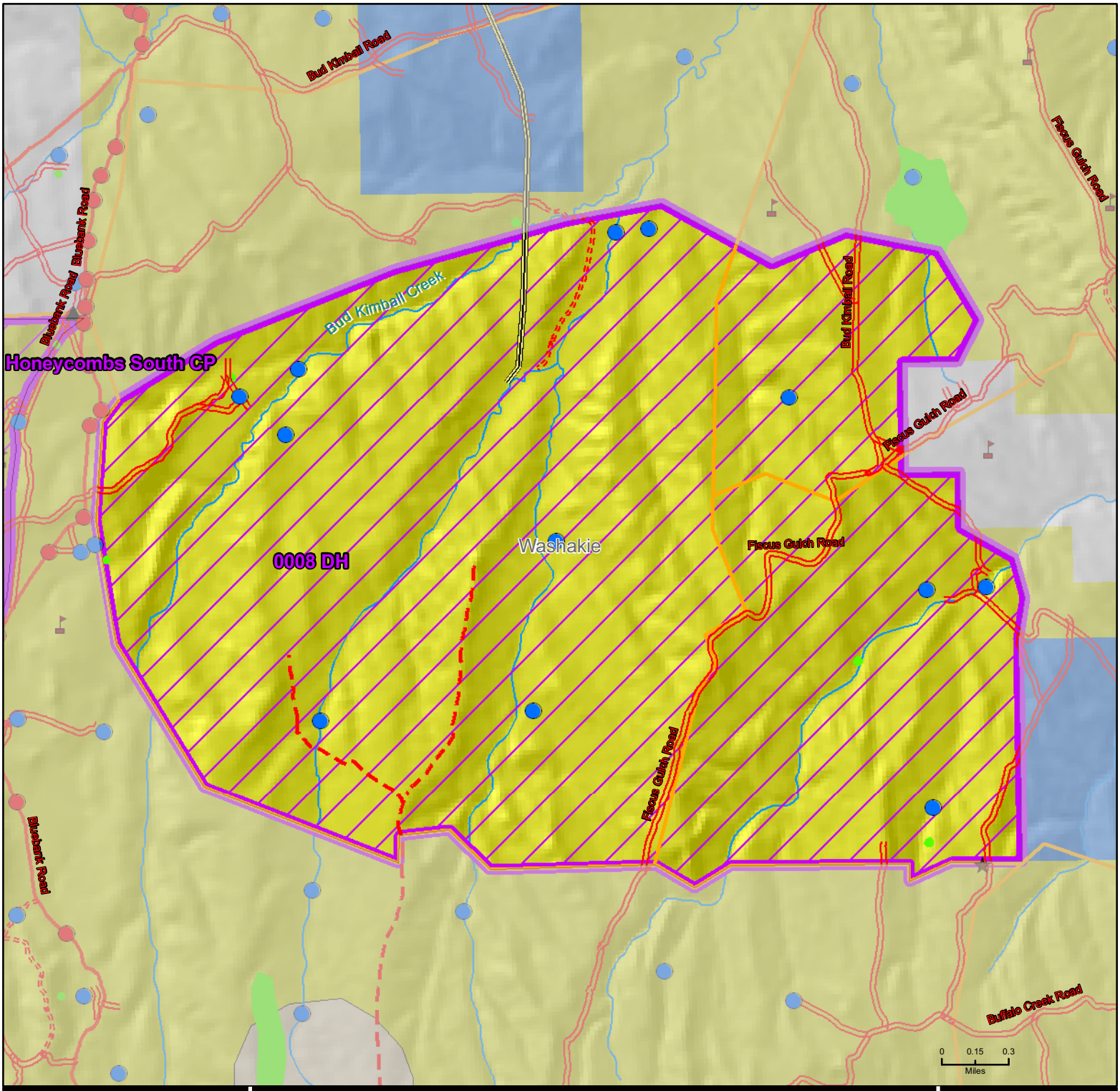
WASHAKIE COUNTY CONSERVATION DISTRICT

Dan Rice



Lands with Wilderness Charateristics

ERG Ecosystem Research Group www.ecosystemrg.com

0008 DH

N W E S

Acres: 6417

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 0008 DH **Acres:** 6,417

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/21/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear

Miles of roads (See the road definition that is stated in Process Paper): 2.27 miles of unknown roads, 7.27 miles of two-track trail, and 0.77 miles of ATV trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 258.58 acres of roaded natural and 6,158.09 acres of semi-primitive motorized in BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.80 acres noxious weeds, 0.97 acres non-native species.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Contains 0.69 miles of water pipeline, 12 reservoirs, and 9.06 miles of fence.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "1.5 roads." (Chet Wheeless, BLM, 7/7/2009). "Blue Ridge Road not too far away to west, plus spike in visitor use during hunting season may compromise solitude." (Paul Rau, BLM, 7/16/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM Manual 6300-1-Wilderness Inventory. This area contains roads, motorized ROS, noxious weeds and non-native plants, and the presence of multiple range improvement structures. There are 2,195 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures which eliminates the opportunity to redraw boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: 0008 DH

DATE: November 5, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

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HOT SPRINGS CONSERVATION DISTRICT

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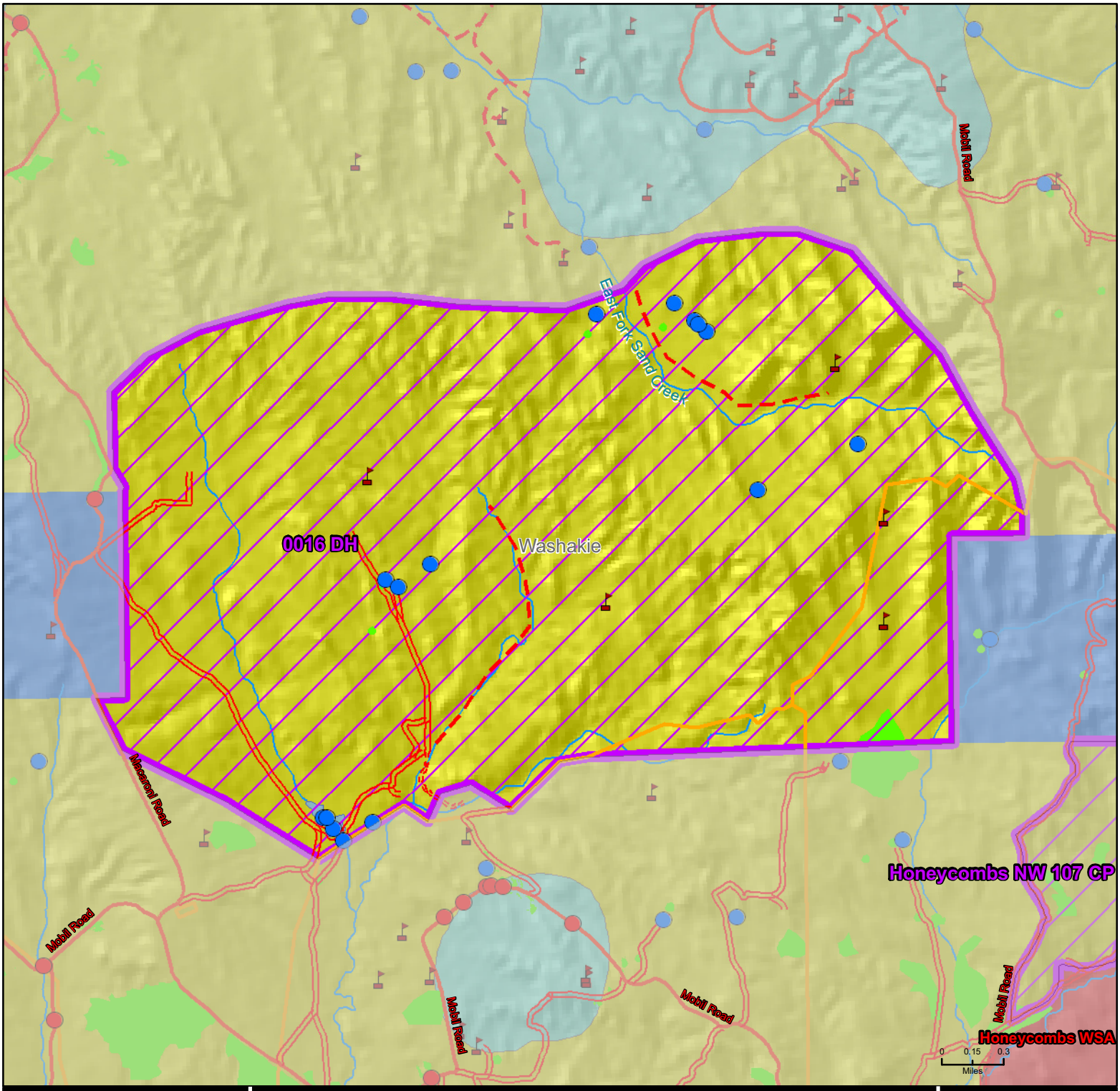

Lands with Wilderness Charateristics

0016 DH

Acres: 6186

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 0016 DH **Acres:** 6,186

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear

Miles of roads (See the road definition that is stated in Process Paper): 4.69 miles of two-track trail, 0.29 miles of ATV trail, 0.04 miles of graded dirt road, and 2.57 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 485.05 acres of roaded natural and 5,700.90 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Five oil and gas wells, boundary is 1/10 mile from existing oil and gas field to the north and 0.3 miles from oil and gas field to the south.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.80 acres noxious weeds, 15.18 acres of non-native plants.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 4.38 miles of fence and 13 reservoirs. Area is within GIS data gap.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Roads as shown are still very active. Plus I believe there is a new one to a drill pad as shown in pink. Not sure." (Chet Wheeless, BLM, 7/7/2010).

Aaron Anderson, Washakie County Commissioner documented and photographed seven roads within wilderness polygon 0016 DH that were not contained within the BLM's transportation dataset, January 2011.

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. This area contains roads, motorized ROS, presence of oil and gas wells, proximity to existing oil and gas fields, range improvement structures, and presence of noxious weeds and non-native plants. There are 2,731 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of oil and gas wells, range improvement structures, and a dissection by roads and fences that prevents the opportunity to redraw the boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: 0016 DH

DATE: November 5, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

JOHN LUMLEY (DID MAKE UP SESSION)

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

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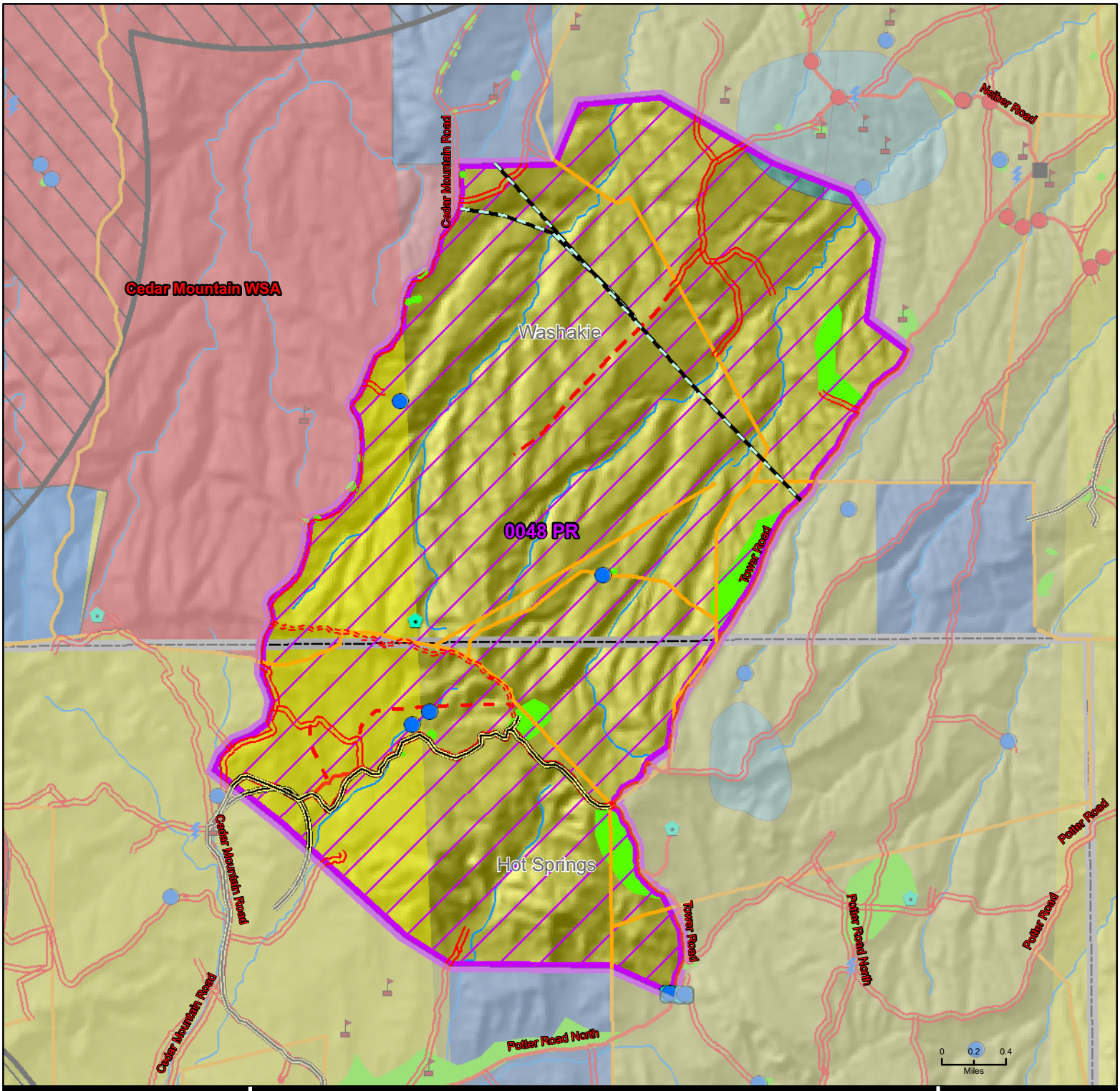

Lands with Wilderness Charateristics

0048 PR

Acres: 8771

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 0048 PR **Acres:** 8,771

State: Wyoming **County:** Hot Springs and Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 11.36 miles of two-track trail, 1.9 miles of ATV trail, 1.39 miles of graded dirt road, and 2.8 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 385.96 acres of roaded natural and 8,385.42 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Boundary overlaps into existing oil and gas field, 2.84 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 1.51 acres noxious weeds, 229.73 acres of non-native plants.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Five reservoirs, 12.62 miles of fence, one guzzler, and 3.98 miles of pipeline.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Has roads, livestock, water pipelines with troughs, and tanks. Petroleum pipeline. Looks empty but has "stuff"." (Chet Wheeless, BLM, 7/7/2009). "Roads are visible from western boundary, impairs untrammeled value." (Aaron Kania, BLM, 7/27/2009). "The roads may impair naturalness, primitiveness, and solitude." (Paul Rau, BLM, 7/10/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. This area contains roads, motorized ROS, the boundary overlaps into existing oil and gas field, there are noxious weeds and non-native plants, oil and gas pipeline, and a presence of multiple range improvement structures. The area also contains 8,506 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures and is dissected by roads and fences which results in an inability to redraw the boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: 0048 PR

DATE: November 5, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

JOHN LUMLEY (DID MAKE UP SESSION)

HOT SPRINGS CONSERVATION DISTRICT

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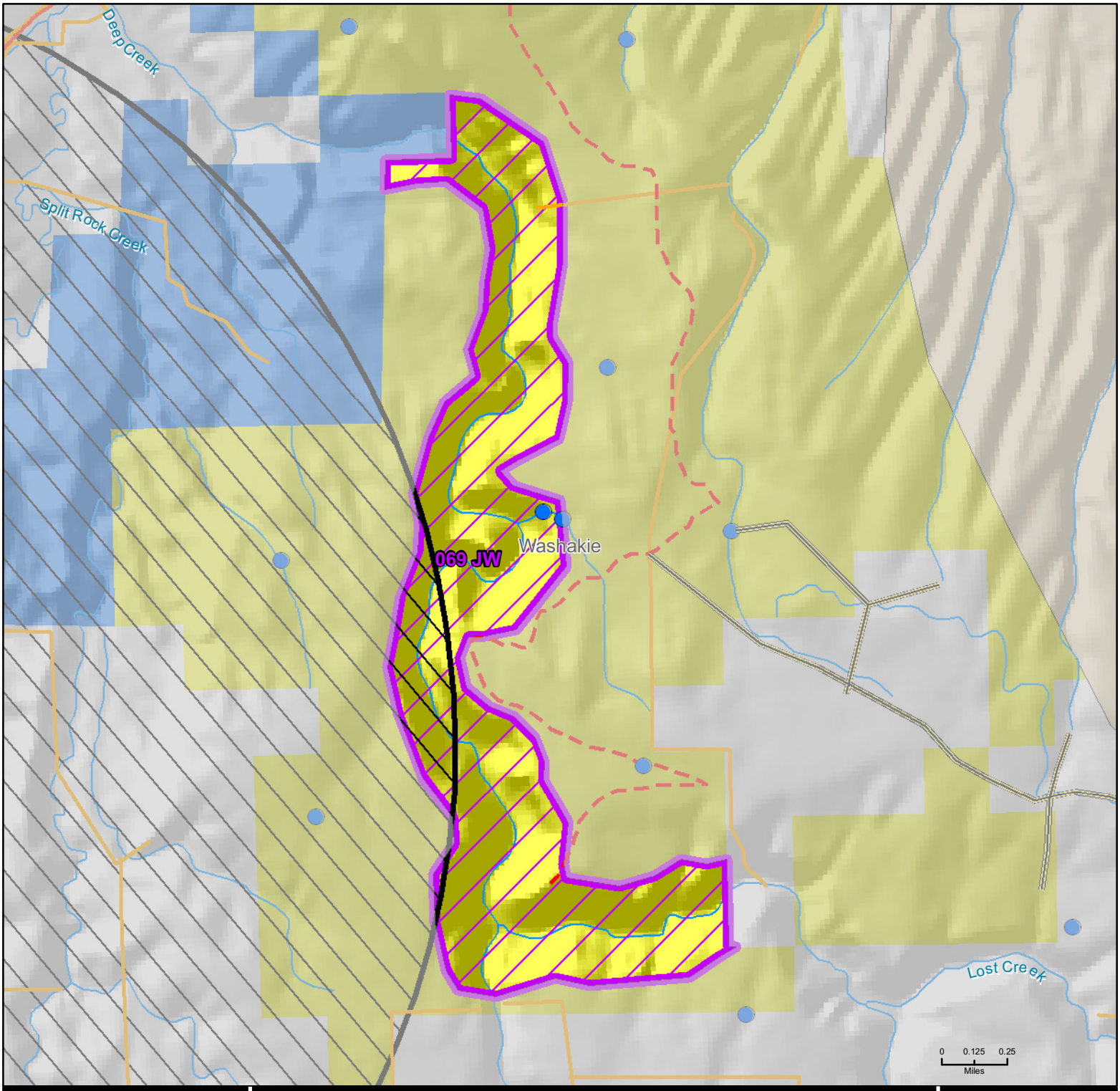

Lands with Wilderness Charateristics

069 JW

N W E S

Acres: 1056

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 069 JW **Acres:** 1,056

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear river canyon.

Miles of roads (See the road definition that is stated in Process Paper): 0.09 miles of unknown roads.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,056.11 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One reservoir and 0.1 miles of fence. Possible GIS data gap. Field verify for structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Not worth the effort to protect. It's totally invisible by itself. There will never be a road, mine, or any other disturbance so why bother designating it?" (Chet Wheeless, BLM, 7/7/2009). It is eligible and suitable for WSR designation (Paul Rau, BLM, 7/6/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is a linear river canyon insufficient in acreage with range improvement structures present, has a semi-primitive ROS designation, and is adjacent to a wildland urban interface. There are 1,056 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is no wilderness or wilderness study area adjacent to enhance wilderness characteristics, which confirms insufficient acreage to mange for wilderness characteristics.

AREA REVIEW POLYGON NAME: 069 JW

DATE: November 5, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

JOHN LOMLEY (DID MAKE UP SESSION)

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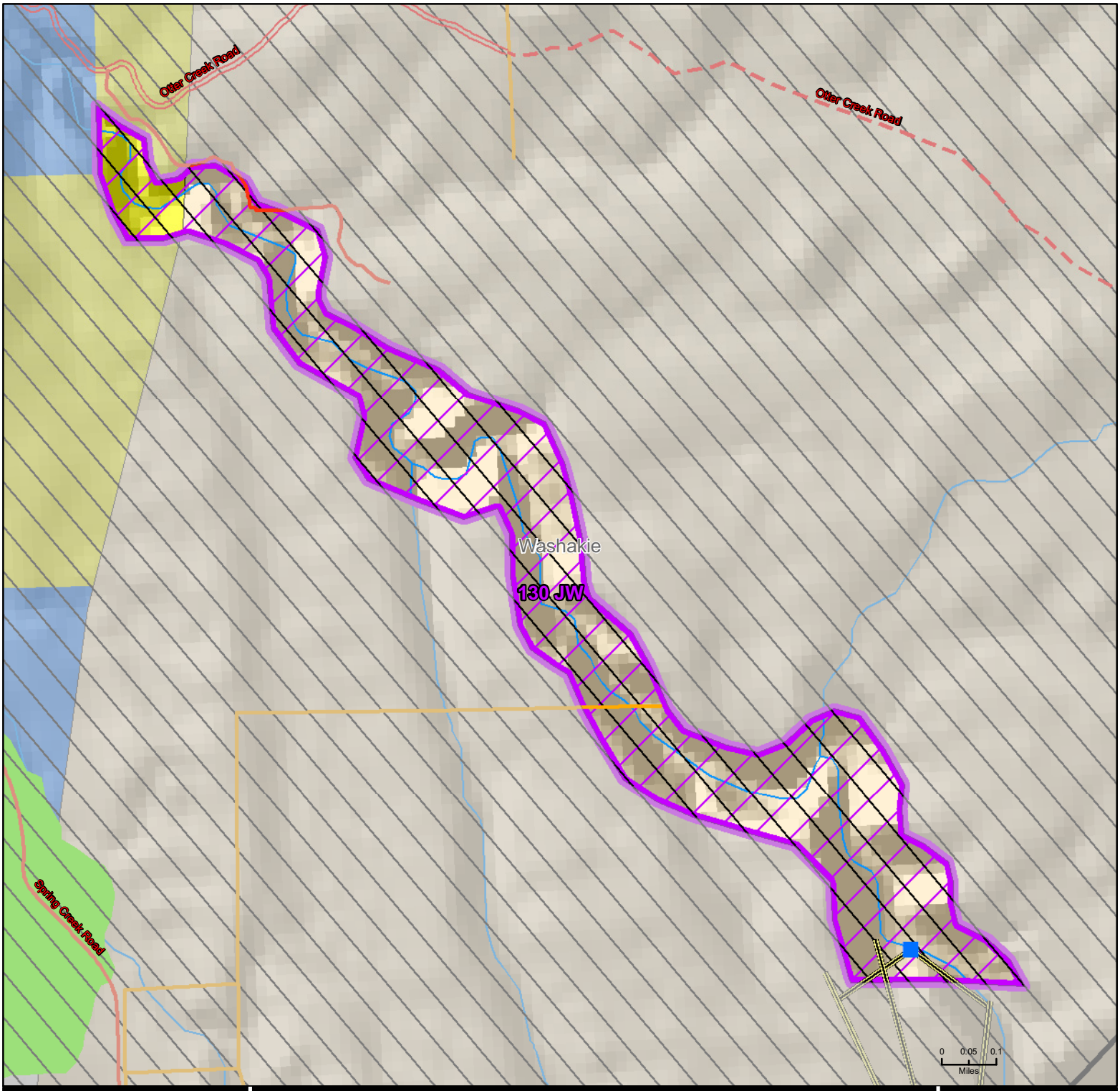

Lands with Wilderness Charateristics

130 JW

Acres: 248

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 130 JW **Acres:** 248

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear river canyon.

Miles of roads (See the road definition that is stated in Process Paper): 0.13 miles of road from Stakeholder review.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 247.88 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Majority of boundary is within an existing locatable/salable mineral area.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 0.15 miles of fence and 0.21 miles of water pipeline from Stakeholder review. Located within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Why would we bother? This canyon protects itself. Impossible to put a road up it or over it. This is silly." (Chet Wheeless, BLM, 7/13/2009). "Lacks size requirement." (Aaron Kania, BLM, 7/27/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is a linear river canyon with range improvement structures present, motorized ROS, and the boundary is almost entirely contained within an existing locatable/salable mineral area. There are 93 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. This area lacks the size criteria and is not adjacent to a wilderness or wilderness study area in which to enhance the wilderness characteristics.

AREA REVIEW POLYGON NAME: 130 JW

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

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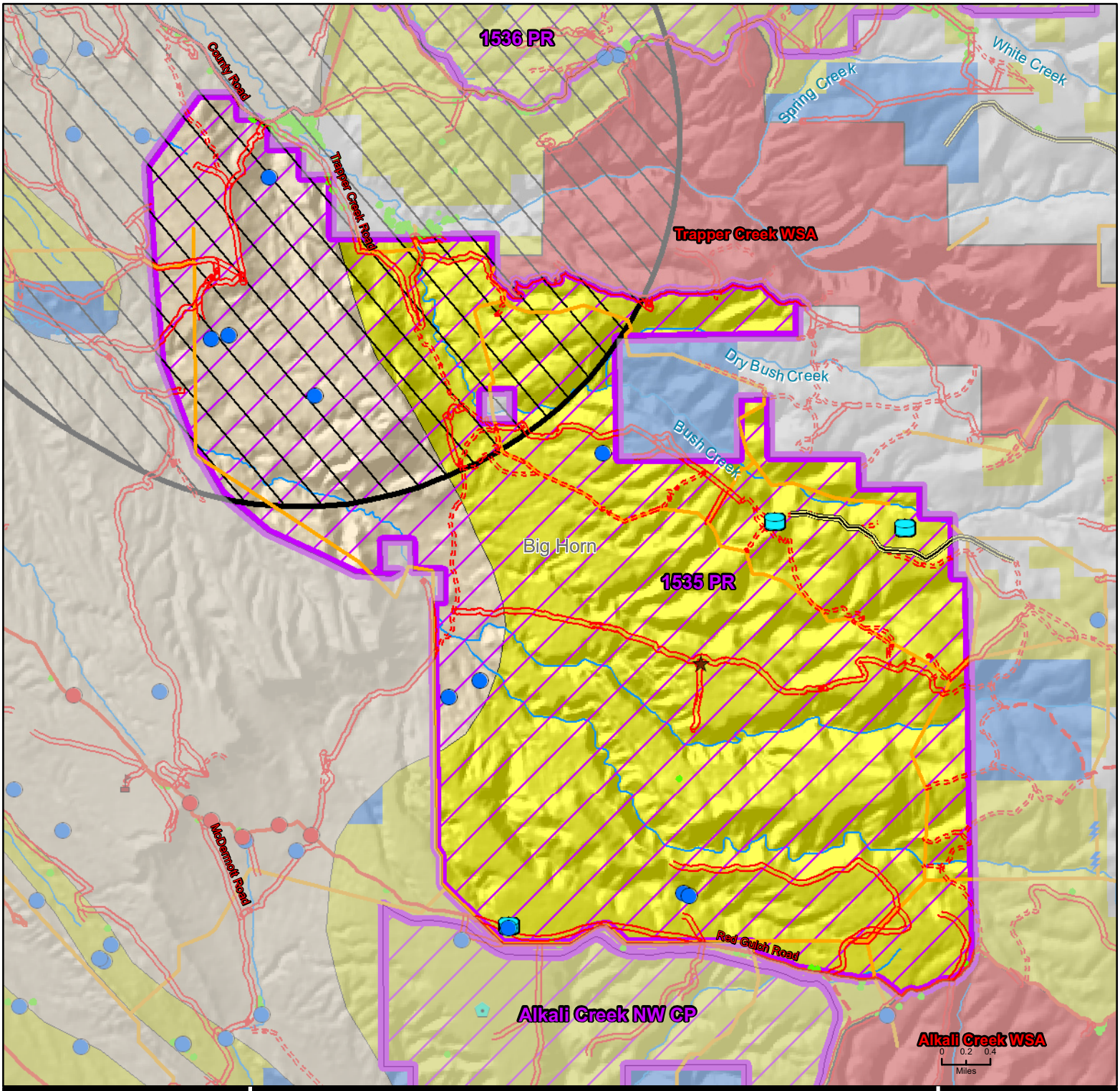
Dan Rice



Lands with Wilderness Charateristics

1535 PR

Acres: 17458

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 1535 PR **Acres:** 17,458

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 25.69 miles of two-track trail, 15.49 miles of ATV trail, 1.63 miles of graded dirt road, and 0.06 miles of paved road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 3,119.27 acres of roaded natural, 8.14 acres of rural, 3,467.18 acres of semi-primitive motorized, and 10.61 acres of semi-primitive non-motorized in the BLM ROS data. According to Chet Wheeless at the BLM it is a popular four-wheel area.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Boundary overlaps into existing locatable/salable mineral area.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 1.09 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 1.51 miles of pipeline, six reservoirs, one elk study/cattle exclosure, and 24.09 miles of fence. Possible GIS data gap, field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Has roads used for hunting. A major WG&F/BLM elk/cattle exclosure. Popular 4 wheel area." (Chet Wheeless, BLM, 7/7/2009). "Numerous 2 tracks are evident from S. Trapper road. Roads contrast with sage brush." (Aaron Kania, BLM, 7/27/2009). "Roads and visitor use may compromise naturalness and solitude." (Paul Rau, BLM, 7/16/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area overlaps with an existing locatable/salable mineral area, is adjacent to a wildland urban interface, contains range improvement structures and noxious weeds, motorized ROS, and has a multitude of roads dissecting it. There are 17,424 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. This area is within a GIS data gap for range improvement structures and should be field verified. This area is adjacent to the Trapper Creek Wilderness Study area but the attributes detracting from wilderness characteristics override the adjacency to the wilderness study area, therefore it does not enhance wilderness characteristics.

AREA REVIEW POLYGON NAME: 1535 PR

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

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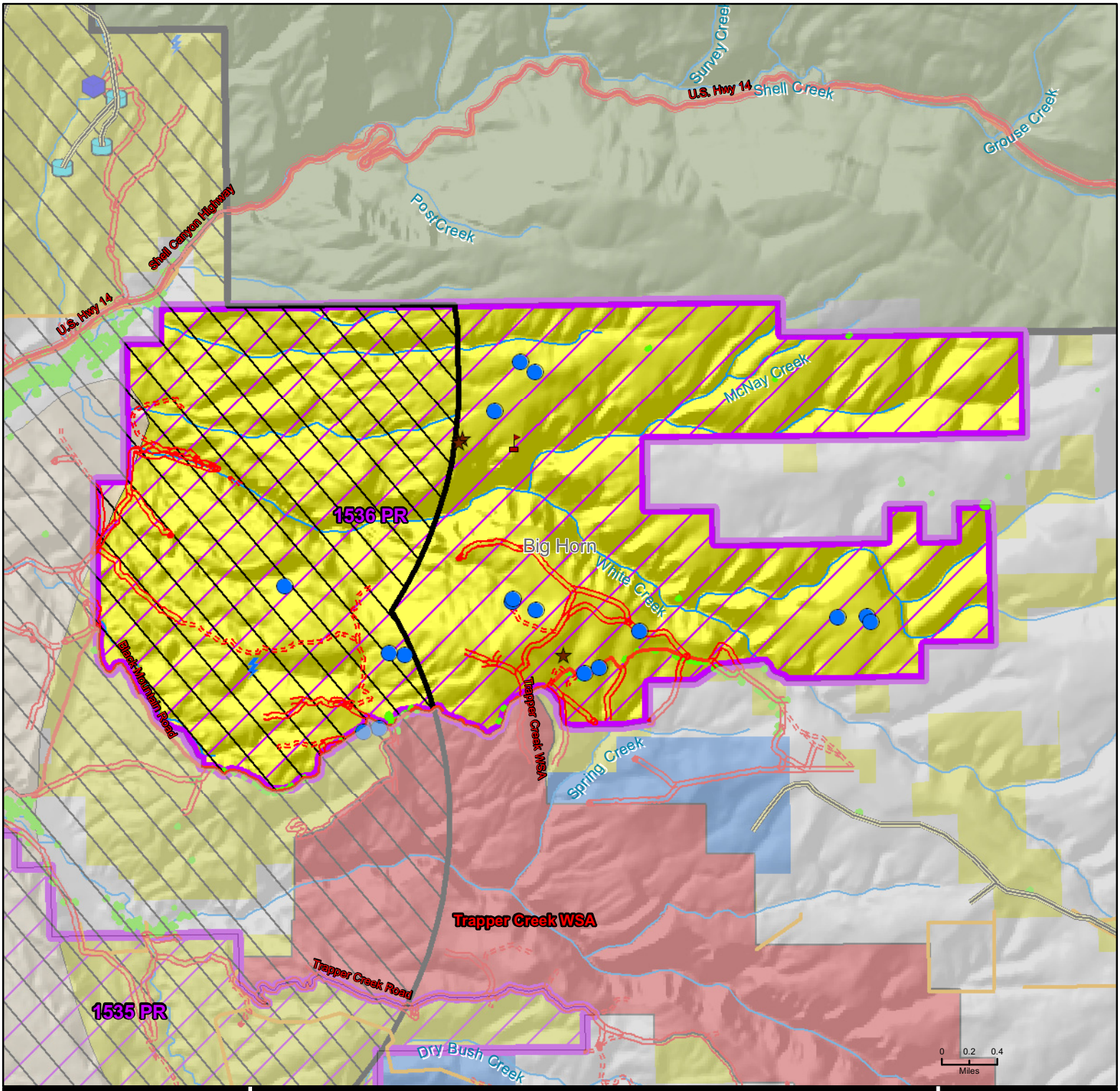

Lands with Wilderness Charateristics

1536 PR

Acres: 10685

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 1536 PR **Acres:** 10,685

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 11.53 miles of two-track trail, 4.59 miles of ATV, and 3.16 miles of gravel road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,478.72 acres of roaded natural, 5.74 acres of rural, 3,467.18 acres of semi-primitive motorized, 5,734.23 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Boundary overlaps into existing locatable/salable mineral area. One oil or gas well present.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 7.23 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One water well, three exclosures, and 15 reservoirs. Within area of possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Need to redraw east boundary. Those roads are important." (Chet Wheeless, BLM, 7/7/2009). "Road on Horse Mountain accesses Sheep Camp with trailer." (Aaron Kania, BLM, 7/27/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. There is a presence of an oil and gas well, roads, range improvement structures, motorized ROS, and noxious weeds. There are 9,897 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is adjacent to a wildland urban interface and overlaps into an existing locatable/salable mineral area. It is within a GIS data gap for range improvement structures and should be field verified. This area is adjacent to the Trapper Creek Wilderness Study Area but this would not contribute to wilderness characteristics in this case due to the amount of factors that detract from wilderness characteristics.

AREA REVIEW POLYGON NAME: 1536 PR

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

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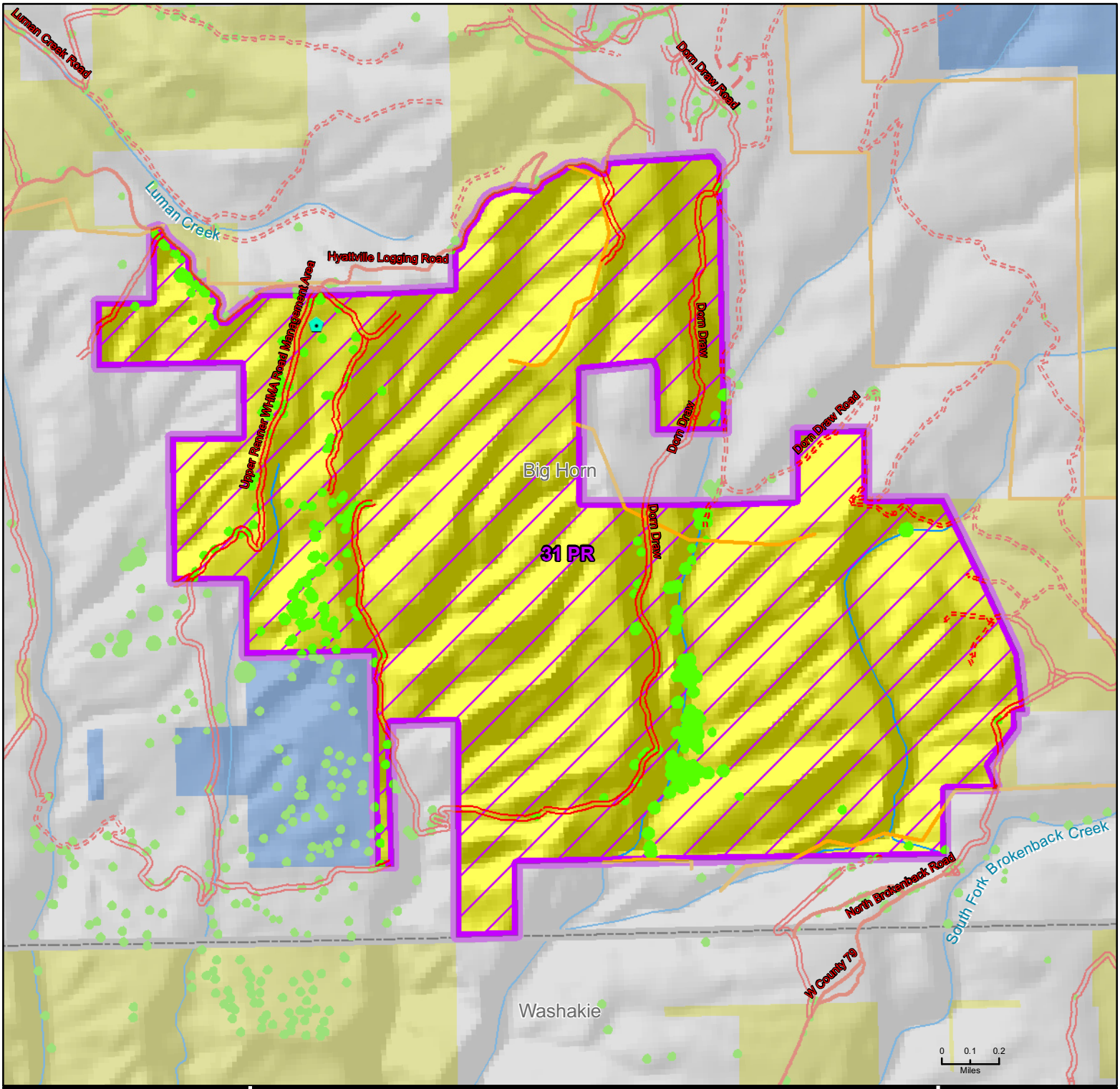

Lands with Wilderness Charateristics

31 PR

Acres: 2972

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 31 PR **Acres:** 2,972

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage.

Miles of roads (See the road definition that is stated in Process Paper): 6.76 miles of two-track trail, 1.69 miles of ATV trail, and 0.62 miles of graded dirt road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 268.53 acres of roaded natural and 2,703.33 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 48.43 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One guzzler and 2.57 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Roads as outlined still get traffic. Other roads have been put to bed after timber cuts. Are we planning to never cut timber here again?" (Chet Wheeless, BLM, 7/13/2009). "Lacks size criteria. High use year round." (Aaron Kania, BLM, 7/27/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. This area contains roads, motorized ROS, noxious weeds, and insufficient acreage. There are 2,981 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. This area is not adjacent to a wilderness or wilderness study area to enhance wilderness characteristics.

AREA REVIEW POLYGON NAME: 31 PR

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

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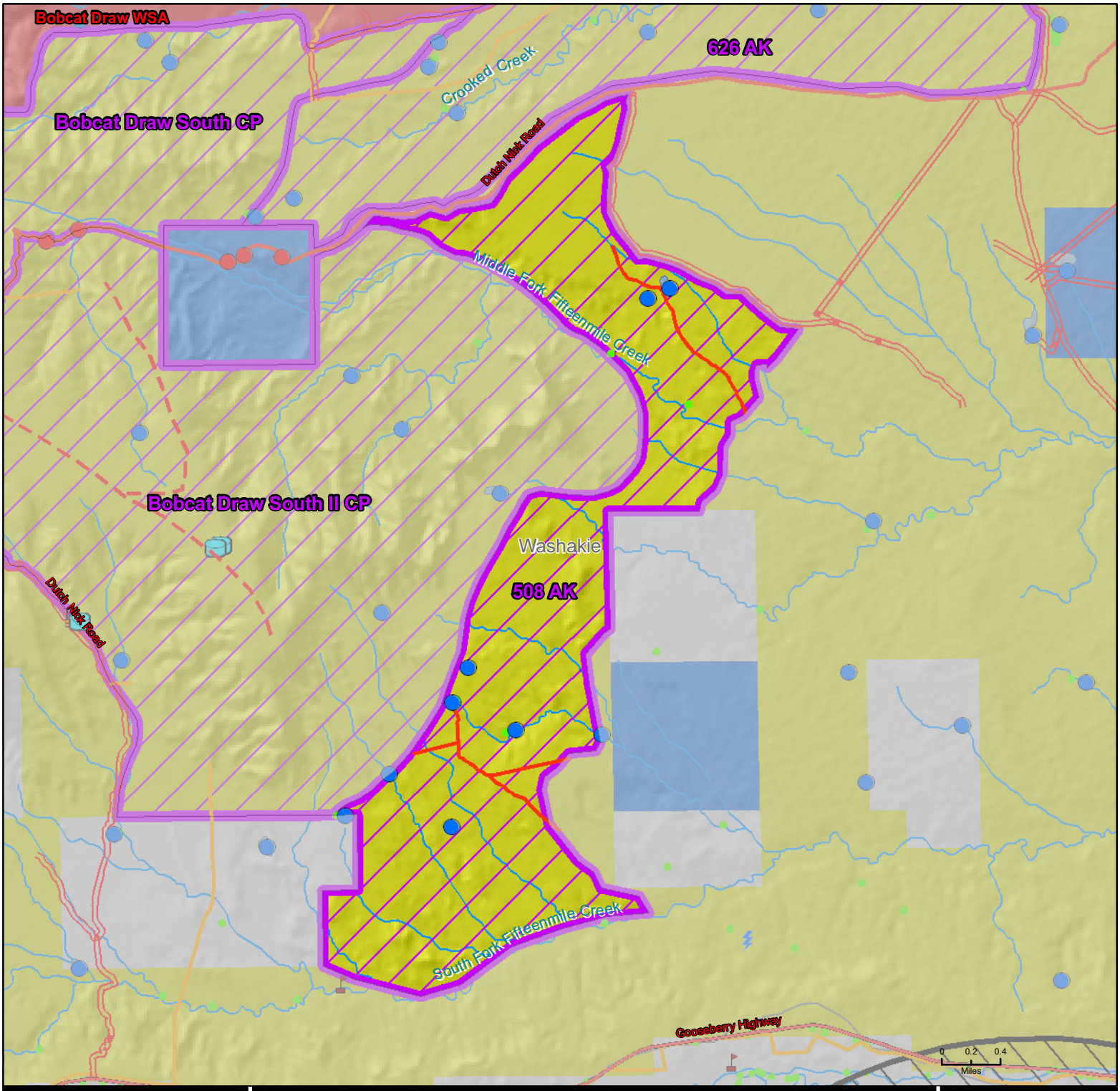

Lands with Wilderness Charateristics

508 AK

Acres: 4035

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 508 AK **Acres:** 4,035

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear shape.

Miles of roads (See the road definition that is stated in Process Paper): 0

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 4,034.57 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.82 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Six reservoirs. Within area of possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Another gerry-mandered mess to no good end. No wilderness allure here. Too many roads, old and new, around it." (Chet Wheeless, BLM, 7/13/2010).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is a linear feature that is insufficient in acreage and contains reservoirs, and a motorized ROS designation. There are 4,035 acres of Category Improve for the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. This area is within the GIS data gap for range improvement structures and should be field verified for structures to further confirm the lack of wilderness characteristics. If field verification returns no structures, it would be possible to merge this area with adjacent lands to capture wilderness characteristics. According to GIS data, it is a roadless area.

AREA REVIEW POLYGON NAME: 508 AK

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

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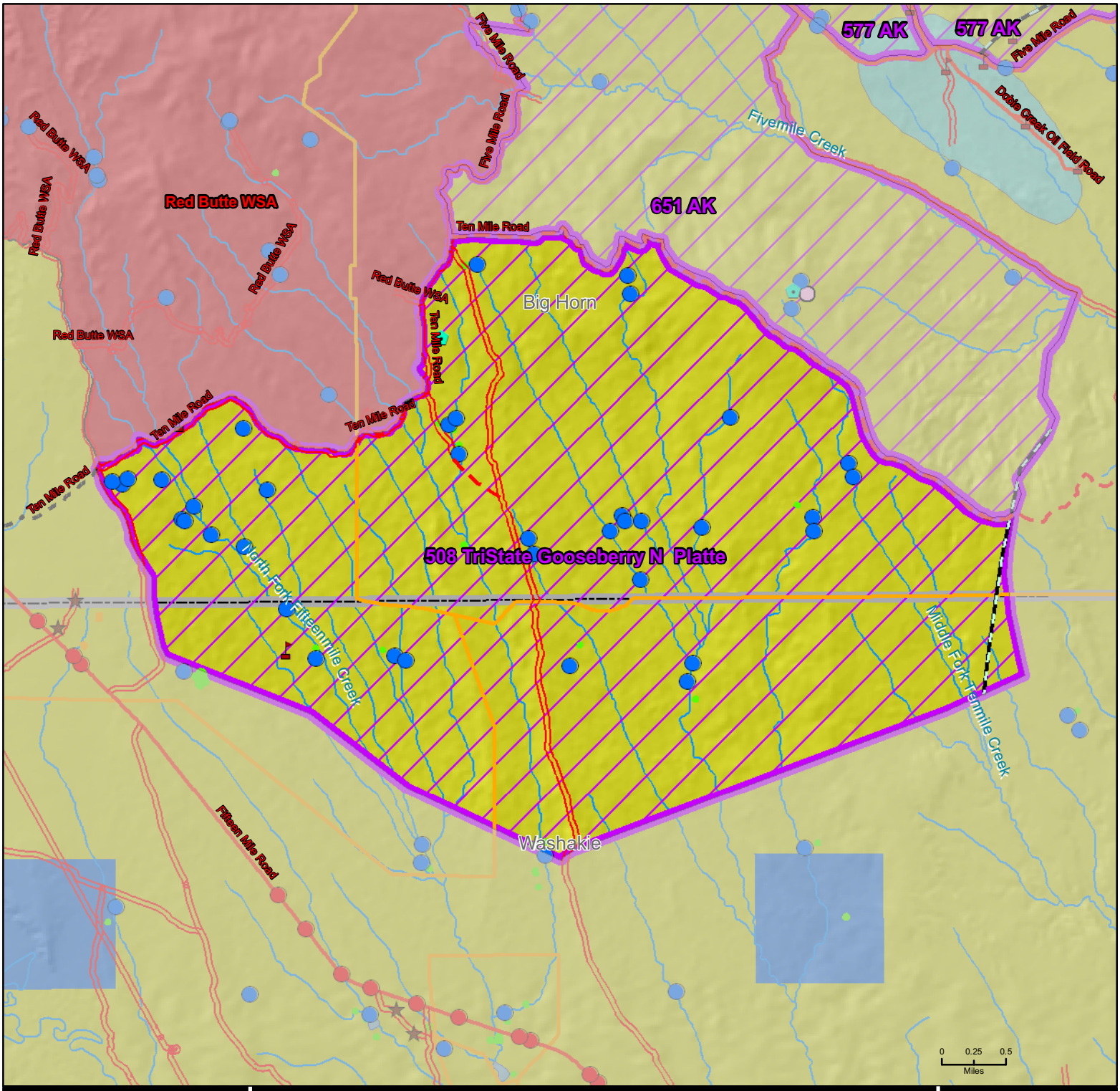

Lands with Wilderness Charateristics

508 TriState Gooseberry N Platte

Acres: 13464

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
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- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 508 Tri-State Gooseberry N Platte **Acres:** 13,464

State: Wyoming **County:** Big Horn and Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear

Miles of roads (See the road definition that is stated in Process Paper): 10.73 miles of two-track trail, 0.13 miles of reclaimed road, and 0.5 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 13,439.06 acres of semi-primitive motorized and 24.52 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: One oil or gas well. 1.37 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 2.10 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 35 reservoirs, extensive terracing around reservoirs, 8.18 miles of fence, and one guzzler. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Has well traveled road through the middle. One guzzler." (Chet Wheeless, BLM, 7/7/2009). "Area east of 2 track marked in blue meets criteria." (Aaron Kania, BLM, 7/27/2009). "Road may compromise naturalness and solitude." (Paul Rau, BLM, 7/16/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. There is presence of an oil and gas well, oil and gas pipeline, roads, motorized ROS, noxious weeds, extensive terracing around reservoirs, and range improvement structures. There are 6,894 acres of category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures so the opportunity to redraw the boundary to capture wilderness characteristics does not exist.

AREA REVIEW POLYGON NAME: 508 Tri-State Gooseberry N. Platte

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

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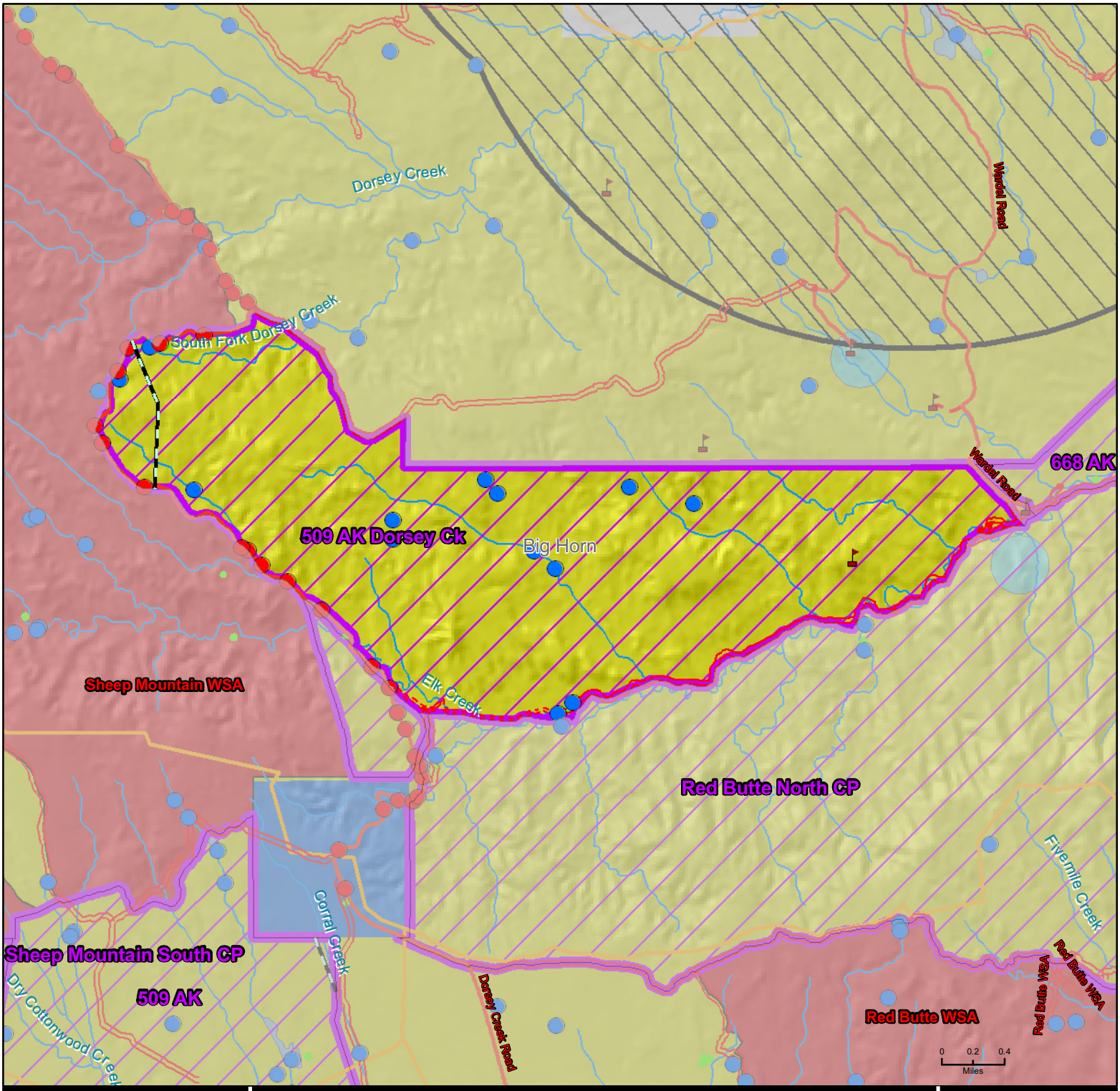

Lands with Wilderness Charateristics

509 AK Dorsey Ck

Acres: 4578

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 509 AK Dorsey Ck **Acres:** 4,578

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear in shape.

Miles of roads (See the road definition that is stated in Process Paper): 3.5 miles of two-track trail, 1.3 miles of ATV trail, and 1.67 miles of graded dirt road. Multiple culverts along boundary.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,480.34 acres of roaded natural, 3,096.86 of semi-primitive motorized, and 0.39 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: One oil and gas well. 0.99 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.30 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Thirteen reservoirs. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. Multiple culverts lie along the boundary, it is insufficient is size, contains motorized ROS designations and reservoirs, there is the presence of noxious weeds, oil and gas pipeline, and an oil and gas well. There are 4,578 acres of Category Improve on the range allotments that detract from the naturalness of this area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. The area lies within a GIS data gap for range improvement structures and should be field verified. The boundary adjacent to the Sheep Mountain Wilderness Study Area would not enhance wilderness characteristics in this case due to the multiple culverts on the road between the two boundaries. There is no opportunity to redraw the boundary to capture wilderness characteristics due to insufficient acreage and an even distribution of structures.

AREA REVIEW POLYGON NAME: 509 AK Dorsey Ck

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

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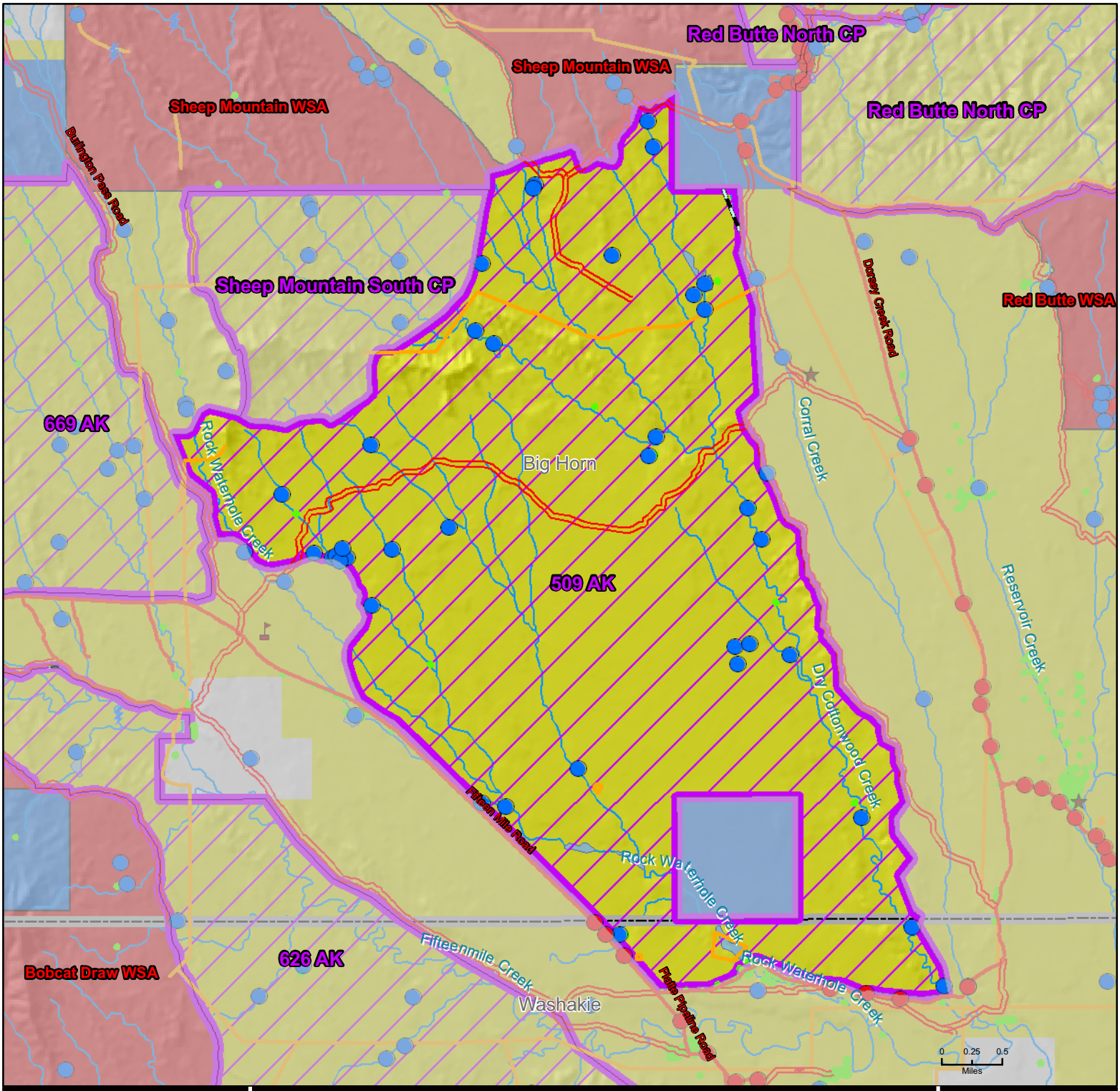

Lands with Wilderness Charateristics

509 AK

Acres: 13873

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 509 AK **Acres:** 13,873

State: Wyoming **County:** Big Horn and Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/22/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 6.94 miles of two-track trail. Multiple culverts along boundary.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,810.56 acres of roaded natural, 12,062.41 acres of semi-primitive motorized, and 0.24 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: 0.37 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 2.60 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 35 reservoirs, extensive terracing around reservoirs, and 5.1 miles of fence. Within area of possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. There is a presence of roads, reservoirs and extensive terracing around them, motorized ROS, oil and gas pipeline, multiple culverts along the boundary, and noxious weeds. There are 6,894 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It lies within a GIS data gap for range improvement structures and these should be field verified. The even distribution of structures does not present the opportunity to redraw the boundary to capture wilderness characteristics. It is adjacent to the Sheep Mountain Wilderness Study Area, but due to the amount of unnatural structures, this does not enhance wilderness characteristics.

AREA REVIEW POLYGON NAME: 509 AK

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

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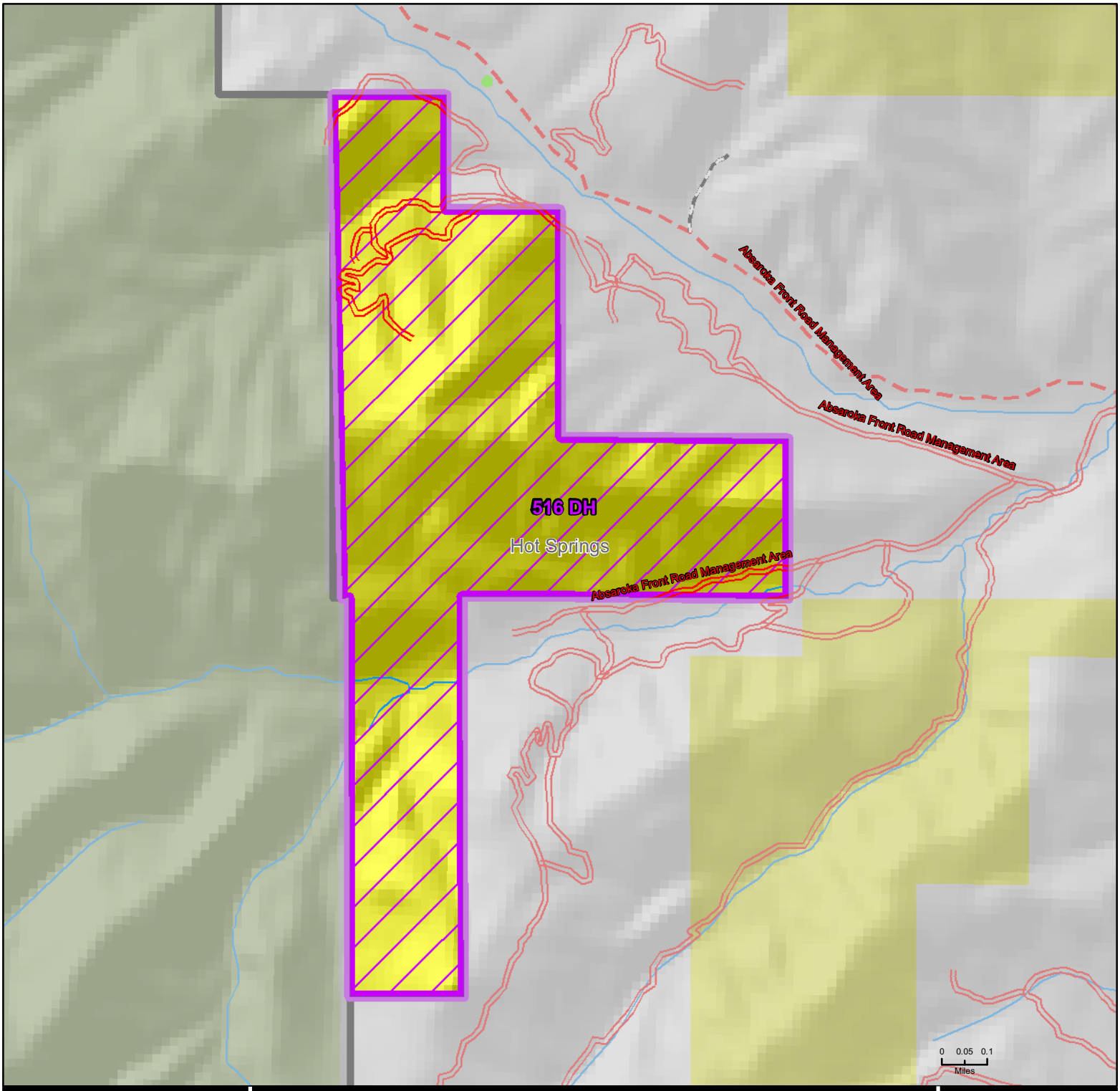

Lands with Wilderness Charateristics

516 DH

Acres: 553

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 516 DH **Acres:** 553

State: Wyoming **County:** Hot Springs

Evaluator: John Sanford, Larry Blocker **Date:** 09/24/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear.

Miles of roads (See the road definition that is stated in Process Paper): 1.62 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 552.72 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It has insufficient acreage, shape, and contains motorized ROS designations. There are 553 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is not adjacent to wilderness or wilderness study area to enhance wilderness characteristics. It is within an area of GIS data gap for range improvement structures and should be field verified.

AREA REVIEW POLYGON NAME: 516 DH

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

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SOUTH BIG HORN CONSERVATION DISTRICT

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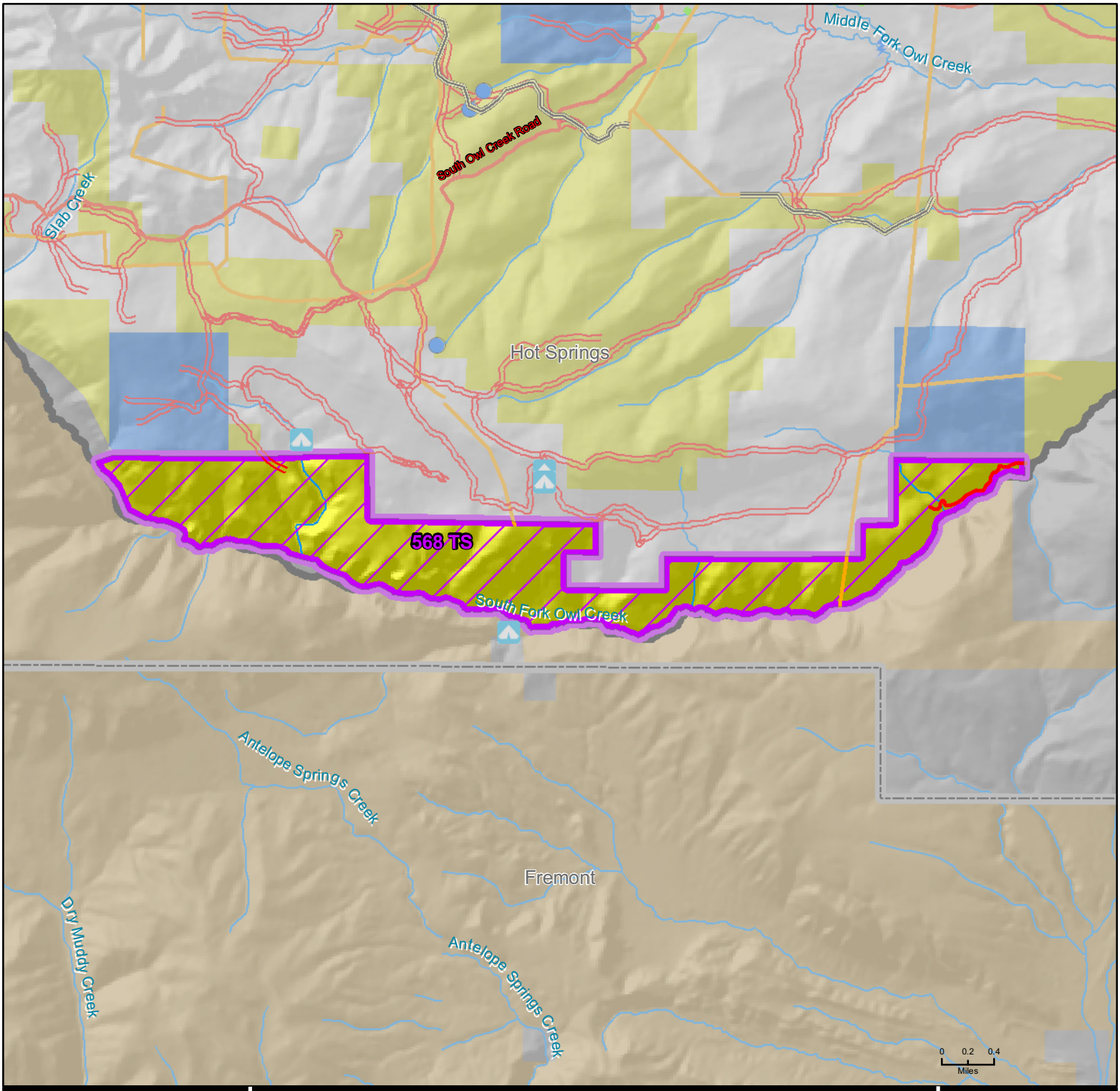

Lands with Wilderness Charateristics

568 TS

Acres: 2491

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 568 TS **Acres:** 2,491

State: Wyoming **County:** Hot Springs

Evaluator: John Sanford, Larry Blocker **Date:** 09/24/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear shape.

Miles of roads (See the road definition that is stated in Process Paper): 0.21 miles of two-track trail and 0.95 miles of constructed road from Stakeholder review.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 2,490.54 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 0.42 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Area less than 5,000 acres." (Aaron Kania, BLM, 7/27/2009)

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. There are 2,092 acres of Category Improve on the range allotments that detract from the naturalness of the area. The entire area contains motorized ROS designations. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within a gap in GIS data for range improvement structures and should be field verified. The area is not adjacent to wilderness or wilderness study area therefore not enhancing wilderness characteristics.

AREA REVIEW POLYGON NAME: 568 TS

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

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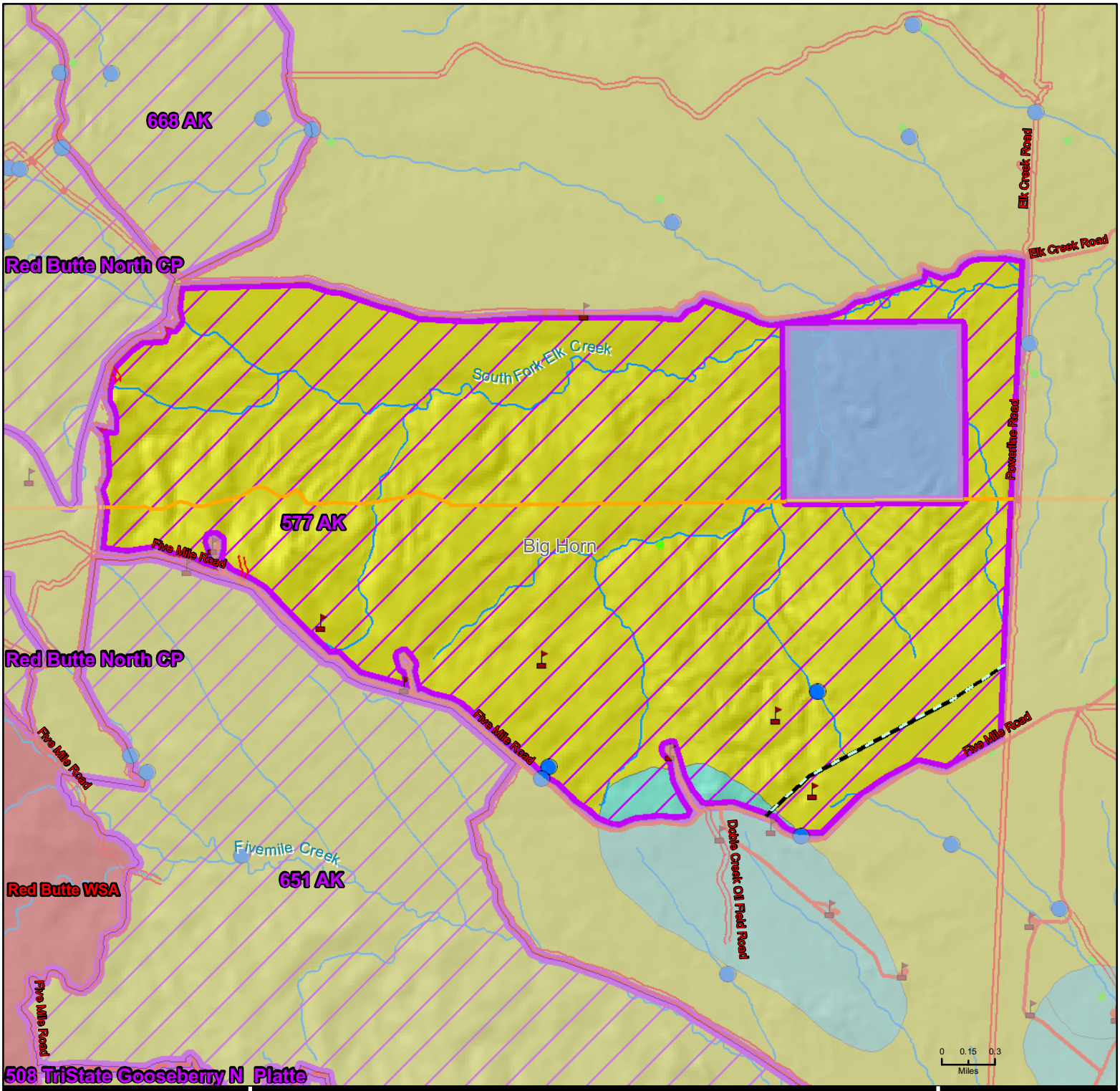

Lands with Wilderness Charateristics

577 AK

Acres: 7107

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
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- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
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- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 577 AK **Acres:** 7,107

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/24/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 0.2 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,404.09 acres of roaded natural and 5,703.17 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Boundary overlaps into an existing oil and gas field, 1.62 miles of oil and gas pipeline, and five oil and gas wells present.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.2 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Two reservoirs and 4.26 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The boundary overlaps into existing oil and gas field, contains motorized ROS designations, oil and gas pipeline, and has five oil and gas wells within its border. There are 3,057 acres of Category Improve that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is a clustered distribution of oil and gas wells so the opportunity to redraw the boundary to capture wilderness characteristics does exist.

AREA REVIEW POLYGON NAME: 577 AK

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

PARK COUNTY COMMISSIONERS

Tim A. French

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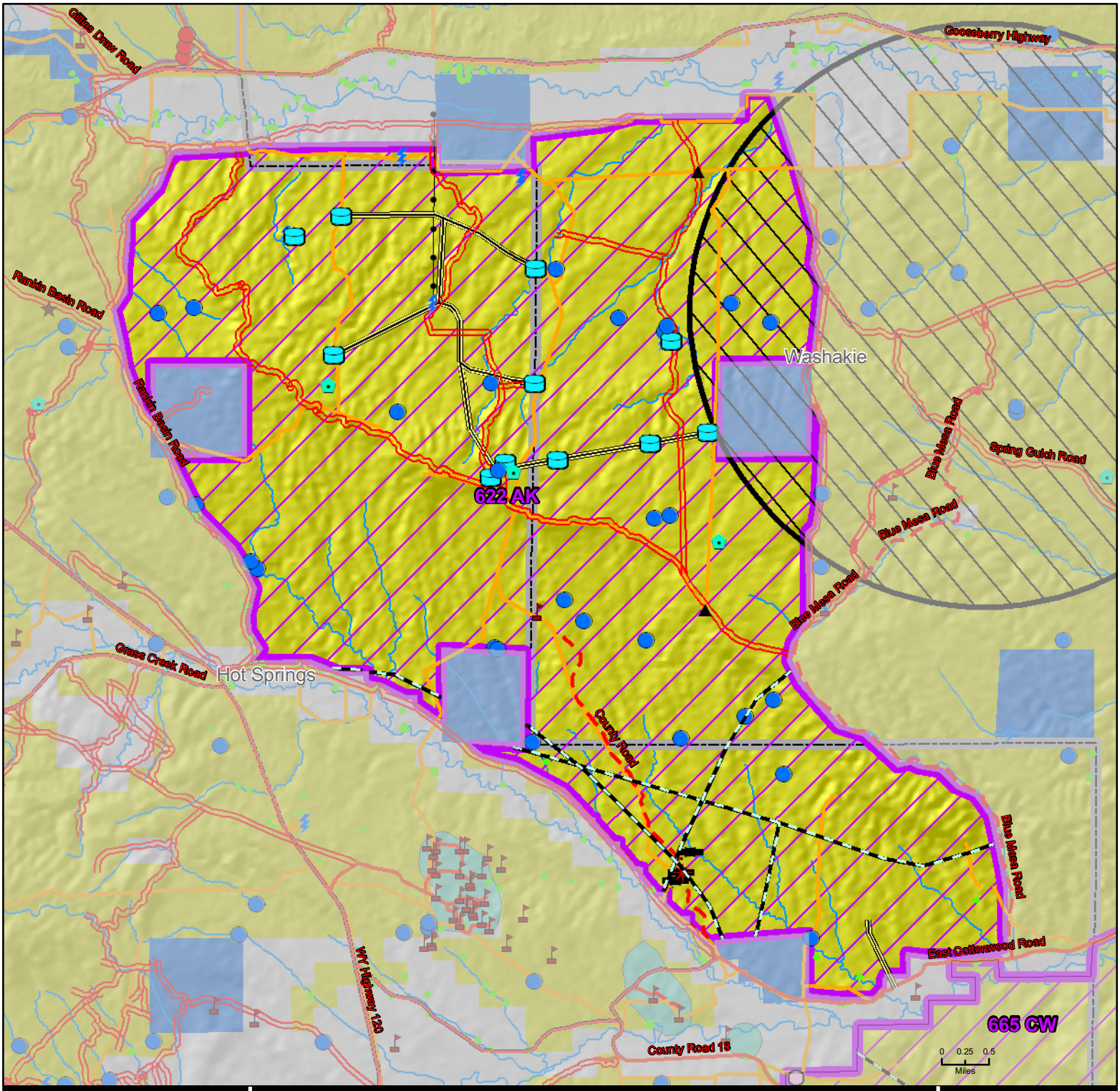
Clara Mae Yetter

WASHAKIE COUNTY CONSERVATION DISTRICT

Dan Rice



Lands with Wilderness Charateristics

622 AK

Acres: 29690

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 622 AK **Acres:** 29,690

State: Wyoming **County:** Washakie and Hot Springs

Evaluator: John Sanford, Larry Blocker **Date:** 09/24/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 3.92 miles of unknown roads. A three road intersection found during field inspection that is not in BLM GIS data.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 897.21 acres of rural and 28,793.14 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Boundary is within 0.5 miles of three existing oil and gas fields. One oil or gas well present. Unvegetated pipeline ROW with signs found during field inspection. 13.55 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 2.0 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 0.61 miles of water pipeline, two water wells, three guzzlers, 33.12 miles of fence, and 24 reservoirs. Lies on the border of possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Roaded approximately as shown. Two guzzlers. Numerous fences." (Chet Wheeless, BLM, 2009). "MILLIE may be good candidate for more field review." (Aaron Kania, BLM, 7/30/2009). "The roads may compromise characteristics." (Paul Rau, BLM, 7/16/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The roads, motorized ROS, adjacency to a wildland urban interface, proximity to existing oil and gas fields, one oil and gas well within its borders, oil and gas pipeline present, and the range improvement structures all detract from wilderness characteristics. There are 26,007 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. An even distribution of structures does not present the opportunity to redraw border to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: 622 AK

DATE: January 11, 2011

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

PARK COUNTY COMMISSIONERS

Dave Burke — DID NOT PARTICIPATE

Tim A. French

Jill Shockley Siggins

MEETEETSE CONSERVATION DISTRICT

Clara Mae Yetter

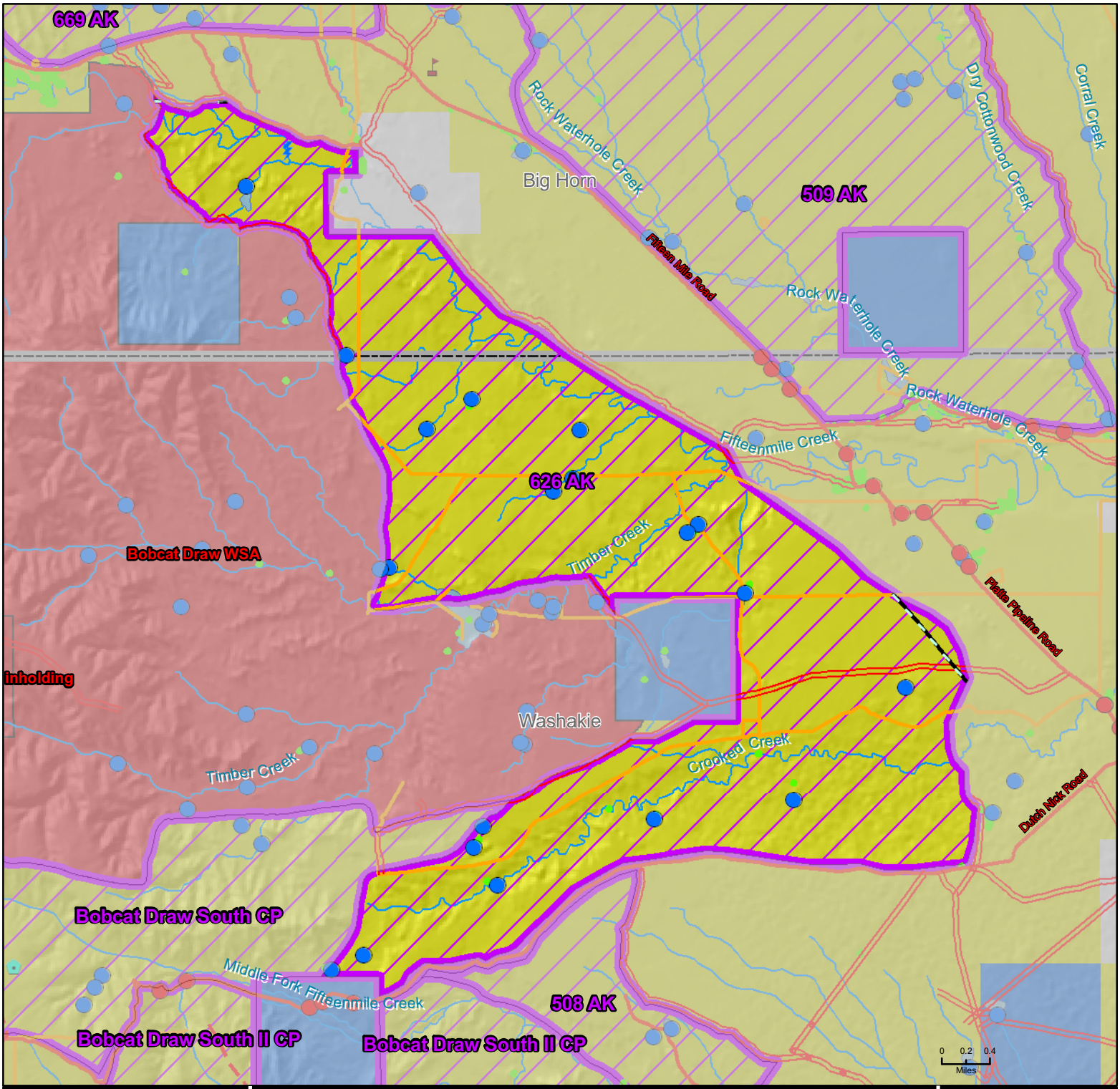
WASHAKIE COUNTY COMMISSIONERS

Aaron Anderson

Terry Wolf

WASHAKIE COUNTY CONSERVATION DISTRICT

Dan Rice



Lands with Wilderness Charateristics

626 AK

Acres: 10280

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 626 AK **Acres:** 10,280

State: Wyoming **County:** Big Horn and Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/24/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, but linear shape.

Miles of roads (See the road definition that is stated in Process Paper): 3.89 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 165.37 acres of roaded natural, 10,114.13 acres of semi-primitive motorized, and 0.56 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: 1.10 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 2.2 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Eighteen reservoirs and 15.98 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area contains motorized ROS designations, reservoirs, and an oil and gas pipeline. There are 10,244 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. Field verification of range improvement structures and the single road dissecting the middle of the area is needed. This area is adjacent to the Bobcat Draw Wilderness Study Area which does not enhance the wilderness characteristics in this case due to the structures found.

AREA REVIEW POLYGON NAME: 626 AK

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

PARK COUNTY COMMISSIONERS

Tim A. French

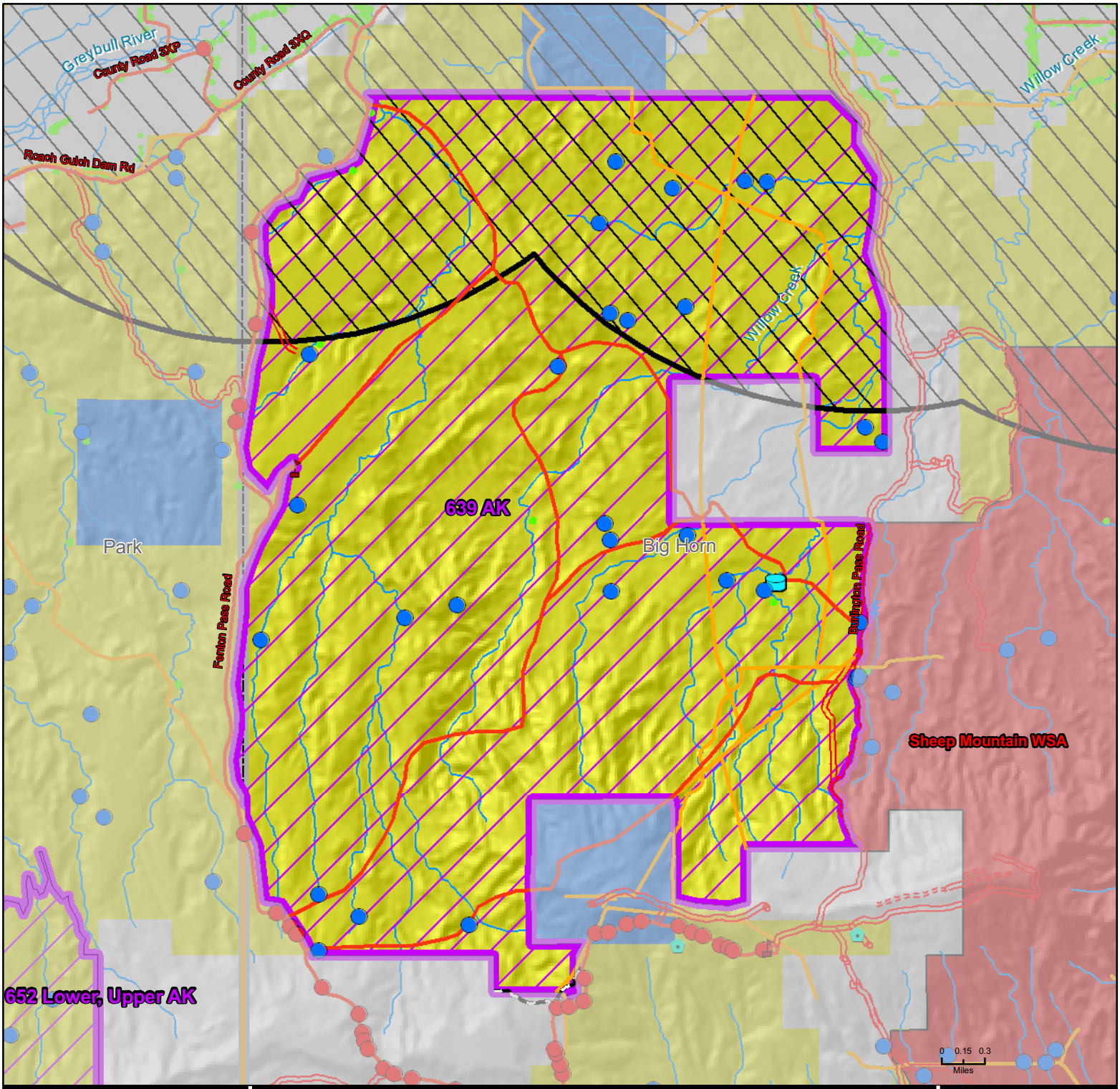
Jill Shockley Siggins

MEETEETSE CONSERVATION DISTRICT

Clara Mae Yetter

WASHAKIE COUNTY CONSERVATION DISTRICT

Dan Rice



Lands with Wilderness Charateristics

639 AK

Acres: 13921

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 639 AK **Acres:** 13,921

State: Wyoming **County:** Big Horn and Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 1.98 miles of two-track trail, 0.25 miles of abandoned road, and 0.01 miles of graded dirt road. 16.65 miles of constructed roads from Stakeholder review. Multiple culverts lie along the perimeter of the area.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 13,920.45 acres of semi-primitive motorized and 0.17 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: One oil or gas well.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 1.26 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 6.24 miles of fence, 5.77 miles of fence from Stakeholder review, and 24 reservoirs, 2 additional reservoirs from BLM Allotment maps, 1 additional reservoir and 1 additional stock tank from Stakeholder review. Within area of possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented insufficient disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is adjacent to a wildland urban interface, contains an oil and gas well that is located on the western border, motorized ROS, contains reservoirs, and has noxious weed infestations. There are 12,553 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. If no structures are found based on field verification, there is an opportunity to redraw the boundary to capture wilderness characteristics excluding the current features listed. The area is adjacent to the Sheep Mountain Wilderness Study Area, which could enhance wilderness characteristics pending field verification.

AREA REVIEW POLYGON NAME: 639 AK

DATE: November 12, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

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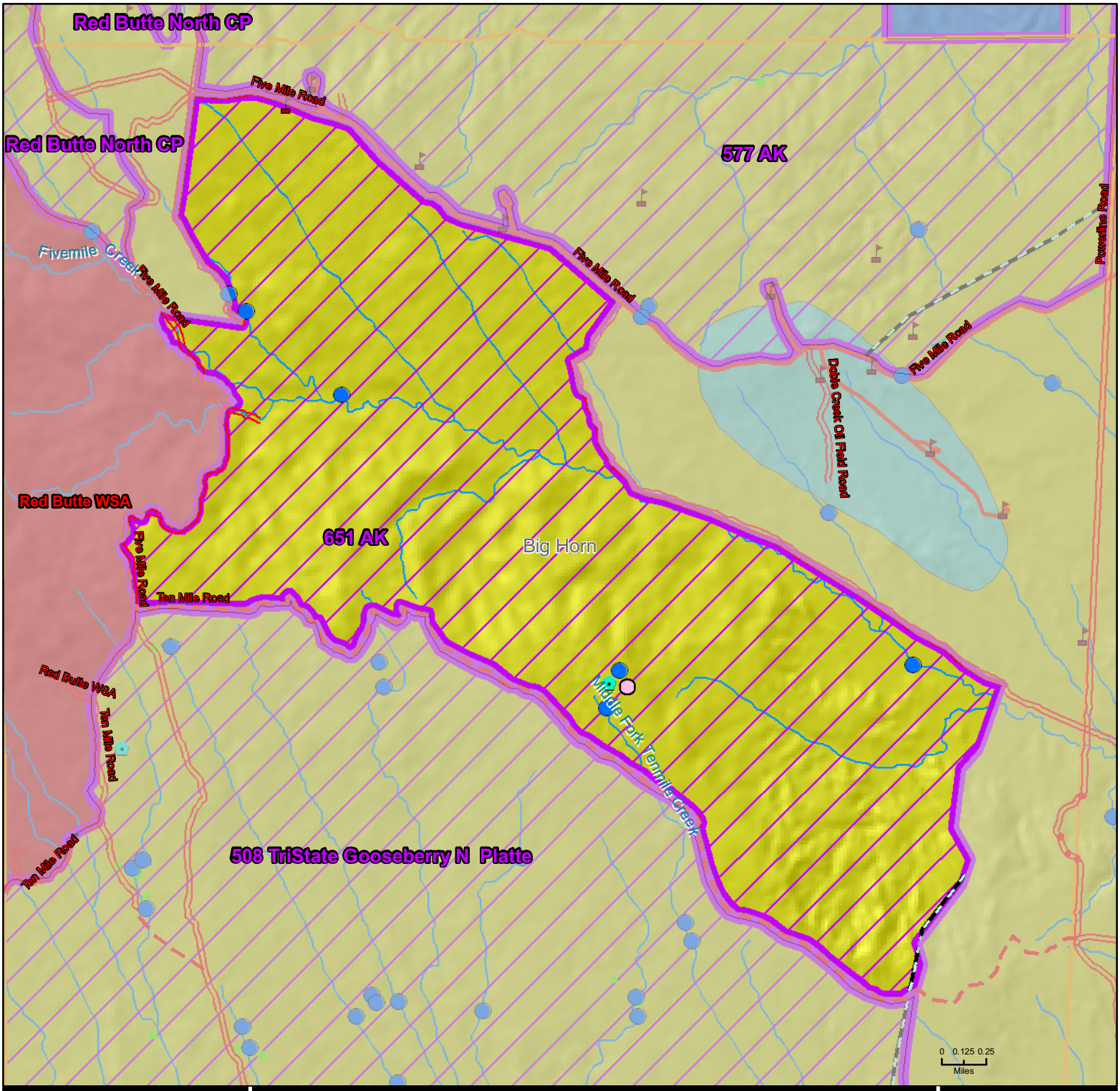


Lands with Wilderness Charateristics

651 AK

Acres: 6410

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 651 AK **Acres:** 6,410

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 1.62 miles of two-track trail. Roads only parallel boundary. None dissecting the area.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,297.06 acres of roaded natural, 5,105.48 acres of semi-primitive motorized, and 7.59 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: 0.69 miles of oil and gas pipeline. One oil and gas well.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One guzzler, one structure/building, and five reservoirs. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☒ **Yes** ☐ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "There is a natural gas pipeline in SE corner which should be revisited further based on maintenance needs. Pipeline route is rehabilitated." (Aaron Kania, BLM, 7/30/2009).

Is the area in natural condition?

☒Yes ☐No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented minimal significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The roads are paralleling the boundary and are not dissecting the area. It is in motorized ROS designations, and contains an oil and gas pipeline and range improvement structures. This area does not contain any Category Improve on the range allotments. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. The area is adjacent to the Red Butte Wilderness Study Area which may enhance the wilderness characteristics. The boundary should be redrawn to exclude observed structures that lie along the border to fully capture the wilderness characteristics.

AREA REVIEW POLYGON NAME: 651 AK

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

PARK COUNTY COMMISSIONERS

Tim A. French

Jill Shockley Siggins

MEETEETSE CONSERVATION DISTRICT

Clara Mae Yetter

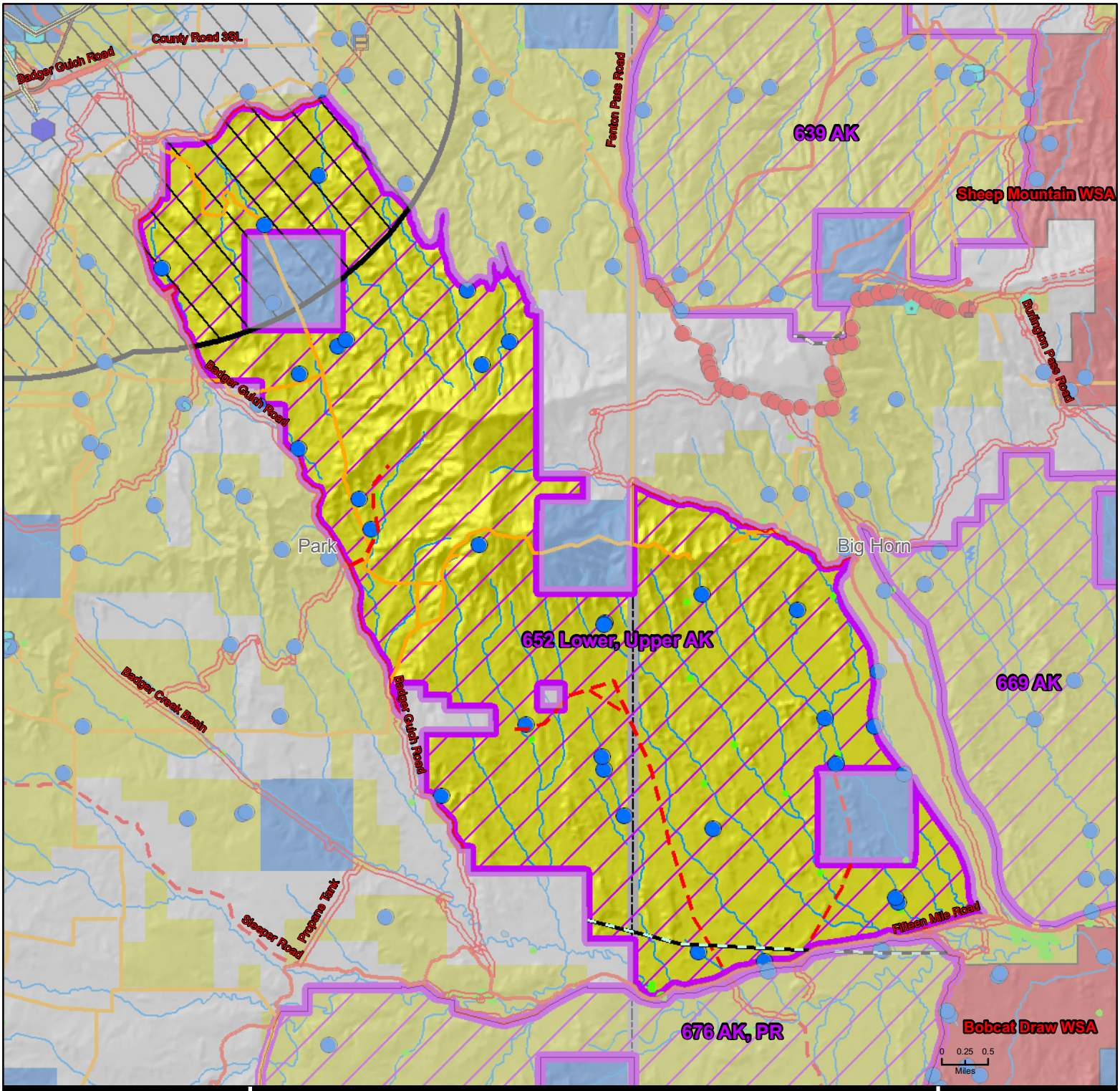
WASHAKIE COUNTY COMMISSIONERS

Aaron Anderson

Terry Wolf

WASHAKIE COUNTY CONSERVATION DISTRICT

Dan Rice



Lands with Wilderness Charateristics

652 Lower, Upper AK

Acres: 21153

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 652 Lower, Upper AK **Acres:** 21,153

State: Wyoming **County:** Big Horn and Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 0.03 miles of two-track trail and 7.19 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,186.54 acres of roaded natural, 34.3 acres of rural, and 19,931.74 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: 2.42 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 7.47 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 10.4 miles of fence and 29 reservoirs. Within possible GIS Data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Southern Tatman may not have wilderness character because of chucker hunters who frequent. Plus the area may be compromised due to development on Tatman. West and northwest Tatman/Beaver Slide area I feel definitely does." (Paul Rau, BLM, 7/18/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is adjacent to a wildland urban interface, contains roads and fences, an oil and gas pipeline, motorized ROS, reservoirs, and noxious weeds. There are 21,153 acres of Category Improve that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. The opportunity to redraw boundary to capture wilderness characteristics exists, pending field verification.

AREA REVIEW POLYGON NAME: 652 Lower, Upper AK

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

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HOT SPRINGS CONSERVATION DISTRICT

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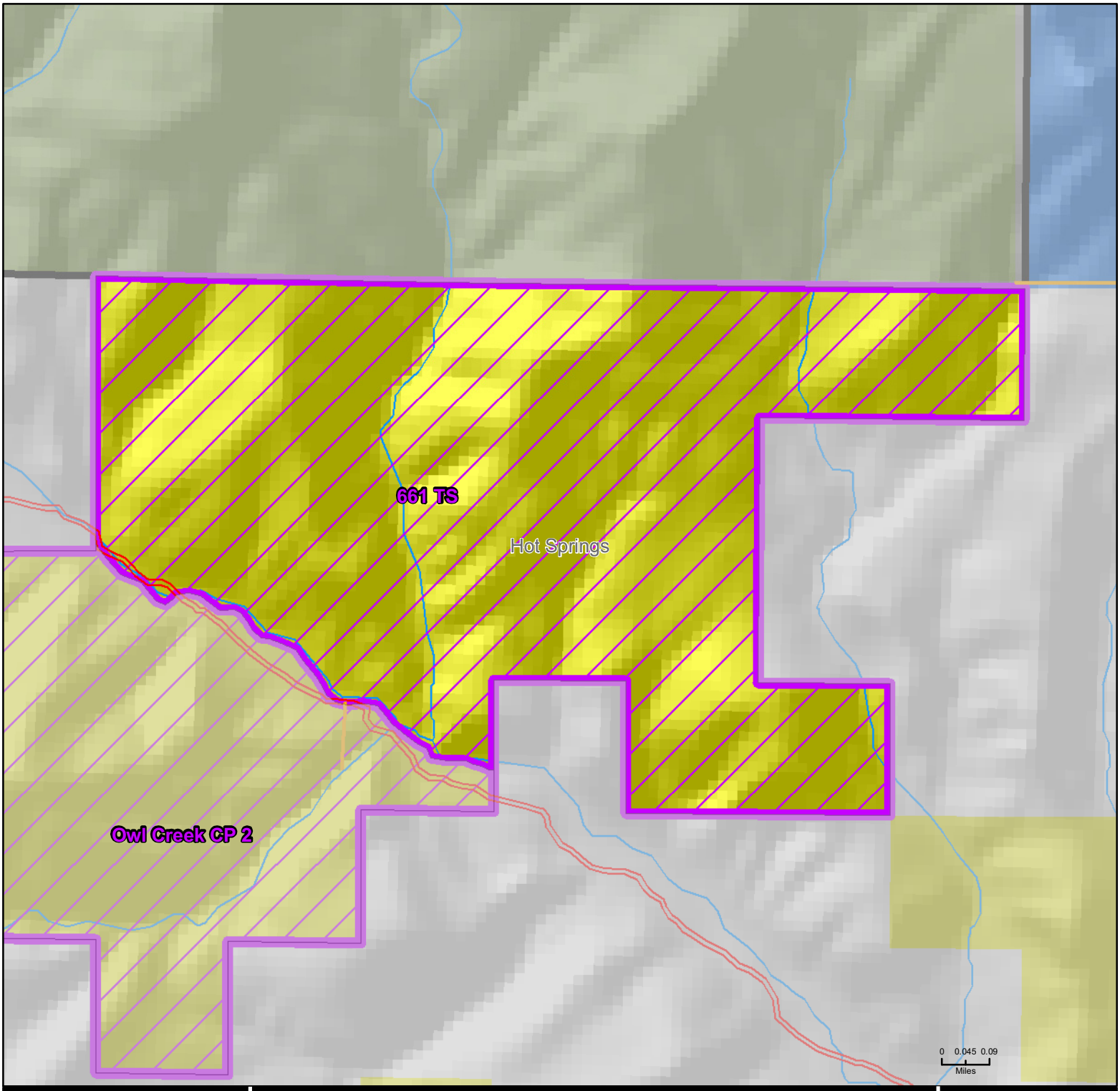

Lands with Wilderness Charateristics

661 TS

Acres: 743

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 661 TS **Acres:** 743

State: Wyoming **County:** Hot Springs

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage.

Miles of roads (See the road definition that is stated in Process Paper): 0.25 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 742.99 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities, or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area contains motorized ROS designations. There are 743 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. This area is within the GIS data gap for range improvement structures and should be field verified. It is insufficient in acreage to manage for wilderness characteristics and is not adjacent to wilderness or a wilderness study area to enhance wilderness characteristics.

AREA REVIEW POLYGON NAME: 661 TS

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

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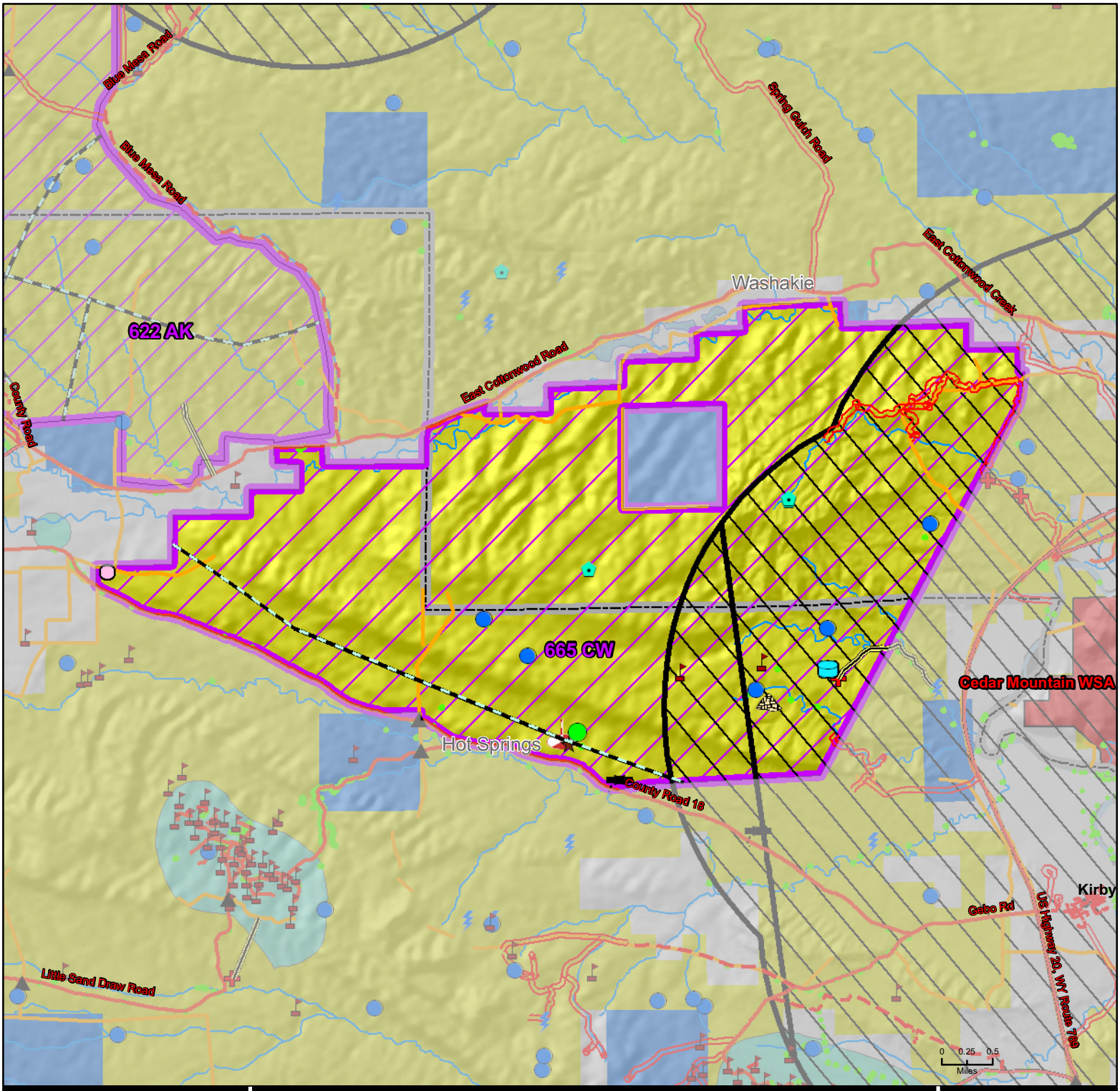

Lands with Wilderness Charateristics

665 CW

Acres: 15688

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 665 CW **Acres:** 15,688

State: Wyoming **County:** Hot Springs and Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 4.83 miles of two-track trail and 3.46 miles of gravel road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 3,417.89 acres of roaded natural and 12,269.75 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Two oil and gas wells. Exposed pipeline found during field inspection. 5.58 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 2.67 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Cheatgrass and prickly pear cactus found during field inspection.

Range Improvement structures: 10.0 miles of fence, 0.63 miles of pipeline, one water storage trough, five reservoirs, two guzzlers, one storage facility/silo structure (aerial photo interpreted), one exclosure (field verified), one spring development (Terry Wilson, 11/4/2010), one stock tank (Terry Wilson, 11/4/2010), one rock quarry (Terry Wilson, 11/4/2010), and one cattle guard on perimeter of area.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains a multitude of range improvement structures, roads, oil and gas wells and an oil and gas pipeline, motorized ROS, noxious weeds and is adjacent to a wildland urban interface. There are 8,321 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures therefore resulting in no opportunity to redraw the boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: 665 CW

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

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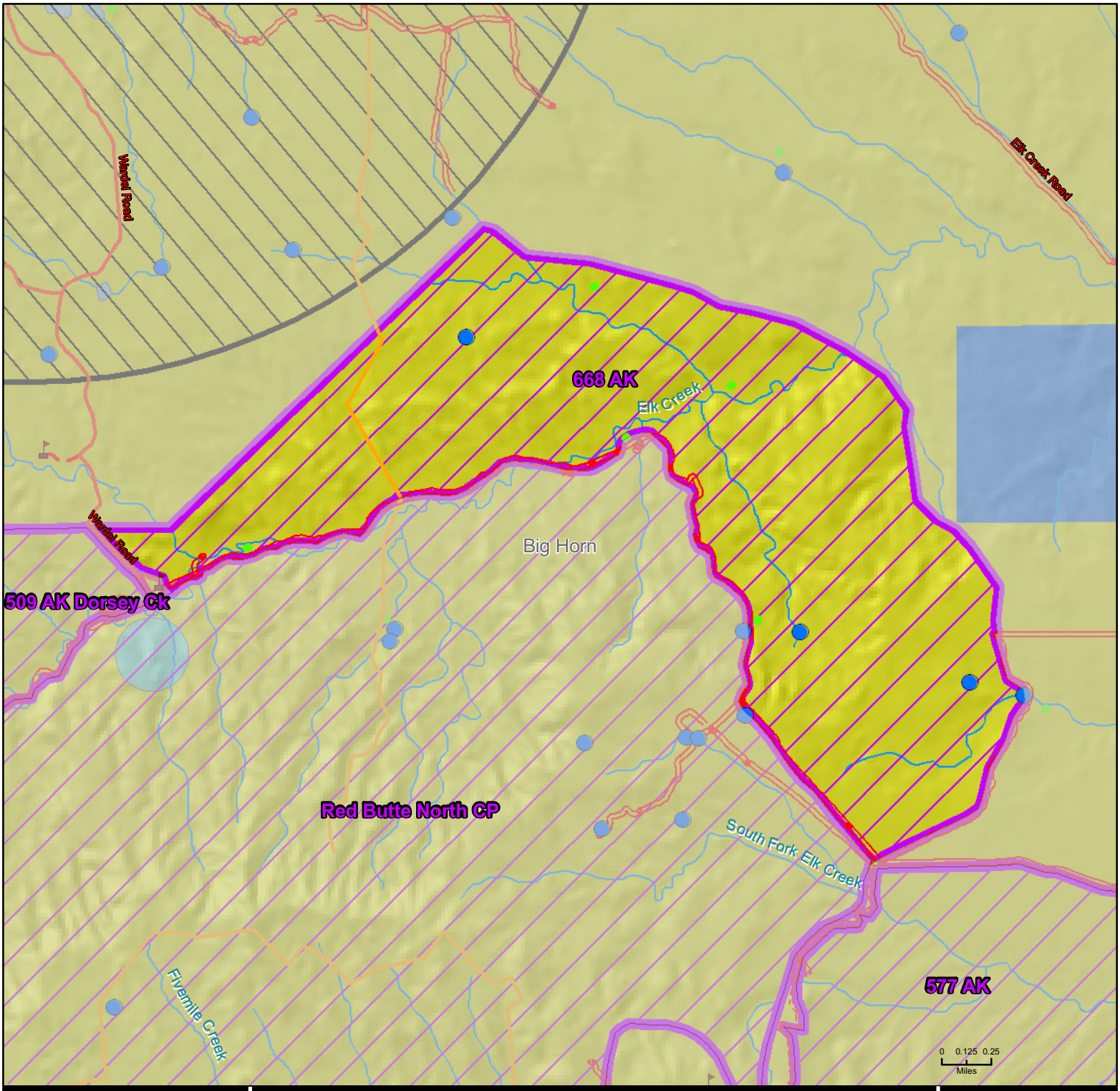

Lands with Wilderness Charateristics

668 AK

N W E S

Acres: 3435

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 668 AK **Acres:** 3,435

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear in nature.

Miles of roads (See the road definition that is stated in Process Paper): 5.1 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,040.86 acres of roaded natural and 2,394.41 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.92 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Three reservoirs and 0.98 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "From what I remember, some agriculture activity further north, and oil and gas not too far away. This may compromise primitiveness and solitude." (Paul Rau, BLM, 7/16/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area is insufficient in size, linear in nature, and contains roads, a reservoir, and motorized ROS designations. There are 2,187 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified to further confirm this decision. The area is not adjacent to wilderness or a wilderness study area to enhance wilderness characteristics.

AREA REVIEW POLYGON NAME: 668 AK

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

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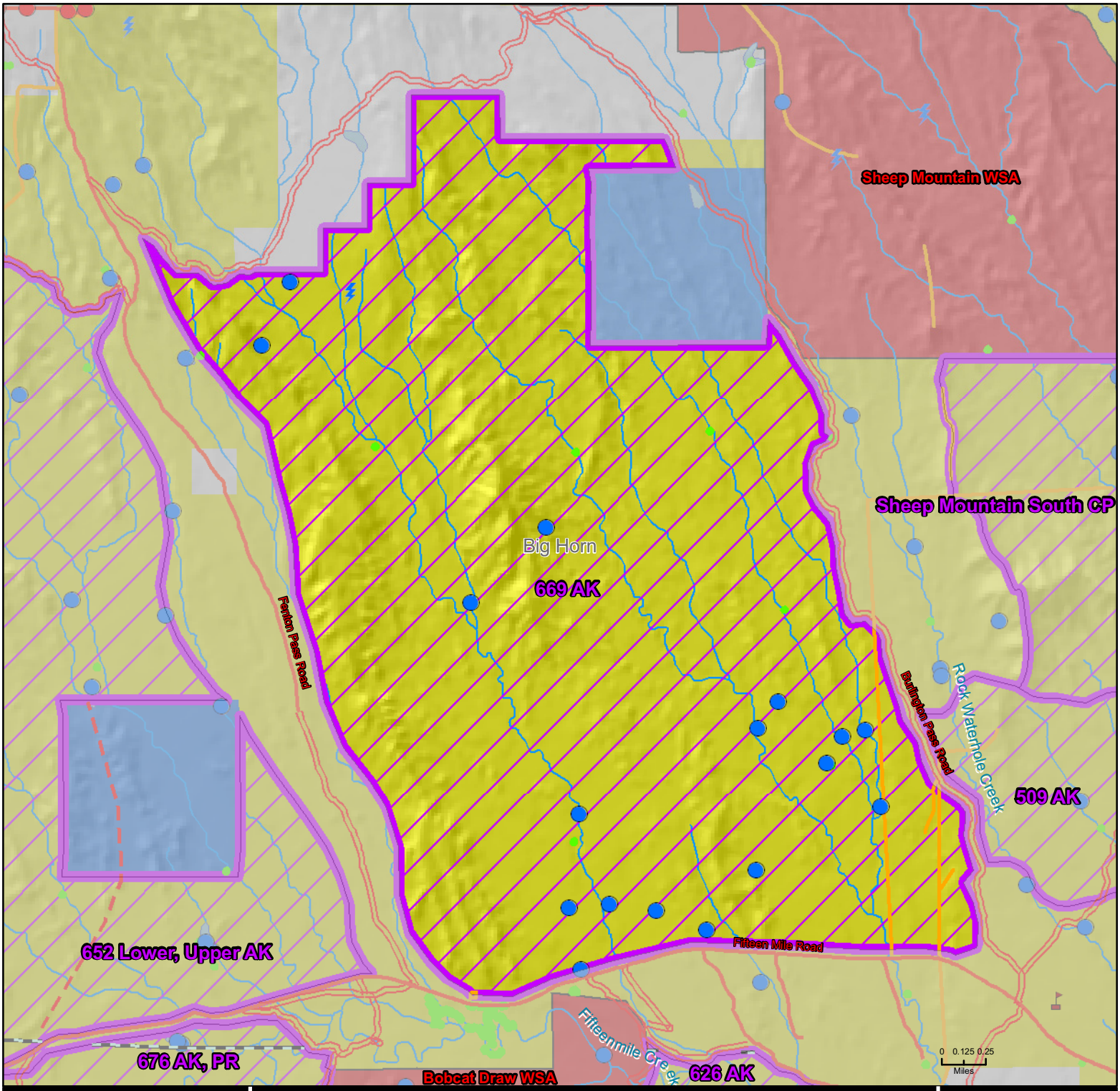

Lands with Wilderness Charateristics

669 AK

Acres: 8387

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 669 AK **Acres:** 8,387

State: Wyoming **County:** Big Horn

Evaluator: John sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 0

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 791.8 acres of roaded natural and 7,595.16 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 1.24 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One water well, 1.37 miles of fence, 1.81 miles of fence from Stakeholder review, and 17 reservoirs. Extensive terracing structures around reservoirs. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area contains motorized ROS designations, terracing structures, and reservoirs. There are 8,387 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap and range improvement structures should be field verified. It is a roadless area and is partially adjacent to the Sheep Mountain Wilderness Study Area, which may enhance wilderness characteristics. There is a clustered distribution of structures which may present the opportunity to redraw the boundary capturing wilderness characteristics.

AREA REVIEW POLYGON NAME: 669 AK

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

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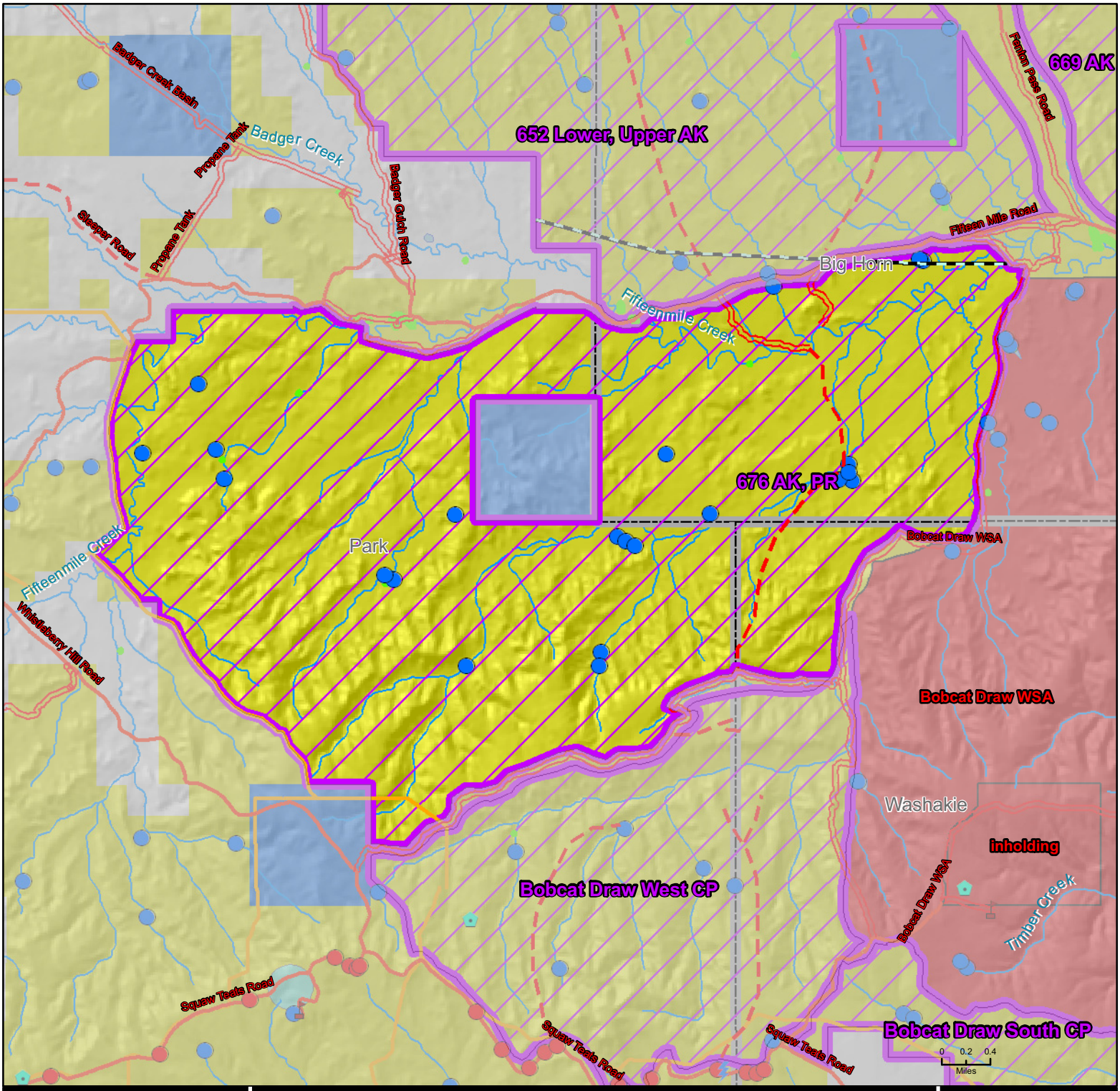

Lands with Wilderness Charateristics

676 AK, PR

Acres: 14226

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: 676 AK, PR **Acres:** 14,226

State: Wyoming **County:** Big Horn, Park, and Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0.86

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 1.86 miles of two-track trail and 3.01 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,457.45 acres of roaded natural, 12,768.00 acres of semi-primitive motorized, and 0.18 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: 1.20 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.80 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Twenty-one reservoirs and 1.12 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Has one road to a reservoir and then an ATV/jeep road that looks very interesting." (Chet Wheeless, BLM, 7/7/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The roads, reservoirs, an oil and gas pipeline, and motorized ROS detract from wilderness characteristics. There is 14,226 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. The even distribution of structures does not allow for boundary adjustments to capture wilderness characteristics. The area is adjacent to the Bobcat Draw Wilderness Study Area which does not enhance the wilderness characteristics in this case.

AREA REVIEW POLYGON NAME: 676 AK, PR

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

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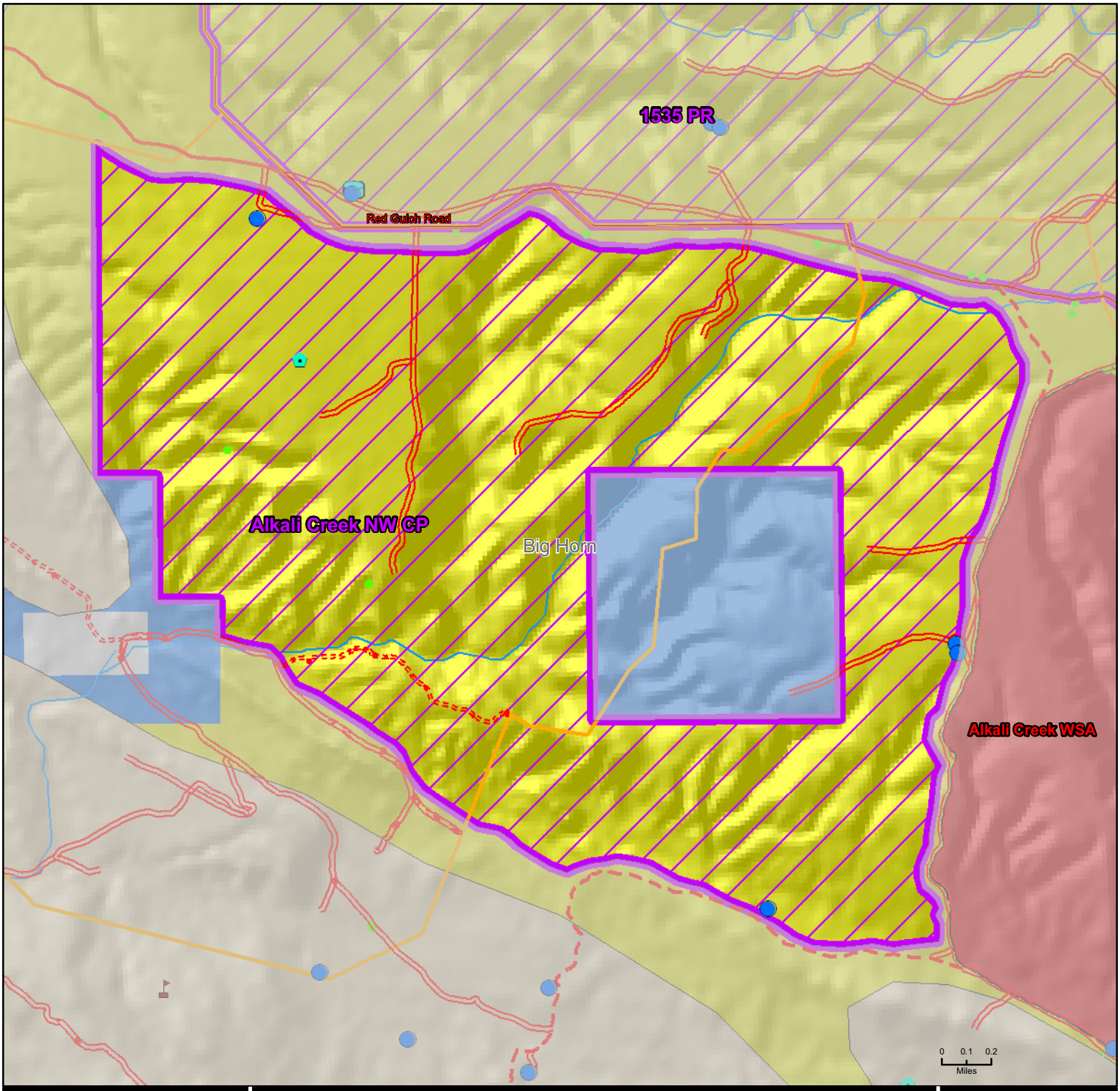

Lands with Wilderness Charateristics

Alkali Creek NW CP

N W E S

Acres: 4444

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Alkali Creek NW CP **Acres:** 4,444

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage.

Miles of roads (See the road definition that is stated in Process Paper): 4.67 miles of two-track trail and 1.2 miles of ATV trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 943.40 acres of roaded natural and 3500.67 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: No boundary overlap but close proximity to existing locatable salable mineral areas. Western boundary is coincident with mineral area

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.20 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Four reservoirs, 1.98 miles of fence, and one guzzler. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Water pipeline to troughs. Wildlife guzzler on state inholding. Roads frequently traveled by rancher, BLM, WGFD, and recreational hunters." (Chet Wheeless, BLM, 8/10/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is dissected by roads, contains a reservoir and motorized ROS, and is insufficient in acreage. There are 4,444 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified to further confirm this decision. The boundary runs parallel with the Alkali Creek Wilderness Study Area but is not coincident with so there is no enhancement of wilderness characteristics.

AREA REVIEW POLYGON NAME: Alkali Creek NW CP

DATE: November 19, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

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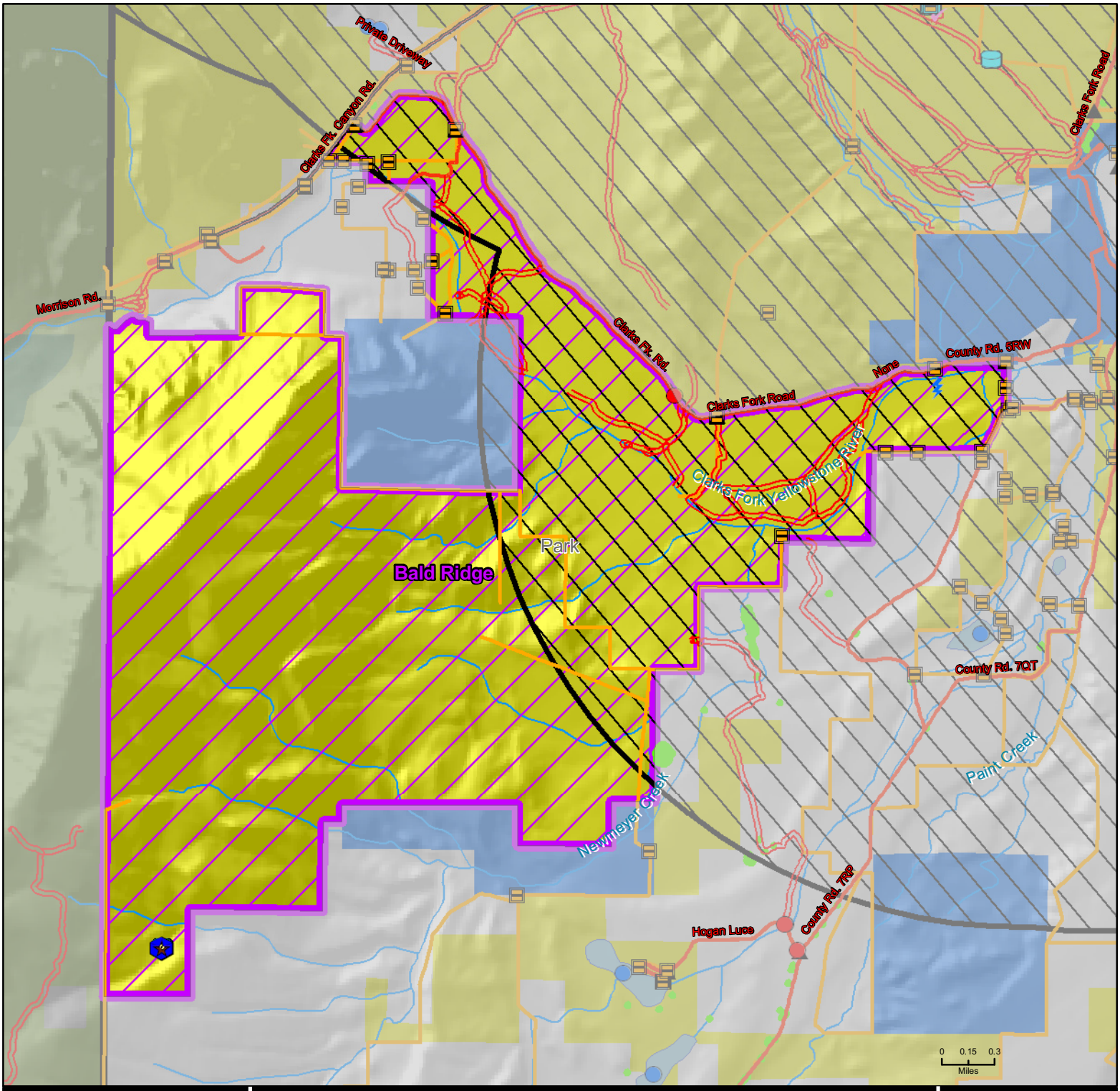
Dan Rice



Lands with Wilderness Charateristics

Bald Ridge

Acres: 7077

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Bald Ridge **Acres:** 7,077

State: Wyoming **County:** Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/27/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 7.8 miles of two-track trail, 2.61 miles of graded dirt road, and 2.82 miles of gravel road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 246.16 acres of roaded natural, 4,396.95 acres of semi-primitive motorized, and 2,434.17 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.10 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One spring box, one stock tank, one water well, boundary lined with seven cattleguards, eight gates, one exclosure, 12.17 miles of fence and 7.64 miles of natural barrier.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area is dissected by roads, motorized ROS, contains range improvement structures and noxious weeds, and is adjacent to a wildland urban interface. There are only 122 of 7,077 acres of Category Improve on the range allotments which would not detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an opportunity to redraw boundaries to capture wilderness characteristics to exclude the constructed features.

AREA REVIEW POLYGON NAME: Bald Ridge

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

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Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

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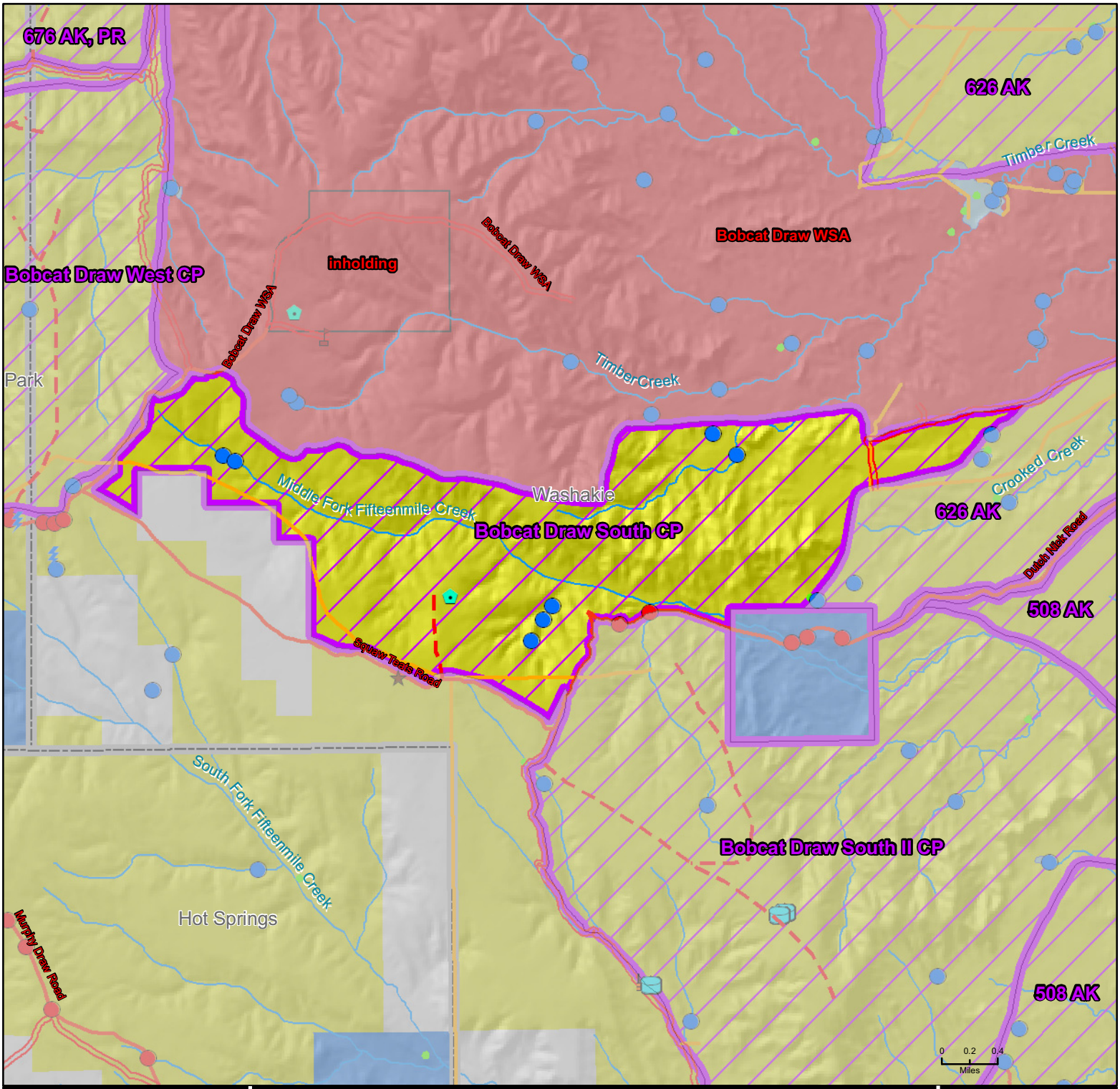

Lands with Wilderness Charateristics

Bobcat Draw South CP

Acres: 4200

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Bobcat Draw South CP **Acres:** 4,200

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear.

Miles of roads (See the road definition that is stated in Process Paper): 0.92 miles of two-track trail, 1.03 miles of graded dirt road, 0.05 miles of gravel road, and 0.57 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 4,199.07 acres of semi-primitive motorized and 0.49 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.2 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One guzzler, seven reservoirs, and 3.37 miles of fence. Within possible GIS data gap. Field verify range improvement structures

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Has guzzler and access road." (Chet Wheeless, BLM, 7/7/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area is not of sufficient size and shape to manage for wilderness characteristics, and contains roads, motorized ROS, and a range improvement structure. There are 4,135 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be verified in the field. The area is adjacent to the Bobcat Draw Wilderness Study Area but in this case does not enhance wilderness characteristics due to lack of sufficient size, shape, and structures.

AREA REVIEW POLYGON NAME: Bobcat Draw South CP

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

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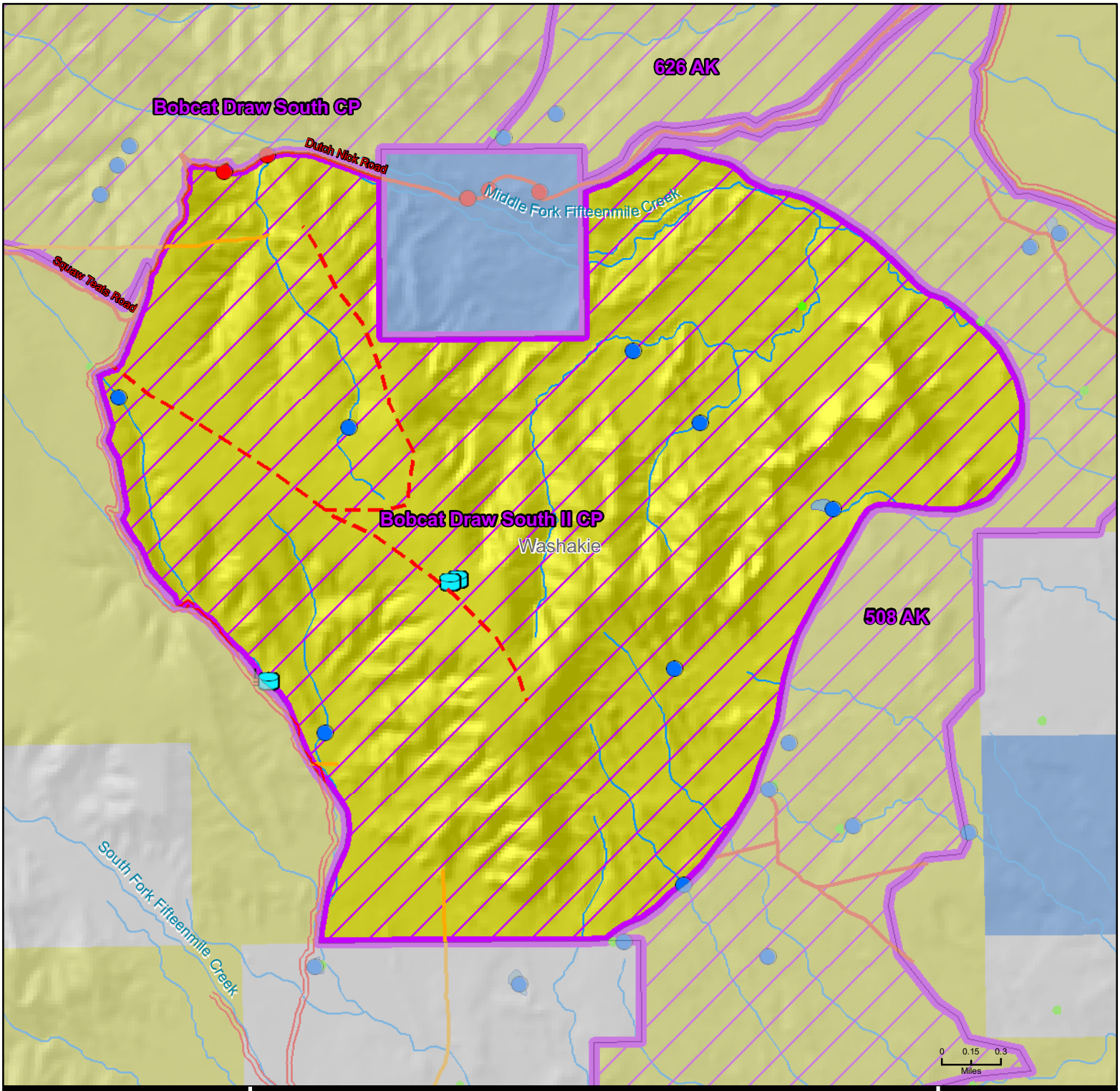

Lands with Wilderness Charateristics

Bobcat Draw South II CP

Acres: 7567

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Bobcat Draw South II CP **Acres:** 7,567

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear

Miles of roads (See the road definition that is stated in Process Paper): 0.19 miles of two-track trail, 0.89 miles of graded dirt road, and 4.71 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 7,566.58 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.2 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Eight reservoirs and 1.03 miles of fence, 1 generator and 3 stock tanks from Stakeholder review. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Roads as shown are used regularly by permittee, hunters, several trappers, etc." (Chet Wheeless, BLM, 7/10/2009). "See Chet's comments. The road and spike in hunting season may make it questionable as containing wilderness characteristics." (Paul Rau, BLM, 7/16/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains roads, a reservoir, and a motorized ROS. There are 4,740 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. The roads and reservoir within the boundary prevent redrawing the boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Bobcat Draw South II CP

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

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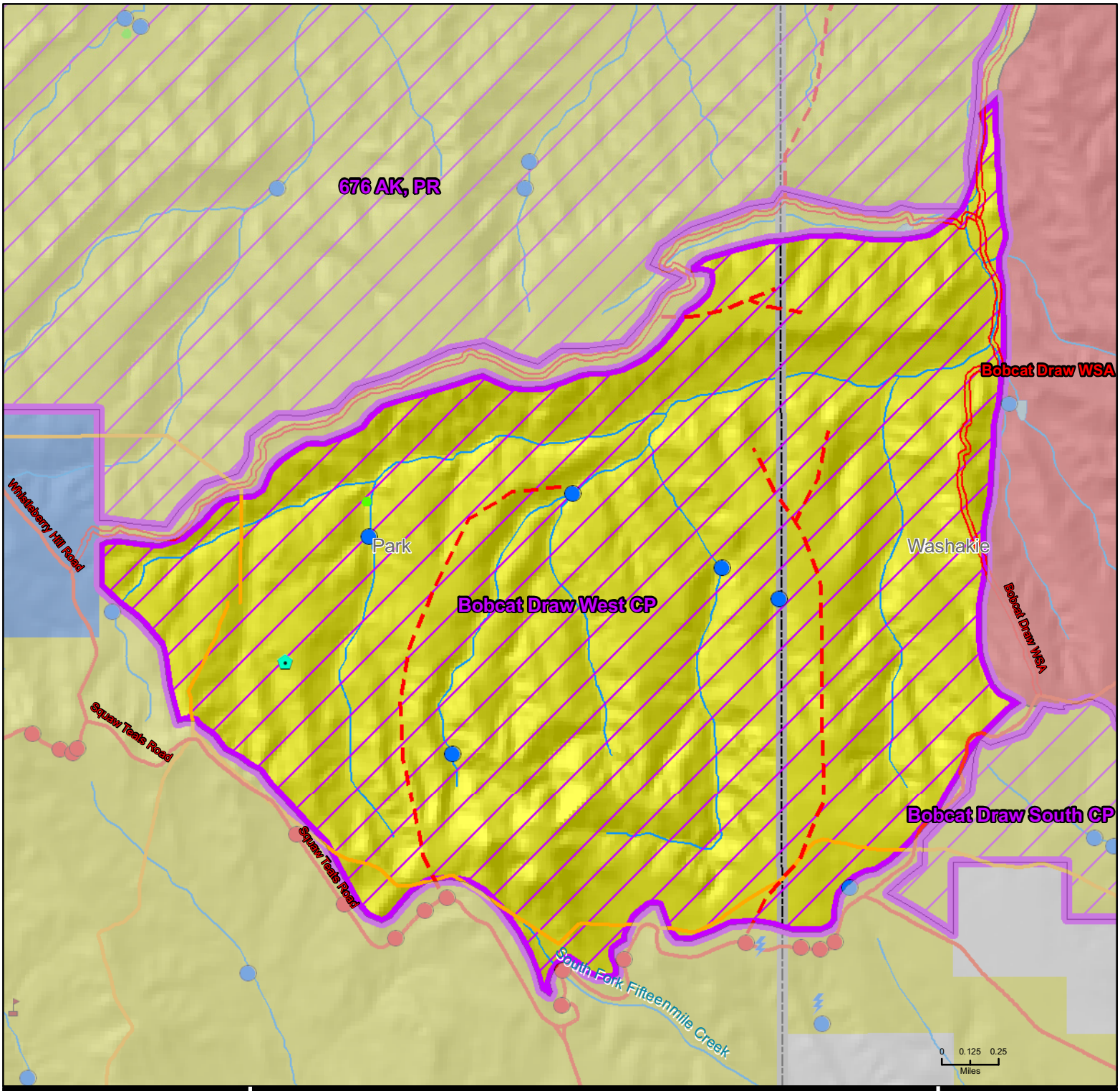

Lands with Wilderness Charateristics

Bobcat Draw West CP

Acres: 5511

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Bobcat Draw West CP **Acres:** 5,511

State: Wyoming **County:** Park and Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 2.37 miles of two-track trail, 0.4 miles of gravel road, and 5.5 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 599.03 acres of roaded natural, 4,911.74 acres of semi-primitive motorized, and 0.13 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.2 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One guzzler, 3.61 miles of fence, and three reservoirs. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Horse area. Has a guzzler that needs maintenance and roads as shown. Reservoirs are functional, but don't need maintenance very often." (Chet Wheeless, BLM, 7/10/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area contains roads, motorized ROS, and range improvement structures that detract from wilderness characteristics. There are 5,511 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be verified in the field. It is adjacent to the Bobcat Draw Wilderness Study Area but does not enhance wilderness characteristics due to the roads and structures.

AREA REVIEW POLYGON NAME: Bobcat Draw West CP

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

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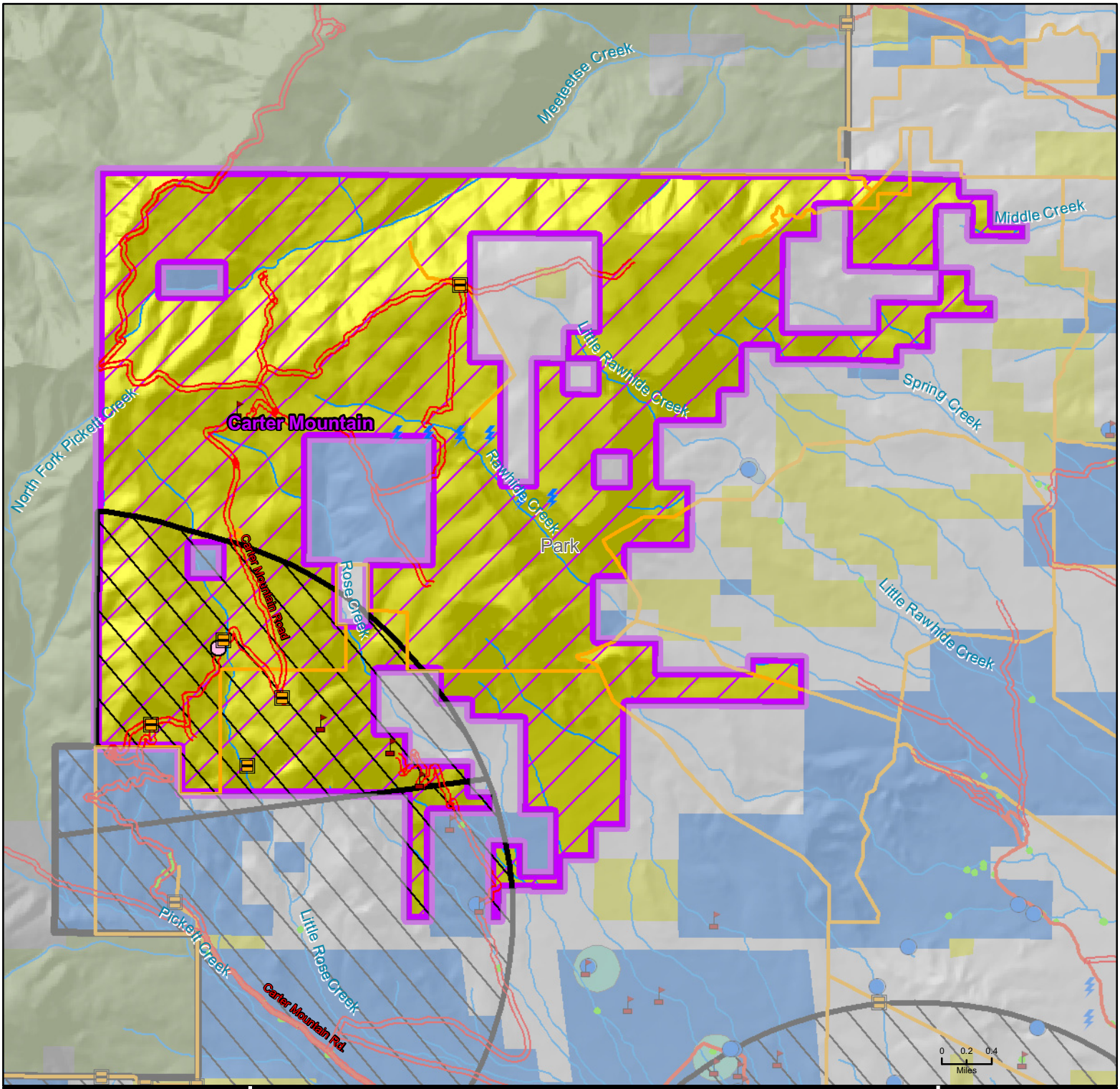

Lands with Wilderness Charateristics

Carter Mountain

Acres: 14496

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Carter Mountain **Acres:** 14,496

State: Wyoming **County:** Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear, but linear extensions.

Miles of roads (See the road definition that is stated in Process Paper): 27.68 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 13,744.53 acres of semi-primitive motorized and 750.97 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Four oil and gas wells.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Five gates, 14.11 miles of fence, and four water wells.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is adjacent to a wildland urban interface, contains range improvement structures, oil and gas wells, motorized ROS, and roads. There are 7,540 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of constructed features which results in no opportunity to redraw boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Carter Mountain

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

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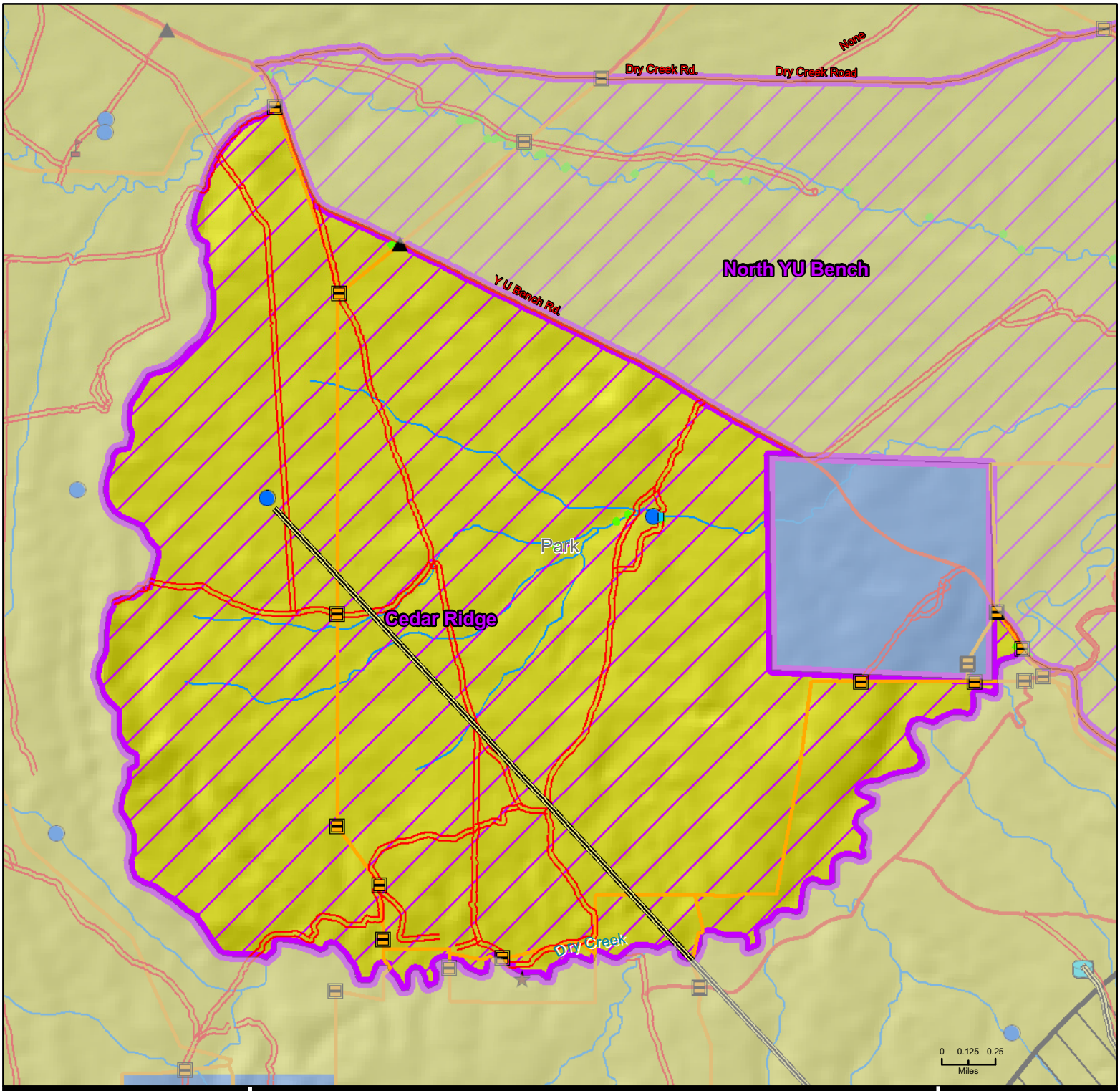

Lands with Wilderness Charateristics

Cedar Ridge

Acres: 6364

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Cedar Ridge **Acres:** 6,364

State: Wyoming **County:** Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 15.04 miles of two-track trails and 1.74 miles of graded dirt.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,995.90 acres of roaded natural and 4,368.07 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 1.06 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One cattleguard, two reservoirs, 14 gates, 2.87 miles of water pipeline, and 9.18 miles of fence.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area contains range improvement structures, roads, motorized ROS, and noxious weeds. There are 6,364 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures so the opportunity to redraw boundary to capture wilderness characteristics does not exist.

AREA REVIEW POLYGON NAME: Cedar Ridge

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

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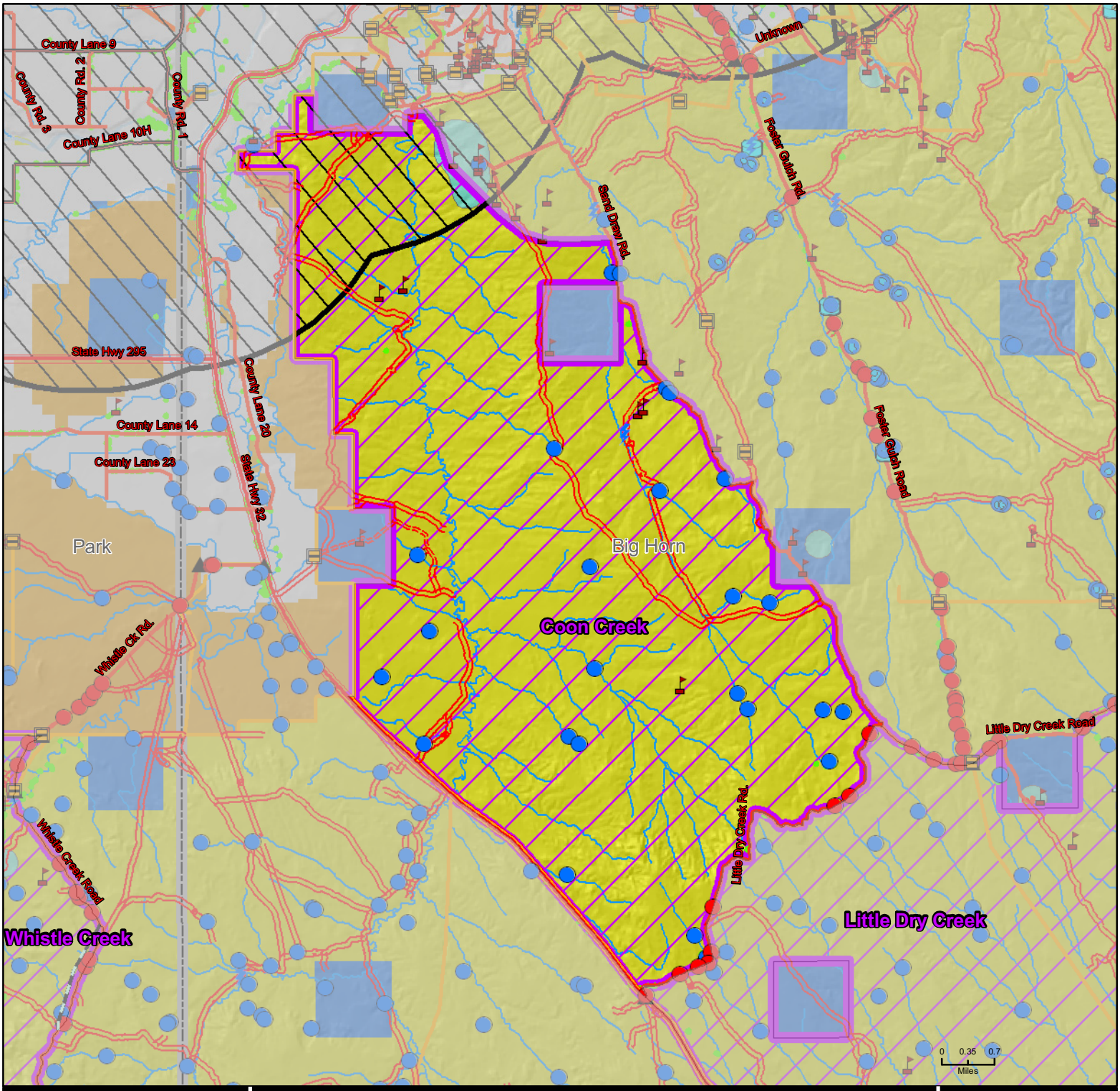

Lands with Wilderness Charateristics

Coon Creek

Acres: 30769

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Coon Creek **Acres:** 30,769

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 25.45 miles of two-track trail, 0.96 miles of ATV trail, 2.6 miles of graded dirt road, and 1.46 miles of gravel road. Multiple culverts rim the boundary.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 2,685.26 acres of roaded natural, 197.71 acres of rural, and 27,885.93 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Boundary overlaps into an existing oil and gas field. Area contains six oil and gas wells.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 3.19 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 12.92 miles of fence, one water well, and 24 reservoirs.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area is dissected by roads, motorized ROS, contains oil and gas wells, a multitude of range improvement structures, and is adjacent to a wildland urban interface. There are 30,714 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures with no opportunity to redraw boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Coon Creek

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

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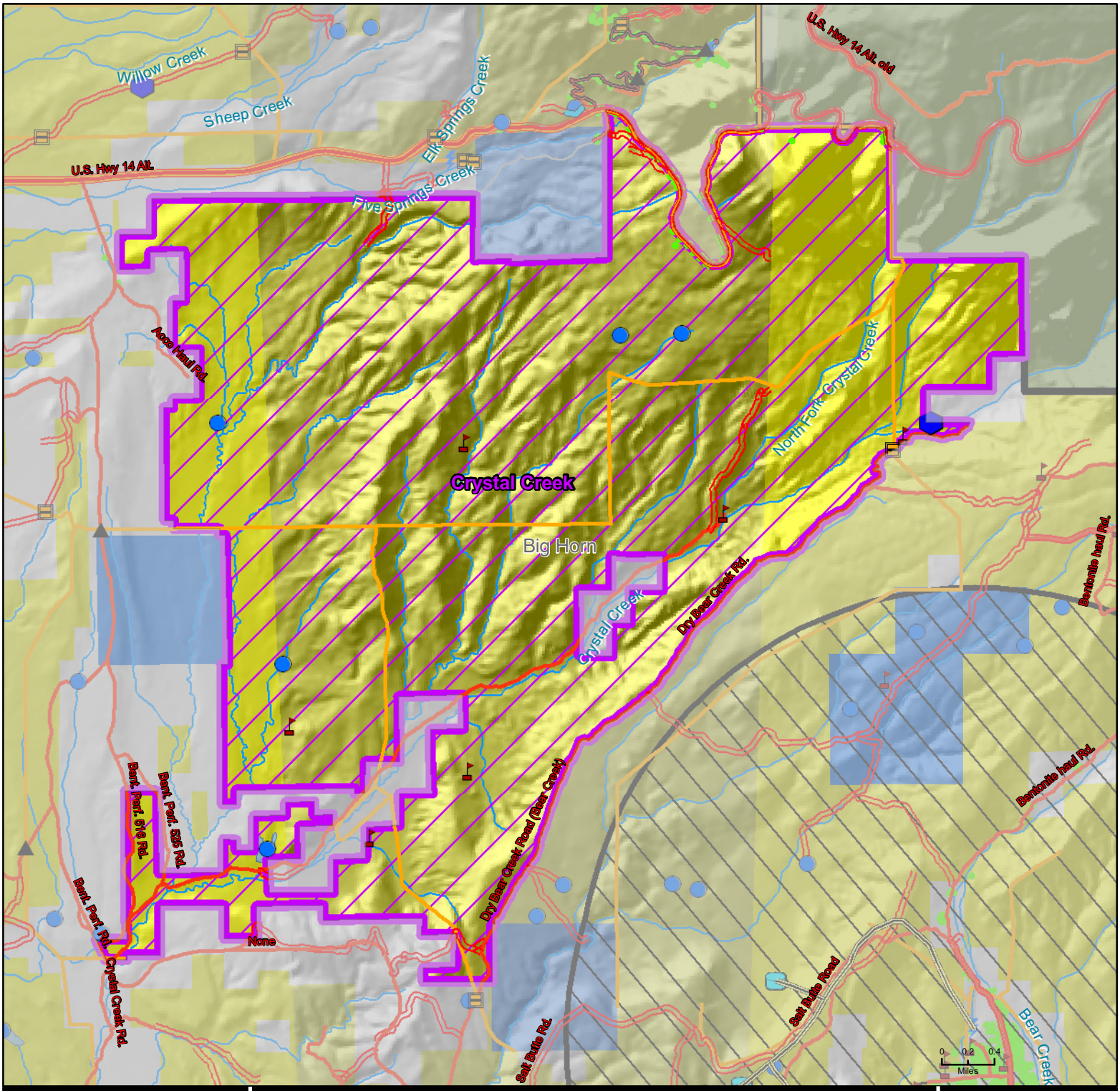

Lands with Wilderness Charateristics

Crystal Creek

Acres: 15165

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Crystal Creek **Acres:** 15,165

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 4.27 miles of two-track trail and 9.99 miles of graded dirt road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 531.86 acres of roaded natural and 14,632.89 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Six oil and gas wells.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 3.91 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One spring box, 15.43 miles of fence, 3.07 miles of natural barrier, and five reservoirs.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. There is oil and gas wells, roads, motorized ROS, noxious weeds, and range improvement structures in this area. There are 7,836 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. No opportunity to redraw the boundary to capture wilderness characteristics exists due to the even distribution of structures.

AREA REVIEW POLYGON NAME: Crystal Creek

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

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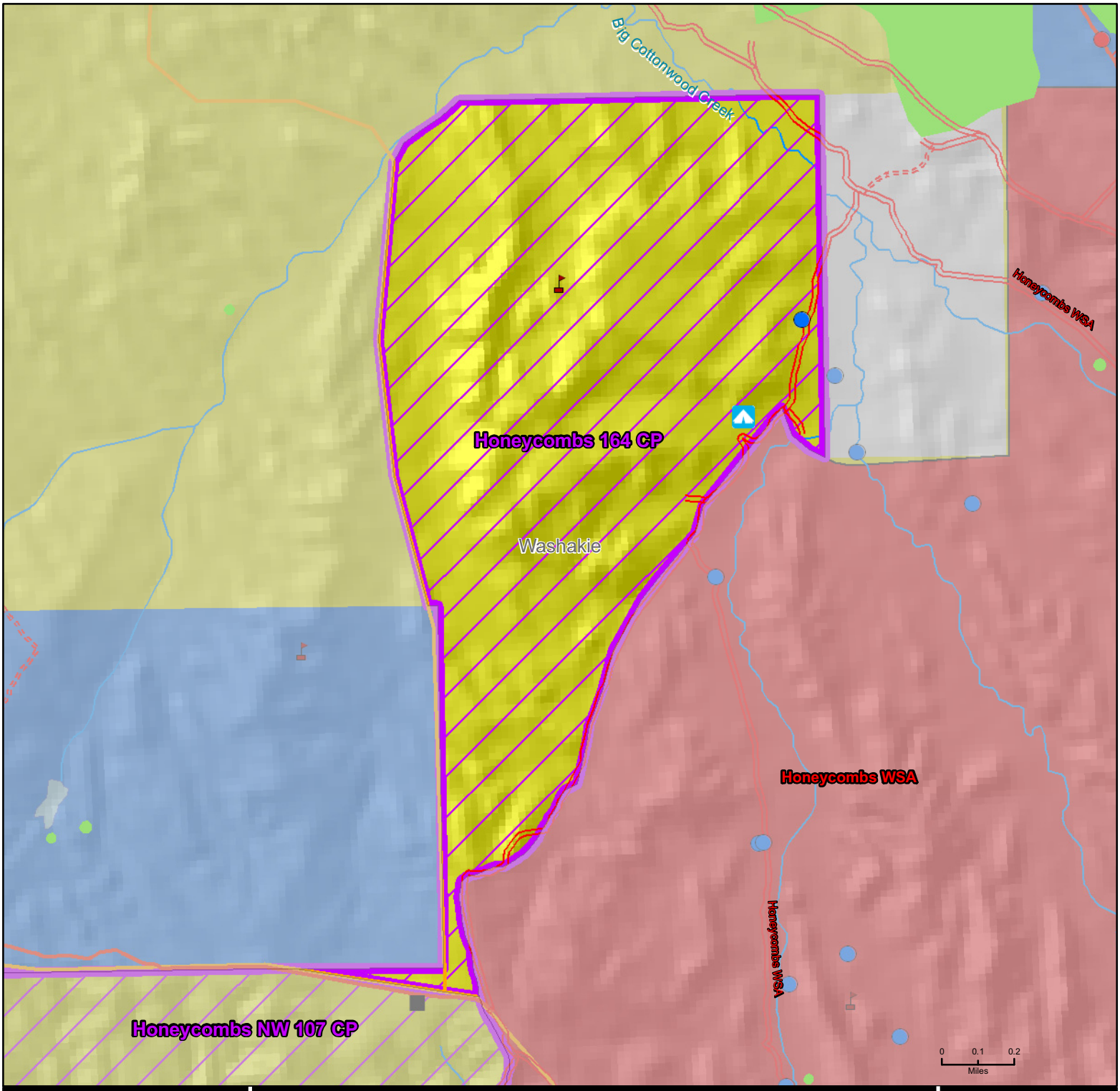

Lands with Wilderness Charateristics

Honeycombs 164 CP

Acres: 1157

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Honeycombs 164 CP **Acres:** 1,157

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient in size.

Miles of roads (See the road definition that is stated in Process Paper): 1.24 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,157.25 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: One oil or gas well.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One reservoir and 1.51 miles of fence, 1 homestead from Stakeholder review. Within a GIS data gap. Field verify range improvement structures

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Lots of activity in northwest corner. Recommend cutting on section line between sections 3 and 2." (Chet Wheeless, BLM, 8/10/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in H-6300-1-Wilderness Inventory Maintenance in BLM Oregon/Washington. Even though there are minimal roads, motorized ROS, and only one oil and gas well, the area is far below the sufficient size limit to manage for wilderness characteristics. There are 1,157 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is adjacent to the Honeycombs Wilderness Study Area but is still far too small for this to enhance wilderness characteristics.

AREA REVIEW POLYGON NAME: Honeycombs 164 CP

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

PARK COUNTY COMMISSIONERS

Tim A. French

Jill Shockley Siggins

MEETEETSE CONSERVATION DISTRICT

Clara Mae Yetter

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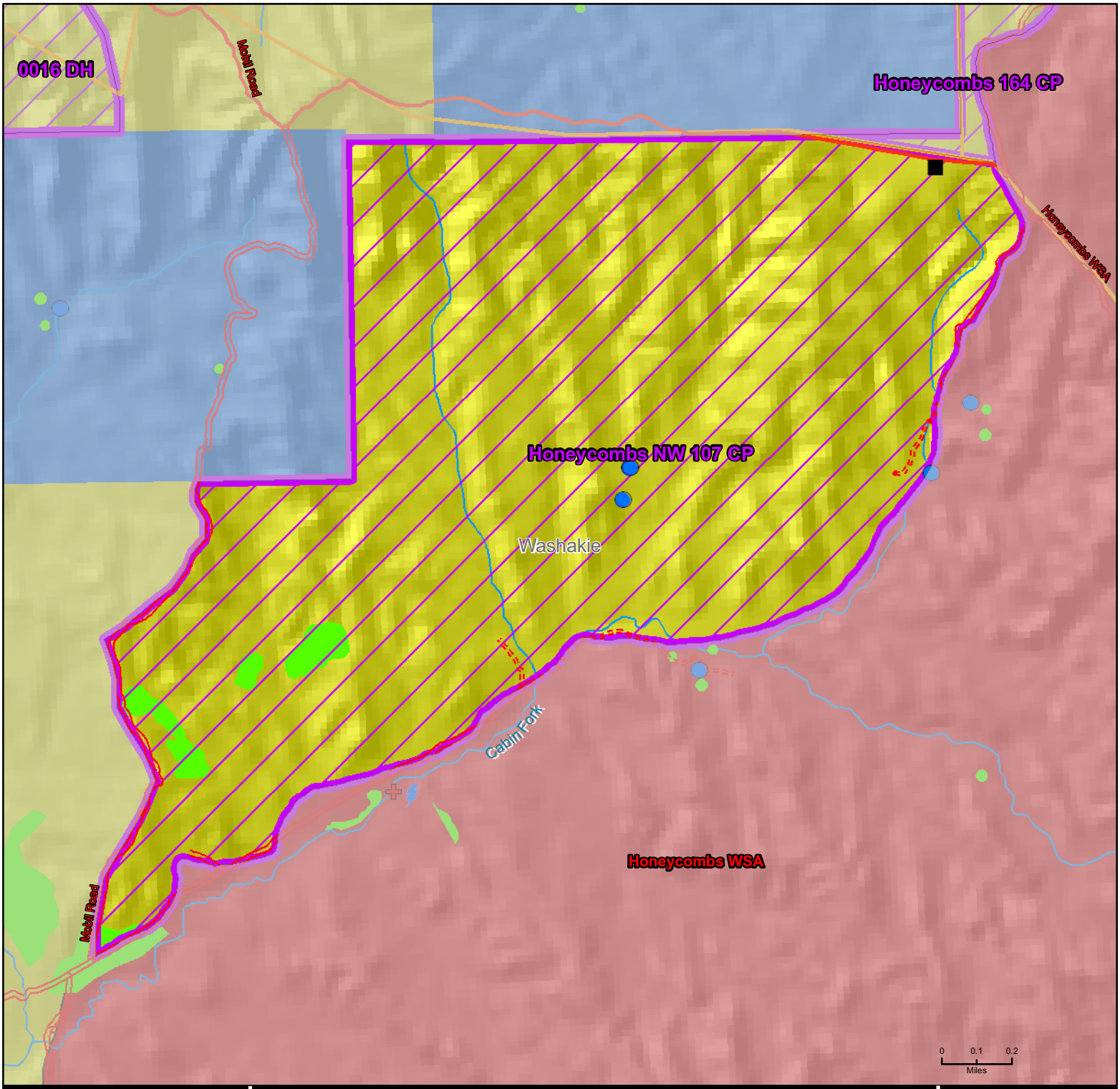
Dan Rice



Lands with Wilderness Charateristics

Honeycombs NW 107 CP

N W E S

Acres: 2026

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Honeycombs NW 107 CP **Acres:** 2,026

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage.

Miles of roads (See the road definition that is stated in Process Paper): 2.22 miles of two-track trail, 0.59 miles of ATV trail, and 0.57 miles of gravel road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,345.76 acres of semi-primitive motorized and 680.50 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 33.31 acres of non-native plants.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One corral chute, one reservoir, 1 additional reservoir from BLM allotment maps, and 1 reservoir from Stakeholder review, and 0.53 miles of fence.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Road thru the middle is used regularly." (Chet Wheeless, BLM, 8/10/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. There are range improvement structures present, motorized ROS, and the size is insufficient for wilderness characteristics. There are 2,026 acres of Category Improve on the range allotments that detract from then naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is adjacent to the Honeycombs Wilderness Study Area but the area is still too small for this to enhance wilderness characteristics.

AREA REVIEW POLYGON NAME: Honeycombs NW 107 CP

DATE: December 10, 2010

BIGHORN COUNTY COMMISSIONERS

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

PARK COUNTY COMMISSIONERS

Tim A. French

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MEETEETSE CONSERVATION DISTRICT

Clara Mae Yetter

WASHAKIE COUNTY COMMISSIONERS

Aaron Anderson

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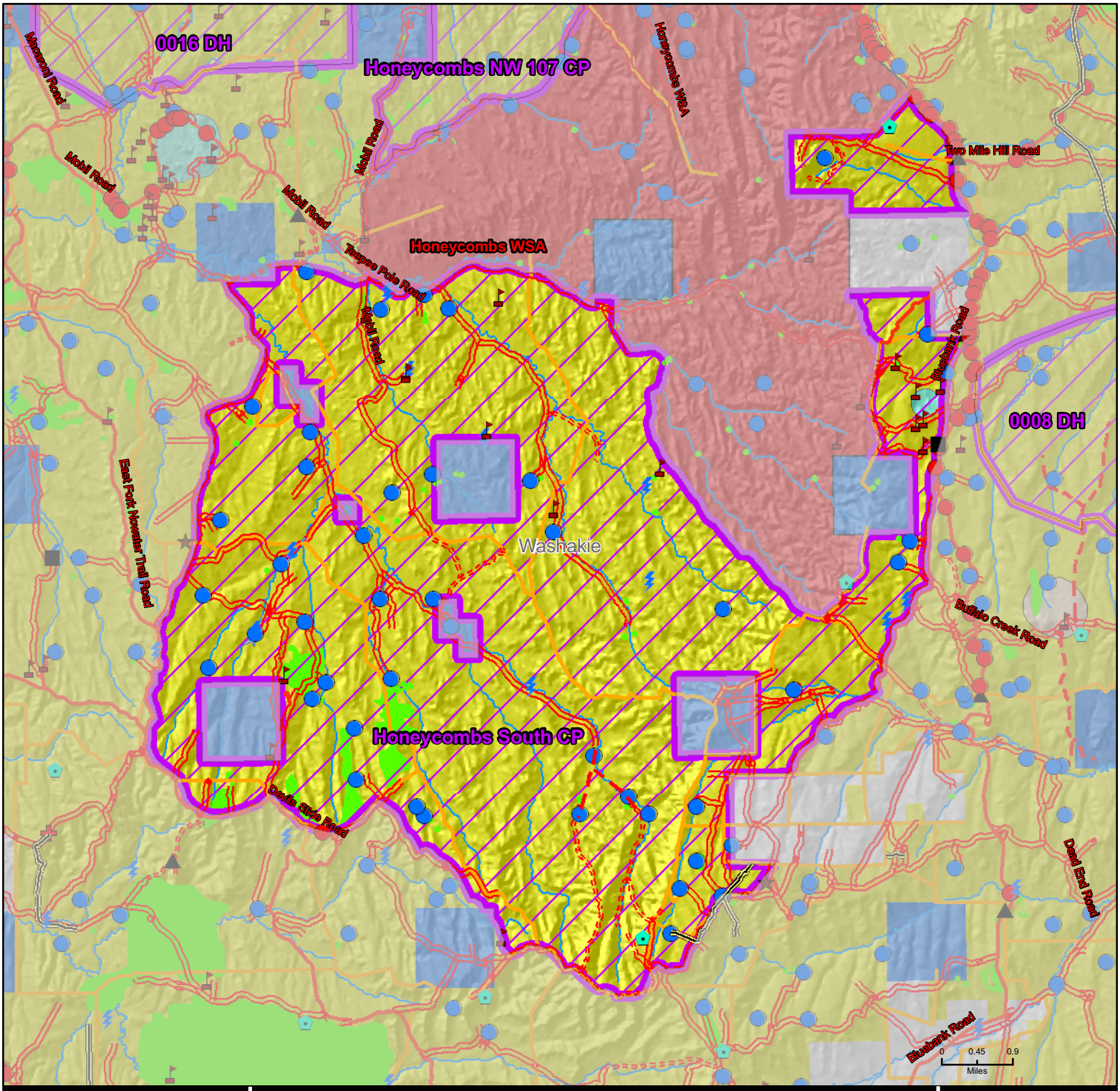
WASHAKIE COUNTY CONSERVATION DISTRICT

Dan Rice



Lands with Wilderness Charateristics

Honeycombs South CP

Acres: 34487

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Honeycombs South CP **Acres:** 34,487

State: Wyoming **County:** Washakie

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 56.22 miles of two-track trail, 10.9 miles of ATV trail, 1.51 miles of graded dirt road, and 1.64 miles of unknown road. Multiple culverts rim the perimeter.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,147.64 acres of roaded natural, 24,946.07 acres of semi-primitive motorized, and 8,393.35 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Boundary overlaps into an existing oil and gas field. Contains 14 oil and gas wells.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 7.44 acres of noxious weeds and 658.85 acres of non-native plants.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 39.11 miles of fence, 0.82 miles of pipeline, six water wells, 41 reservoirs, one corral chute, two guzzlers, and two cattleguards along perimeter.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "This area has numerous roads used by ranchers, hunters, and recreationists. Then lots of roads that due to no maintenance, are used by same people on ATVs. It's primitive and rough but not wilderness." (Chet Wheeless, BLM, 7/10/2009). "I agree with Chet. Physically, wilderness character, but socially, probably not wilderness during hunting season." (Paul Rau, BLM, 7/16/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. Present in this area are multiple range improvement structures, existing oil and gas field, multiple oil and gas wells, noxious weeds and non-native plants, motorized ROS, and a multitude of roads. There are 31,943 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. Due to the even distribution of structures there is no opportunity to redraw the boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Honeycombs South CP

DATE: October 29, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

PARK COUNTY COMMISSIONERS

Dave Burke

Tim A. French

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MEETEETSE CONSERVATION DISTRICT

Clara Mae Yetter

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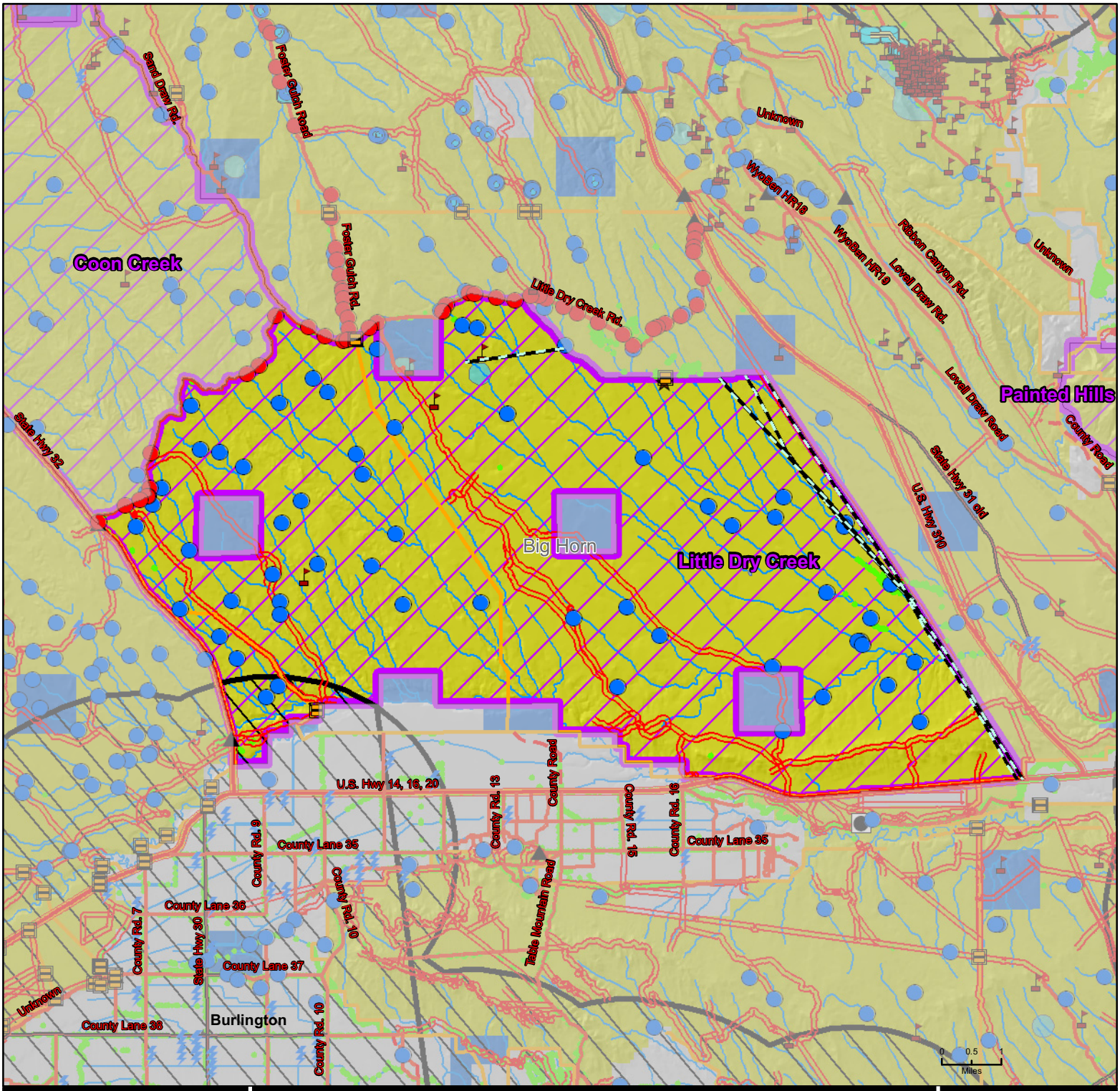

Lands with Wilderness Charateristics

Little Dry Creek

Acres: 48929

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Little Dry Creek **Acres:** 48,929

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes.

Miles of roads (See the road definition that is stated in Process Paper): 46.19 miles of two-track trail and 0.02 miles of graded dirt road. Multiple culverts rim the perimeter.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 5,757.02 acres of roaded natural, 4,096.42 acres of rural, and 39,075.17 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Existing oil and gas field within boundary. Three oil and gas wells. 23.05 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 21.93 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Two gates, 21.1 miles of fence, 57 reservoirs, one exclosure, and three cattleguards along perimeter.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. This area contains multiple range improvement projects, roads, motorized ROS, noxious weeds, oil and gas wells, an oil and gas pipeline, an existing oil and gas field, and is adjacent to a wildland urban interface. There are 48,835 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. The even distribution of structures does not present an opportunity to redraw the boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Little Dry Creek

DATE: October 29, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

PARK COUNTY COMMISSIONERS

Dave Burke

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MEETEETSE CONSERVATION DISTRICT

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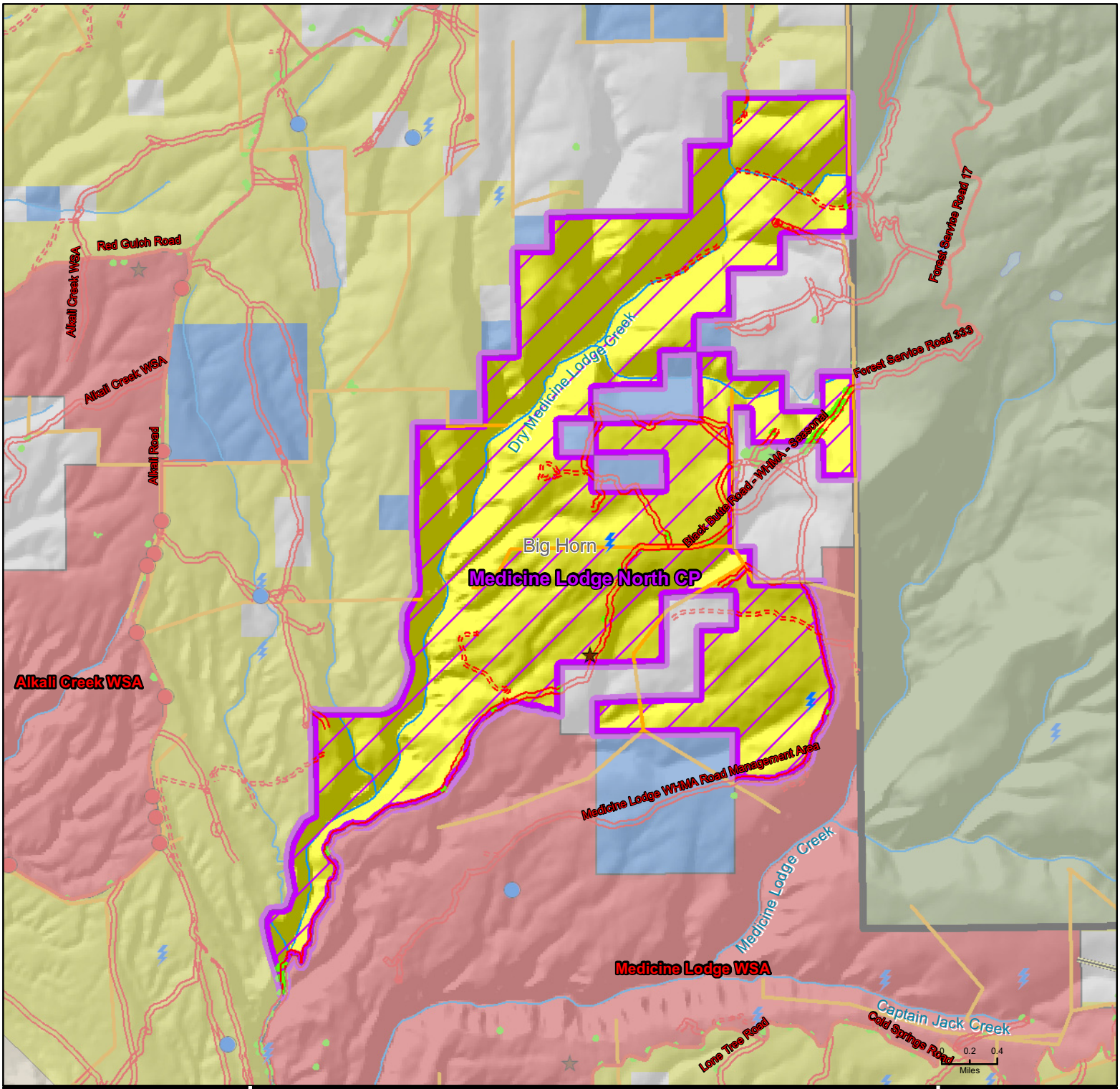

Lands with Wilderness Charateristics

Medicine Lodge North CP

Acres: 6322

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Medicine Lodge North CP **Acres:** 6,322

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 10.73 miles of two-track trail, 3.86 miles of ATV trail, and 0.12 miles of unknown road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 3,212.33 acres of semi-primitive motorized and 3,109.67 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 5.16 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Two water wells, one exclosure, and 5.9 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. There are roads dissecting the area, motorized ROS, range improvement structures, and noxious weeds present. There are 5,840 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. It is adjacent to the Medicine Lodge Wilderness Study Area, but this may not be a factor pending field verification of structures.

AREA REVIEW POLYGON NAME: Medicine Lodge North CP

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

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PARK COUNTY COMMISSIONERS

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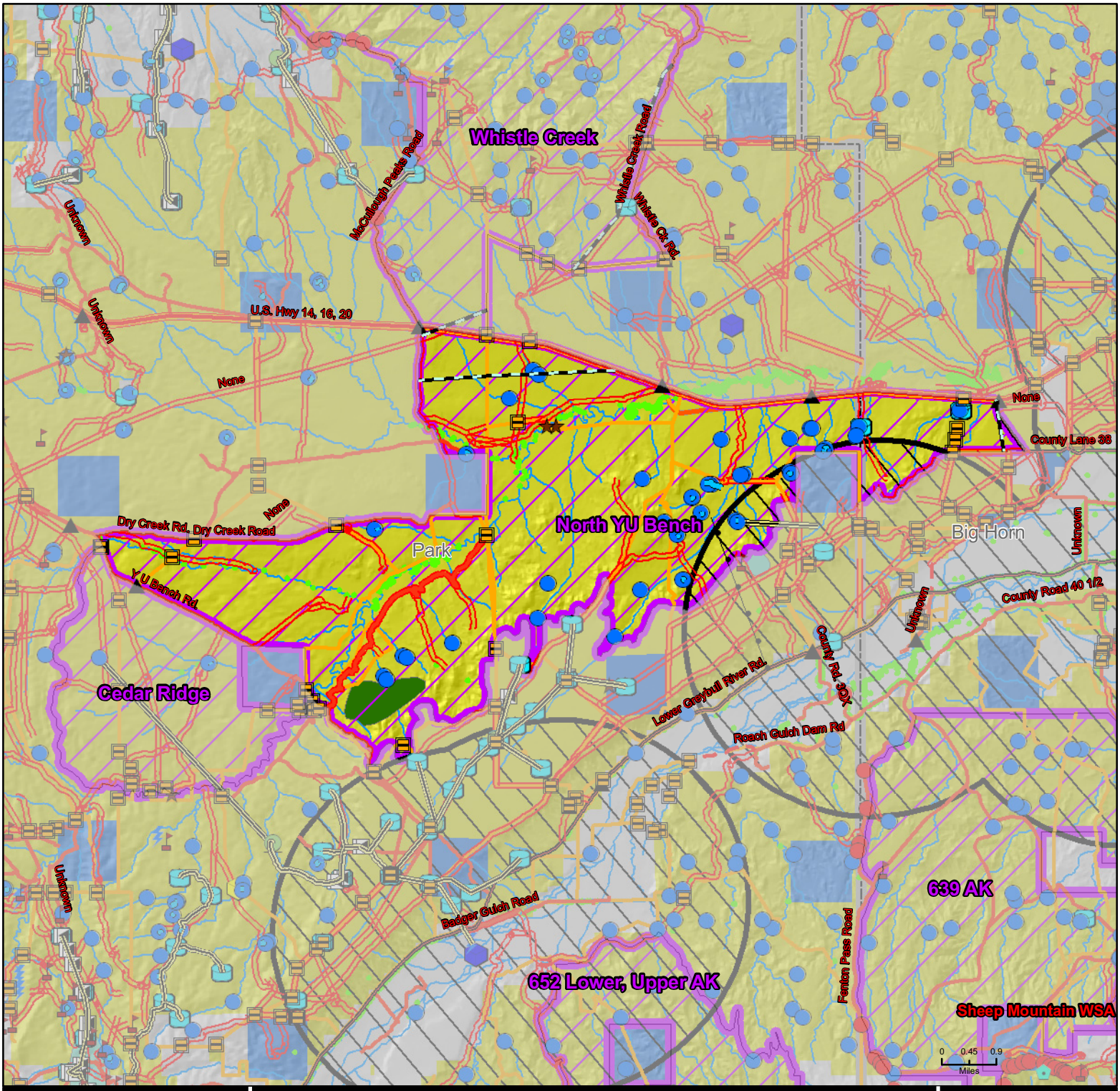

Lands with Wilderness Charateristics

North YU Bench

Acres: 25097

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: North YU Bench **Acres:** 25,097

State: Wyoming **County:** Big Horn and Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/28/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 27.59 miles of two-track road, 11.66 miles of graded dirt road, and 4.57 miles of unknown road. (According to Stakeholder Data a BLM two-track is actually graded, aerial photos confirmed this.)

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 3,410.69 acres of roaded natural and 21,686.33 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Shares boundary with an existing oil and gas field. 4.41 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): 0.84 miles of powerline from Stakeholder Review.

Drill rows (field verified): Yes, verified in the field by Gregory Kennett, ERG.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 23.27 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Thirteen dams, 32 reservoirs, two stock tanks, 14 gates, two exclosures, 0.64 miles of water pipeline, and 40.43 miles of fence. Approximately 430 acres of reseeding project that resulted in drill rows (identified by stakeholder, confirmed in the field).

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The area contains numerous roads, motorized ROS, range improvement structures, drill rows, an oil and gas pipeline, shares a boundary with an existing oil and gas field, and is adjacent to a wildland urban interface. There are 20,970 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. Due to even distribution of features there is no opportunity to redraw the boundary to capture wilderness characteristics.

Figure 1: Drill rows in the N. YU Bench, October 2010.

AREA REVIEW POLYGON NAME: North YU Bench

DATE: October 29, 2010

BIGHORN COUNTY COMMISSIONERS

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Aaron Anderson

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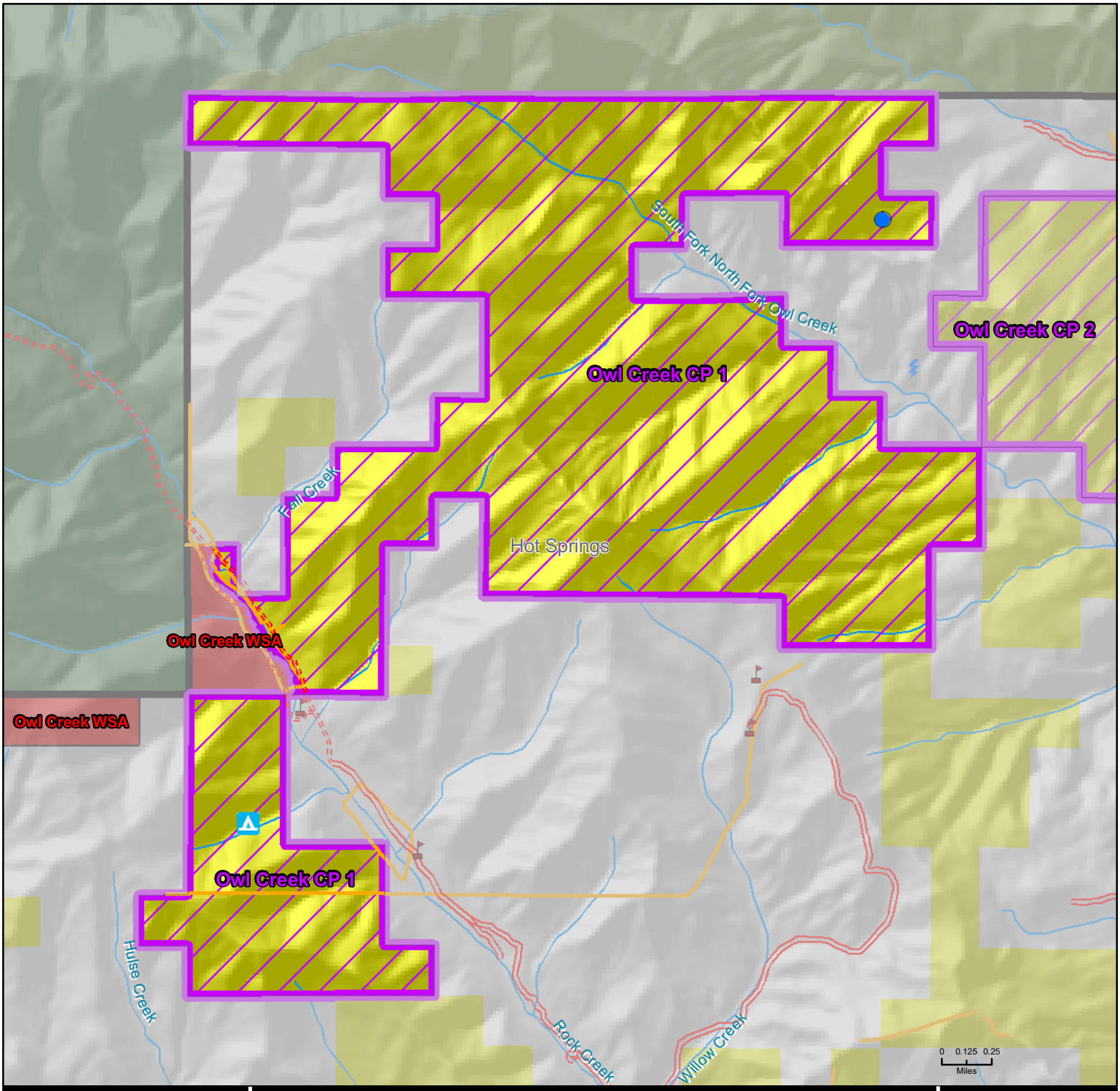
Dan Rice



Lands with Wilderness Charateristics

Owl Creek CP 1

Acres: 4961

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Owl Creek CP 1 **Acres:** 4,961

State: Wyoming **County:** Hot Springs

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage and linear narrow extensions of boundary.

Miles of roads (See the road definition that is stated in Process Paper): 0.72 miles of ATV trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 84.41 acres of semi-primitive motorized and 4,876.46 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 2.27 miles of fence, 1 reservoir and 1 camp site from Stakeholder Review. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities, or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. The size of the area is insufficient in acreage and shape. It contains motorized ROS designations. There are 4,947 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. The boundary has several relatively narrow extensions that are not conducive to managing for wilderness characteristics.

AREA REVIEW POLYGON NAME: Owl Creek CP

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

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DeLoyd Quarberg

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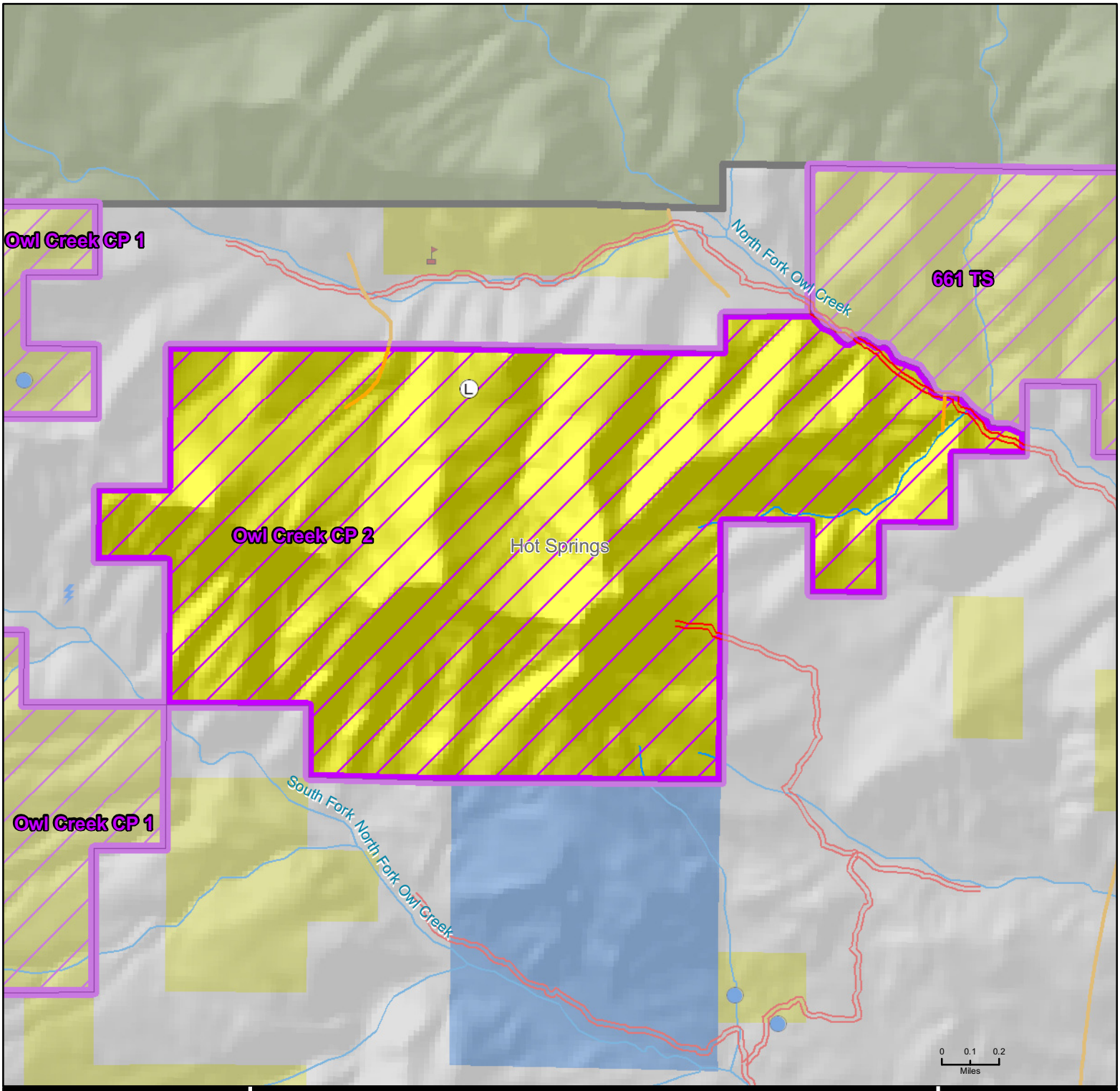
Dan Rice



Lands with Wilderness Charateristics

Owl Creek CP 2

Acres: 2231

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Owl Creek CP 2 **Acres:** 2,231

State: Wyoming **County:** Hot Springs

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage.

Miles of roads (See the road definition that is stated in Process Paper): 0.89 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 384.63 acres of semi-primitive motorized and 1,846.32 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One logging area from Stakeholder Review. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities, or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains roads and motorized ROS designations. It is insufficient in size to manage for wilderness characteristics. There are 2,231 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. It is not adjacent to wilderness or a wilderness study area there not enhancing the wilderness characteristics of the insufficient acreage.

AREA REVIEW POLYGON NAME: Owl Creek CP

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

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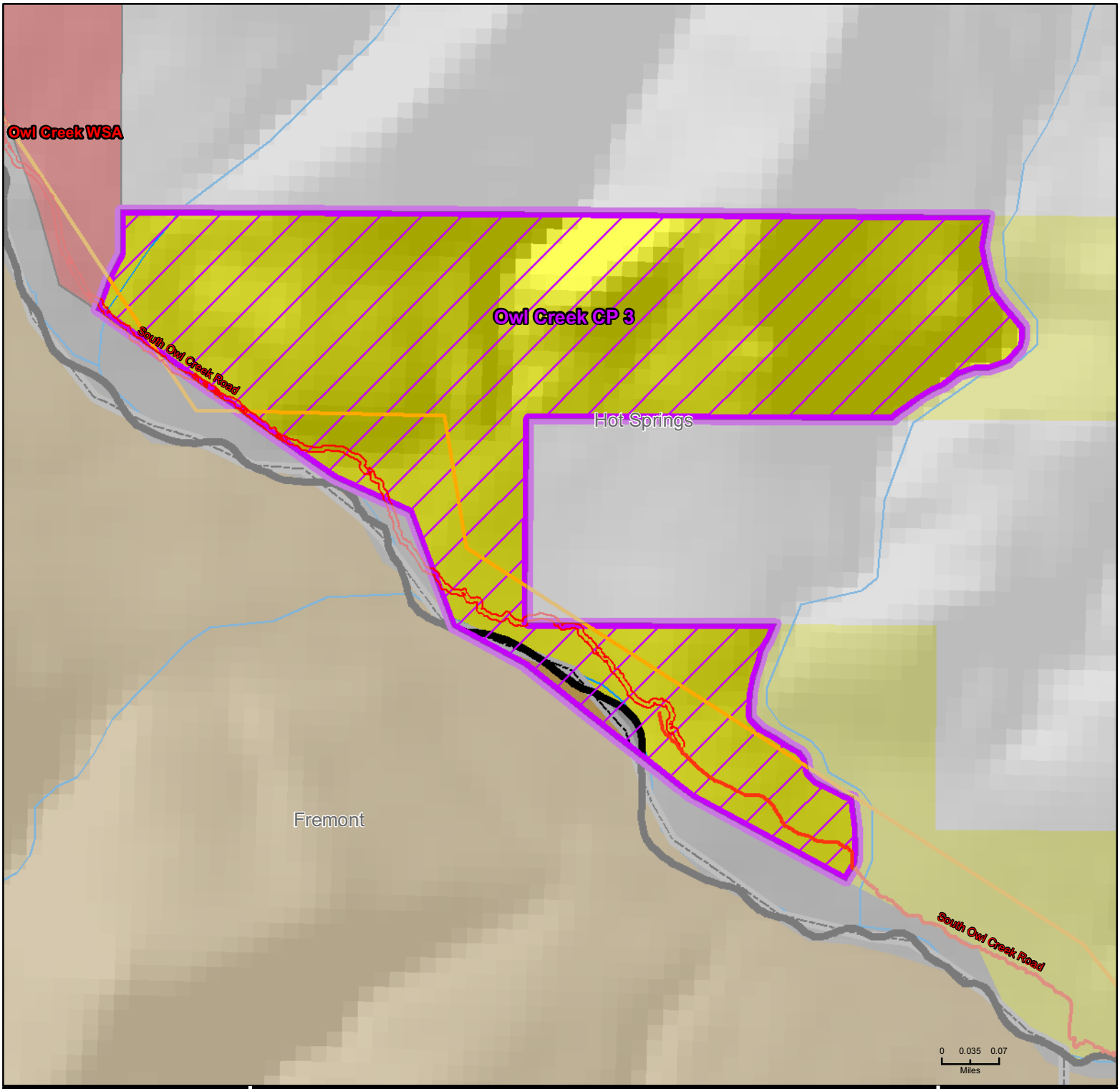

Lands with Wilderness Charateristics

Owl Creek CP 3

N W E S

Acres: 235

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Owl Creek CP 3 **Acres:** 235

State: Wyoming **County:** Hot Springs

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient in acreage and linear shape.

Miles of roads (See the road definition that is stated in Process Paper): 0.83 miles of two-track trail and 0.38 miles of graded dirt road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 148.70 acres of semi-primitive motorized and 82.26 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 0.94 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities, or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is insufficient in acreage to qualify as being considered for the evaluation of wilderness characteristics. It contains roads and motorized ROS designations. There are 232 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. It is adjacent to the Owl Creek Wilderness Study Area but is too small for wilderness characteristics.

AREA REVIEW POLYGON NAME: Owl Creek CP

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

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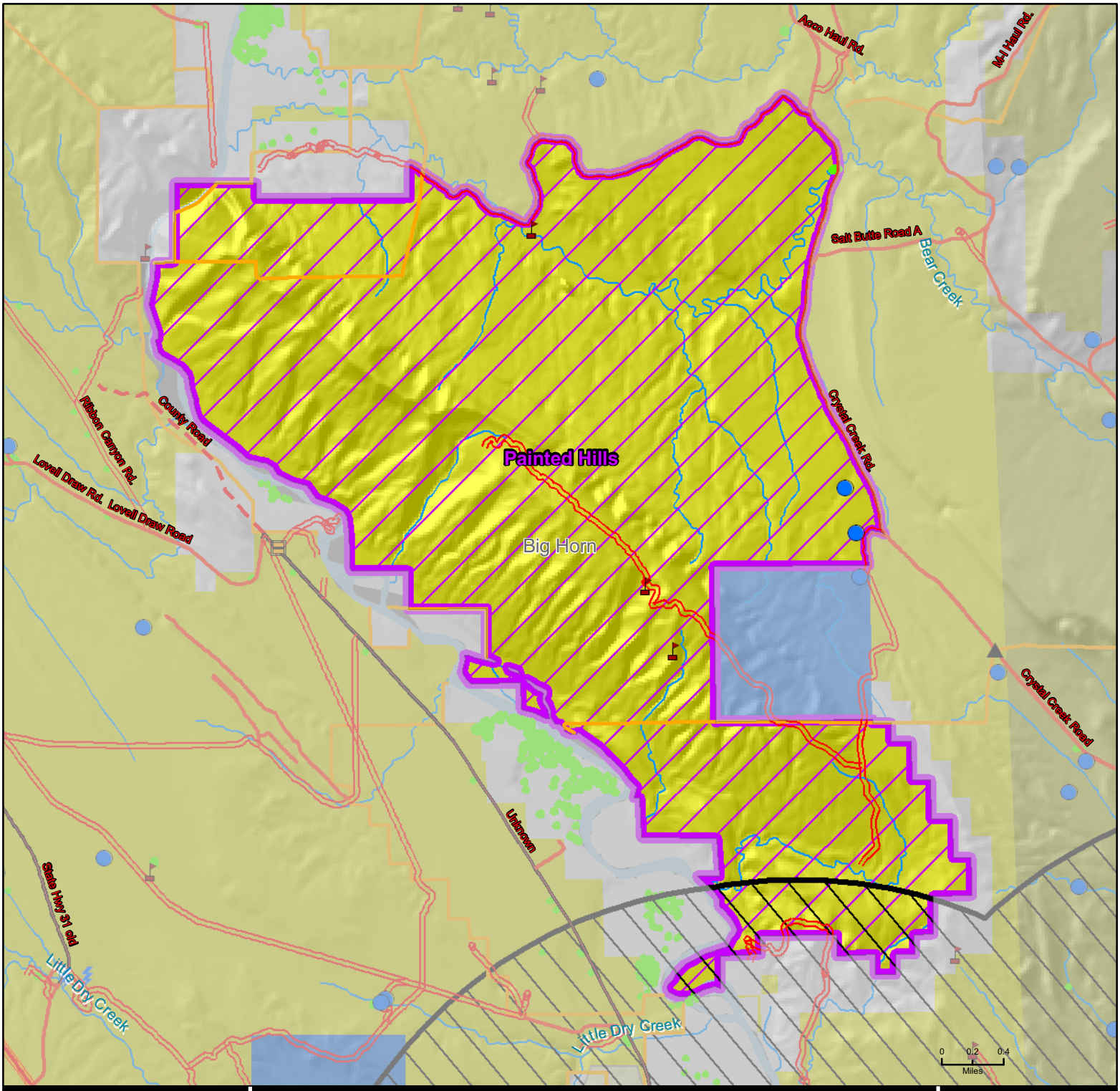

Lands with Wilderness Charateristics

Painted Hills

Acres: 9182

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Painted Hills **Acres:** 9,182

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 6.75 miles of two-track road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,928.16 acres of roaded natural and 7,254.09 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Three oil and gas wells.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.6 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 5.97 miles of fence, 5.42 miles of natural barrier, and two reservoirs.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1 Wilderness Inventory. Present are range improvement structures, roads, motorized ROS, and oil and gas wells. There are 7,463 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures that prevents an opportunity to redraw the boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Painted Hills

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

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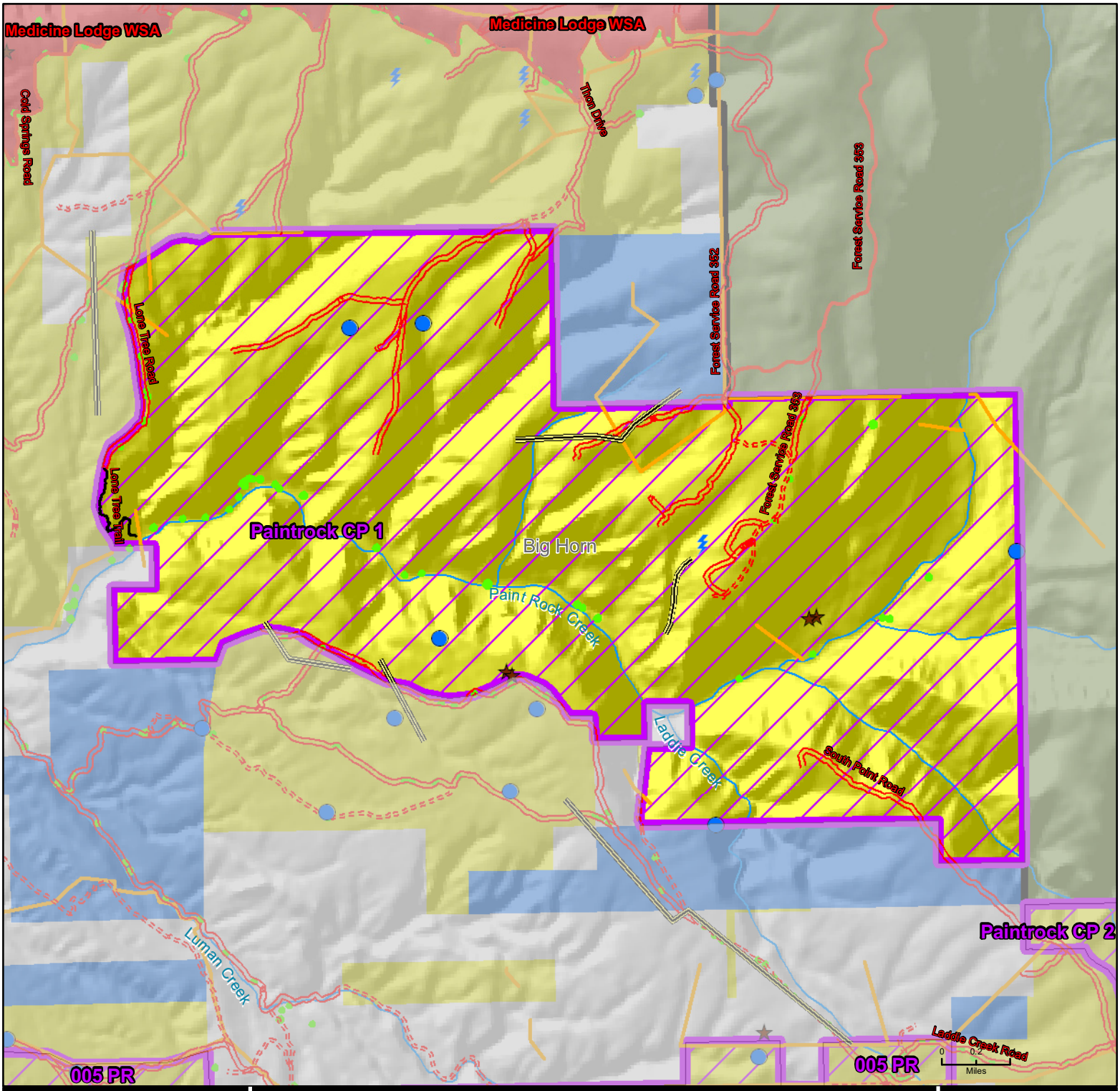

Lands with Wilderness Charateristics

Paintrock CP 1

N W E S

Acres: 8248

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
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- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Paintrock CP 1 **Acres:** 8,248

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 10.32 miles of two-track trail, 1.61 miles of ATV trail, and 0.77 miles of walking trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 2,070.29 acres of semi-primitive motorized and 6,177.40 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 6.47 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified):

Range Improvement structures: 1.59 miles of pipeline, 4.38 miles of fence, four exclosures, four reservoirs, and one water well. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Has 2 rough, dead end roads used for hunting. A black plastic unburied pipeline with a trough to be." (Chet Wheeless, BLM, 7/7/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains range improvement structures, noxious weeds, motorized ROS, and roads. There are only 13 of 8,248 acres of Category Improve on the range allotments which would not detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures with only pipelines appearing in the GIS data. Field verification for other range improvement structures should be performed. There is an even distribution of roads and pipelines resulting in no opportunity to redraw boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Paintrock CP

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

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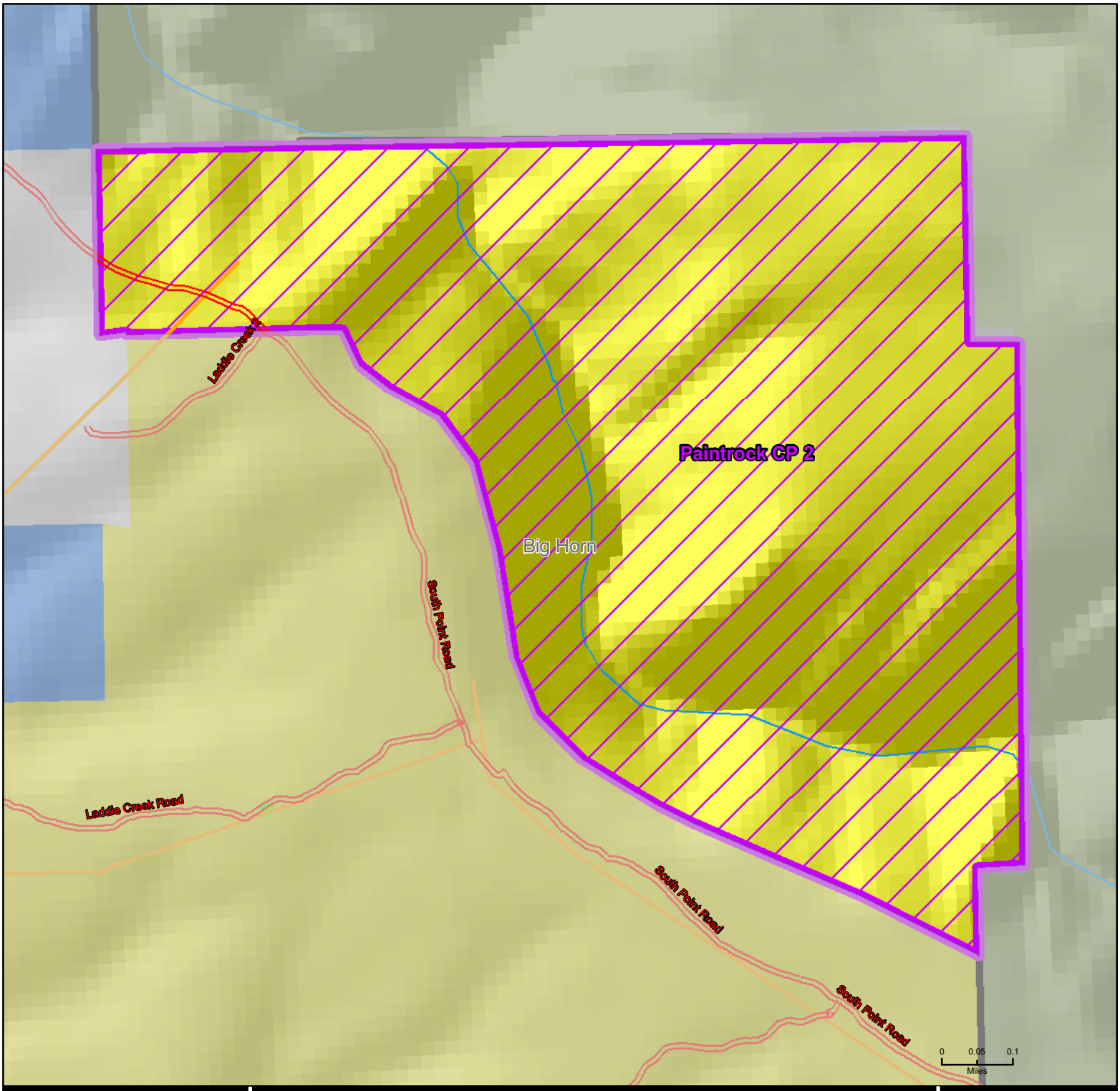
Dan Rice



Lands with Wilderness Charateristics

Paintrock CP 2

N
W
E
S

Acres: 561

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Paintorck CP 2 **Acres:** 561

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage.

Miles of roads (See the road definition that is stated in Process Paper): 0.26 miles of two-track trail.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 42.4 acres of semi-primitive motorized and 517.76 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 0.14 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes: "Has 2 rough, dead end roads used for hunting. A black plastic unburied pipeline with a trough to be." (Chet Wheeless, BLM, 7/7/2009).

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities, or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It is insufficient in size to manage for wilderness characteristics, contains a short road and motorized ROS designations. There is no acreage within Category Improve on the range allotments that would detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified.

AREA REVIEW POLYGON NAME: Paintrock CP

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

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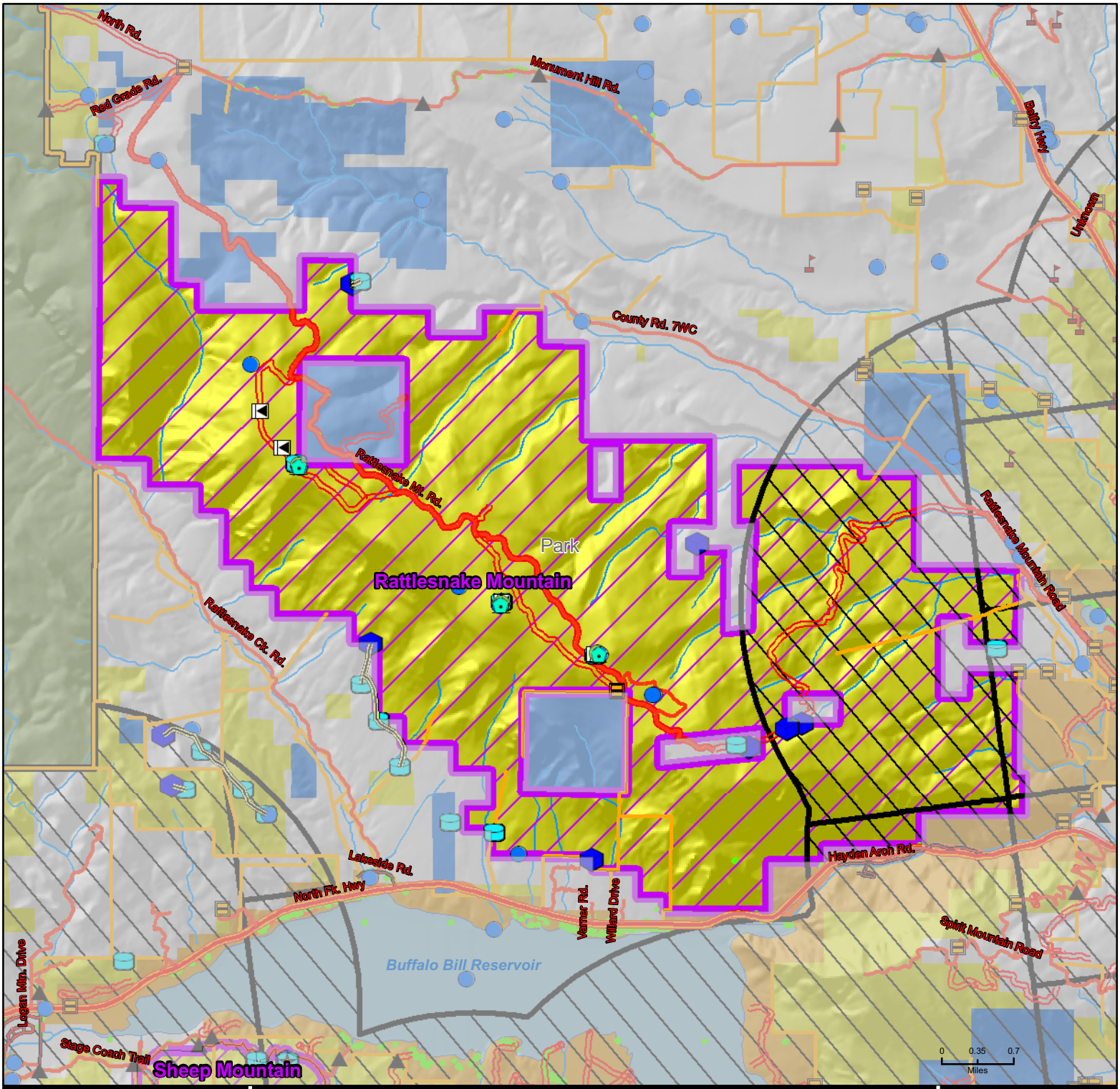

Lands with Wilderness Charateristics

Rattlesnake Mountain

Acres: 18663

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Rattlesnake Mountain **Acres:** 18,663

State: Wyoming **County:** Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0.1

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 15.52 miles of two-track trail and 7.05 miles of graded dirt road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 145.11 acres of rural, 11,593.83 acres of semi-primitive motorized, and 6,924.14 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.78 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Two gates, three exclosures, 7.86 miles of fence, 29.73 miles of natural barrier, four valves, five spring boxes, five stock tanks, three reservoirs, three guzzlers, and three storage tanks.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains multiple range improvement structures, is dissected by multiple roads, motorized ROS, and is adjacent to a wildland urban interface. There are 4,065 acres of Category Improve that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of multiple structures resulting in no opportunity to redraw boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Rattlesnake Mountain

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

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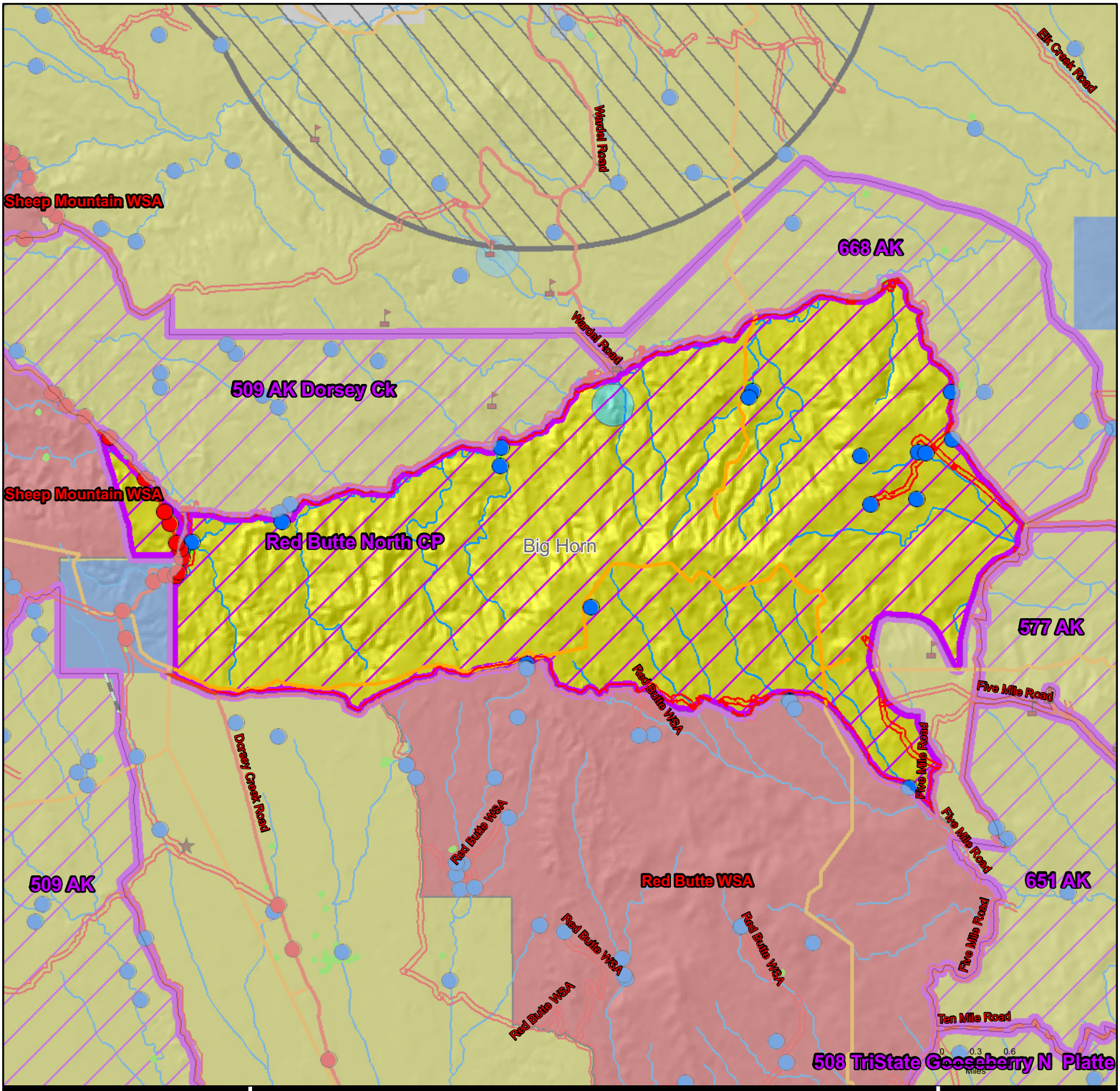

Lands with Wilderness Charateristics

Red Butte North CP

Acres: 11777

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Red Butte North CP **Acres:** 11,777

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 11.9 miles of two-track trail, 0.04 miles of ATV trail, 1.3 miles of graded dirt road, and 0.99 miles of unknown road. Multiple culverts in and along boundary.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 1,208.5 acres of roaded natural, 8,073.70 acres of semi-primitive motorized, and 2,212.97 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Boundary contains an existing oil and gas field.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.68 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Twelve reservoirs and 10.25 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. There is an existing oil and gas field, roads, motorized ROS, reservoirs, and noxious weeds within its boundary. There are 11,313 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. There is an even distribution of structures resulting in no opportunity to redraw the boundary to capture wilderness characteristics.

AREA REVIEW POLYGON NAME: Red Butte North CP

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

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HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

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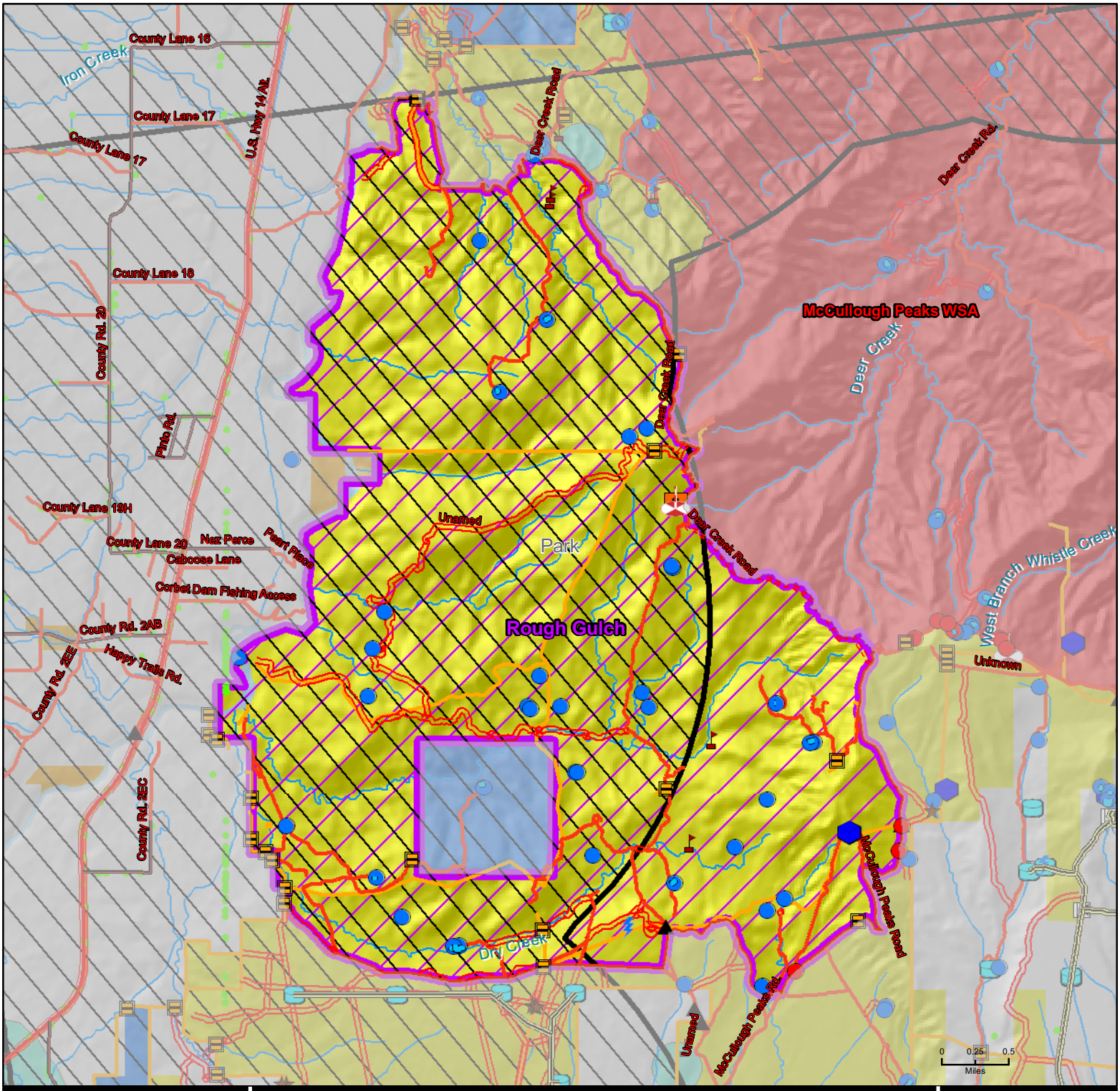

Lands with Wilderness Charateristics

Rough Gulch

Acres: 12508

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Rough Gulch **Acres:** 12,508

State: Wyoming **County:** Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 13.58 miles of two-track road, 2.59 miles of ATV trail, and 24.41 miles of graded dirt road. Three culverts along perimeter.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 2,221.44 acres of rural, 8,073.70 acres of semi-primitive motorized, and 2,212.97 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Boundary overlaps with an existing oil and gas field. Contains four oil and gas wells.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 24.75 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Fourteen gates, 0.16 miles of down fence, 16.75 miles of fence, 6.19 miles of natural barrier, 32 reservoirs, eight dams, one spring box, one spring development, two cattleguards along perimeter, and one excavated catchment.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains an existing oil and gas field, oil and gas wells, multiple range improvement structures, roads, motorized ROS, and is adjacent to a wildland urban interface. There are 8,716 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures resulting in no opportunity to redraw the boundary to capture wilderness characteristics. It is adjacent to the McCullough Peaks Wilderness Study Area but due to the structures it does not enhance wilderness characteristics.

AREA REVIEW POLYGON NAME: Rough Gulch

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

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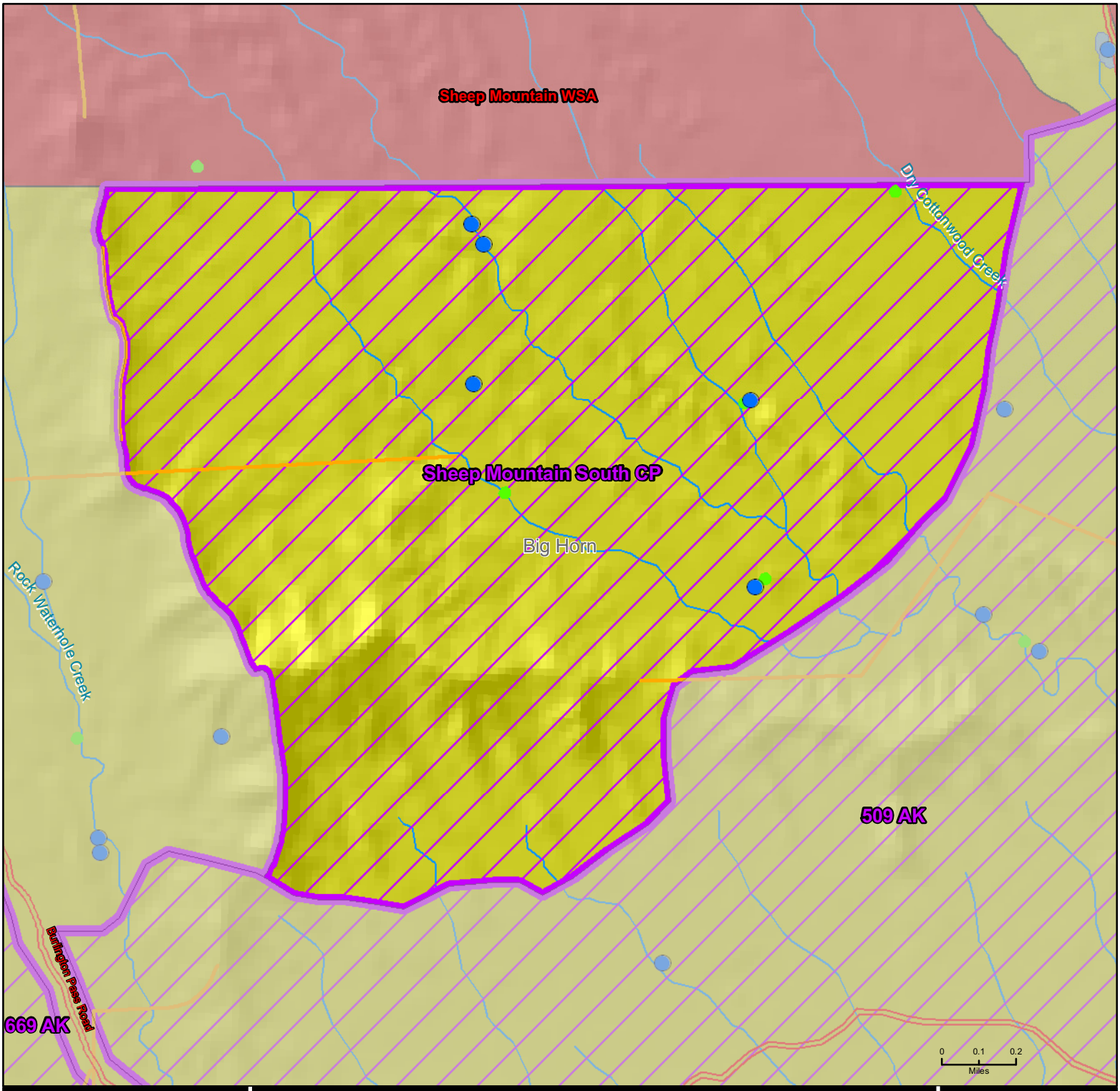


Lands with Wilderness Charateristics

Sheep Mountain South CP

N W E S

Acres: 2172

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Sheep Mountain South CP **Acres:** 2,172

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage.

Miles of roads (See the road definition that is stated in Process Paper): 0

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 2,172.25 acres of semi-primitive motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.8 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Five reservoirs and 0.58 miles of fence. Within possible GIS data gap. Field verify range improvement structures.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance, construction-related activities, or other criteria that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. This area is insufficient in acreage to manage for wilderness characteristics and contains motorized ROS designations and reservoirs. There are 2,172 acres of Category Improve that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is within the GIS data gap for range improvement structures and should be field verified. It is adjacent to the Sheep Mountain Wilderness Study Area, but in this case the size and structures does not allow for the enhancement of wilderness characteristics.

AREA REVIEW POLYGON NAME: Sheep Mountain South CP

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

PARK COUNTY COMMISSIONERS

Tim A. French

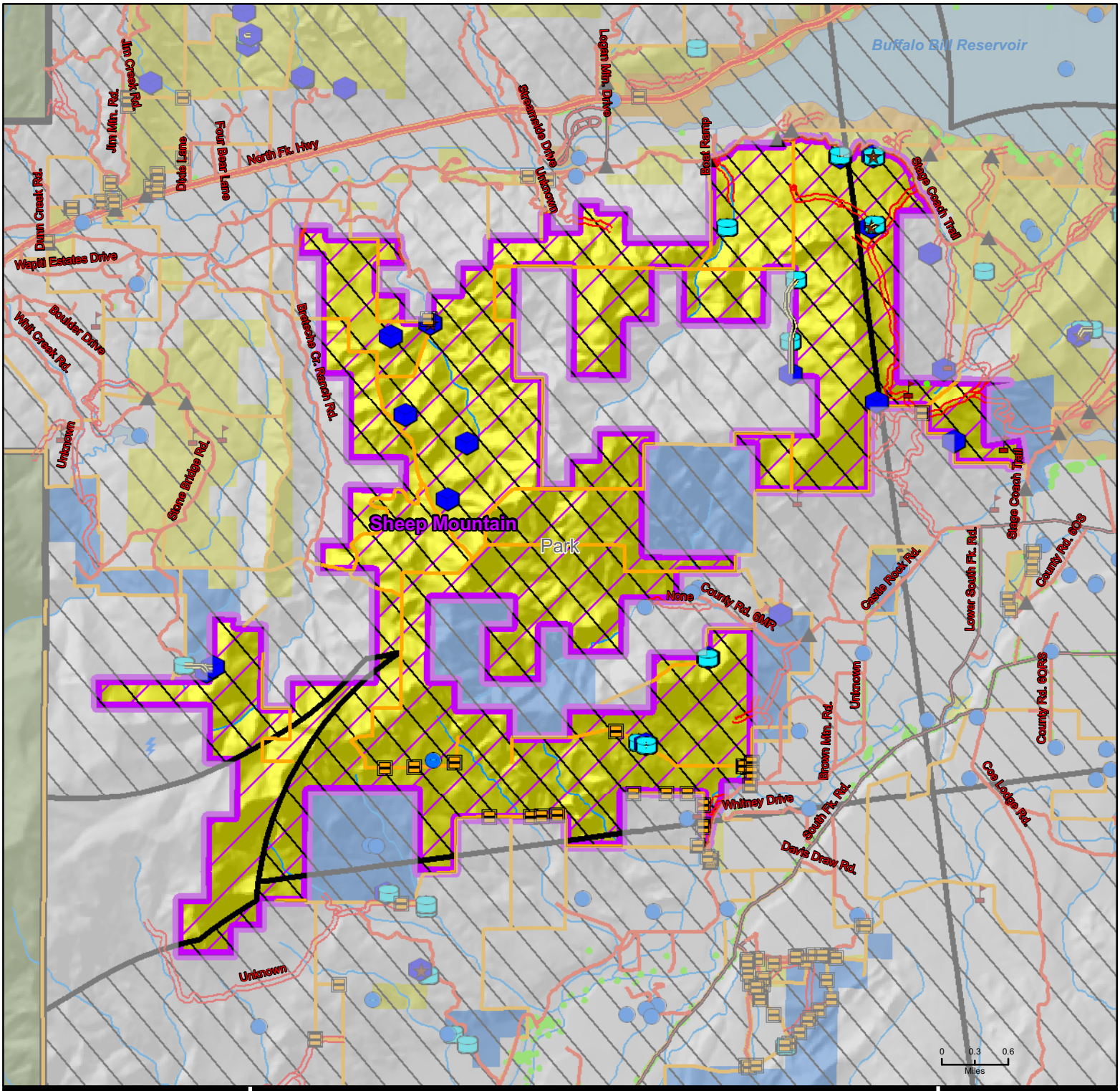
Jill Shockley Siggins

MEETEETSE CONSERVATION DISTRICT

Clara Mae Yetter

WASHAKIE COUNTY CONSERVATION DISTRICT

Dan Rice



Lands with Wilderness Charateristics

Sheep Mountain

Acres: 13064

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

DRAFT

Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Sheep Mountain **Acres:** 13,064

State: Wyoming **County:** Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0.1

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, sufficient acreage but many linear narrow extensions of boundary with large holes of state and private lands.

Miles of roads (See the road definition that is stated in Process Paper): 5.79 miles of two-track road, and 0.12 miles of graded dirt road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 36.45 acres of rural, 3,279.81 acres of semi-primitive motorized, and 9,747.28 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): Yes.

Permitted existing leasable/locatable mineral areas: Two oil and gas wells.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.24 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: Twelve gates, three exclosures, 32.6 miles of fence, 5.13 miles of natural barrier, one dam, one reservoir, one surface point, 14 spring boxes, nine stock tanks, four cattleguards on the perimeter, 0.24 miles of pipelines and one valve.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains multiple types of range improvement structures, oil and gas wells, roads, motorized ROS, and is adjacent to a wildland urban interface. There are 4,138 acres of category Improve on the range allotments that detract from the naturalness of the area. It is a combination of relatively narrow extensions surrounding large holes of private and state lands, making this boundary insufficient in shape to manage for wilderness characteristics. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures therefore no opportunity to redraw the boundary to capture wilderness characteristics exists.

AREA REVIEW POLYGON NAME: Sheep Mountain

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

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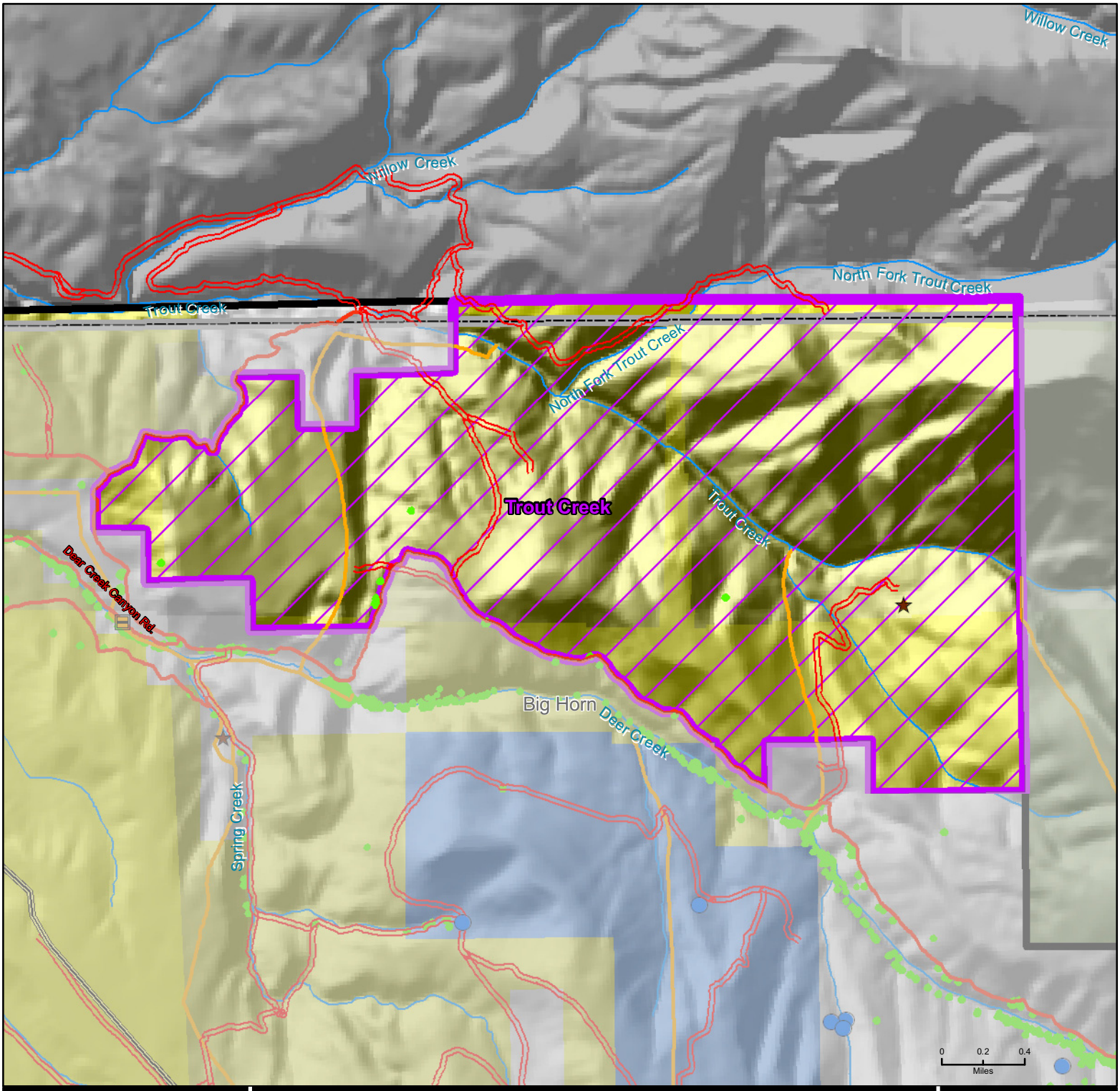

Lands with Wilderness Charateristics

Trout Creek

Acres: 4514

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Trout Creek **Acres:** 4,514

State: Wyoming **County:** Big Horn

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): No, insufficient acreage.

Miles of roads (See the road definition that is stated in Process Paper): 4.7 miles of two-track road and 1.82 miles of graded dirt road.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 3,149.64 acres of semi-primitive motorized and 1,364.65 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Nothing verified.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 0.91 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: One exclosure, 2.3 miles of fence and 3.84 miles of natural barrier.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains range improvement structures, roads, and motorized ROS. The size of the area is not of sufficient size for managing wilderness characteristics. There are 4,514 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. It is not adjacent to a wilderness study area therefore not enhancing wilderness characteristics to allow for the insufficient size.

AREA REVIEW POLYGON NAME: Trout Creek

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

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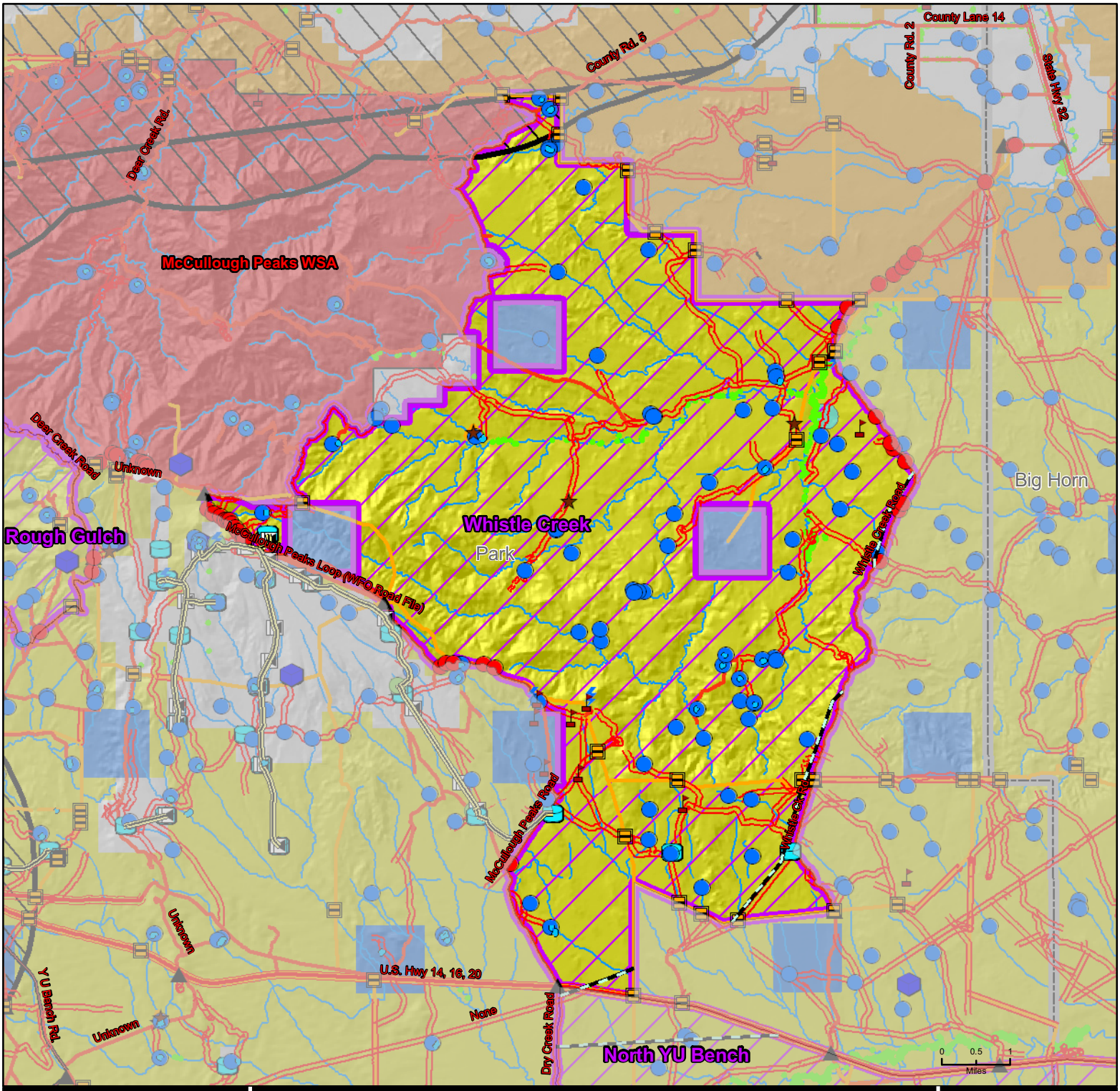
Dan Rice



Lands with Wilderness Charateristics

Whistle Creek

Acres: 37727

Basemap Legend

- Oil and Gas Wells (Active and PA)
- Bighorn Basin Planning Area
- Counties
- Lands with Wilderness Characteristics
- Wilderness Study Area
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Bureau of Reclamation

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Roads/ROW Legend

- Two-track Trail
- Unknown Road
- ATV Trail
- City Street
- Graded Dirt Road
- Gravel Road
- Highway
- Reclaimed
- Secondary Road
- Seismograph Trail
- Walking Trail
- Abandoned Road
- Oil and Gas Pipeline
- Power Line
- Pipeline ROW (Field Verified)
- 3 Road Intersection (Field Verified)

Range Improvement/Structure Legend

- Air Vent
- Cabin/Homestead
- Camp Site
- Cattleguards
- Corral Chutes
- Culverts
- Dams
- Detention Dam
- Diversion Point
- Drain
- Excavated Catchment
- Exclosure
- Existing Loactable Mineral Operation
- Fences
- Gate
- Generator
- Guzzler Intake
- Head Gate
- Logging Area
- Noxious Weeds/Invasives
- Oil and Gas Fields
- Pipeline
- Pipeline (water)
- Portable Tank
- Pump
- Reseeding Projects
- Reservoirs
- Rock Quarry
- Solar Charger
- Solar Panel
- Spring Box
- Spring Development
- Spring Discharge
- Stock Tank/Storage Tank
- Stock Tank Overflow
- Storage Tank
- Supplement Trough
- Surface/Structure Point
- Valve
- Vent
- Water Gap
- Water Spigot
- Water Storage Trough
- Water Structure
- Water Wells
- WUI 3 Mile Proximity Buffer

Big Horn Basin Wilderness Characteristics Confirmation Inventory Evaluation

Inventory Unit Identification

Area Name/Number: Whistle Creek **Acres:** 37,727

State: Wyoming **County:** Park

Evaluator: John Sanford, Larry Blocker **Date:** 09/29/2010

Unit Analysis: Describe in a concise narrative, with numbers as available, the following applicable factors that may affect naturalness, solitude or a primitive and unconfined type of recreation, or supplemental values.

Acres of private ownership (GIS acreage): 0

Area configuration (Is the boundary conducive to maintaining wilderness characteristics?): Yes, non-linear.

Miles of roads (See the road definition that is stated in Process Paper): 54.61 miles of two-track road, 0.77 miles of ATV trail, 18.09 miles of graded dirt road, and 0.82 miles of gravel road. Multiple culverts line the perimeter of the area.

Well established motorized recreation use, summer or winter (Permittee or BLM verified): Contains 3,187.35 acres of roaded natural, 32,788.76 acres of semi-primitive motorized, and 1,751.15 acres of semi-primitive non-motorized in the BLM ROS data.

Adjacent to wildland-urban interface (within three-mile buffer): No.

Permitted existing leasable/locatable mineral areas: Contains existing oil and gas field, five oil and gas wells, and 6.18 miles of oil and gas pipeline.

Power transmission/distribution lines (field verified): Nothing verified.

Drill rows (field verified): Nothing verified.

Invasive plants, non-native plants, and noxious weeds (GIS acreage): 25.28 acres of noxious weeds.

Invasive plants, non-native plants, and noxious weeds (field verified): Nothing verified.

Range Improvement structures: 66 reservoirs, 17 dams, one valve, four stock tanks, seven cattleguards along perimeter, 11 gates, three exclosures, 23.32 miles of fence, and 3.13 miles of natural barrier.

☐ **Local Governmental Cooperating Agencies' inventory did not find significant constructed features or other attributes that detract from wilderness characteristics.**

☒ **Local Governmental Cooperating Agencies' inventory did find significant constructed features or other attributes that detract from wilderness characteristics.**

Area meets size or naturalness criterion.

☐ **Yes** ☒ **No**

Photo log: Attach and describe photos (keyed to a map) that visually explain the points covered in the narrative.

GPS Review Points:

Notes:

Is the area in natural condition?

☐Yes ☒No

Does the area have outstanding opportunities for solitude?

☐Yes ☒No

Does the area have outstanding opportunities for primitive and unconfined recreation?

☐Yes ☒No

Summation Statement: This inventory has documented significant disturbance and construction-related activities that detract from the wilderness characteristics as articulated in the Wilderness Act and defined in BLM manual 6300-1-Wilderness Inventory. It contains a multitude of range improvement structures, roads, motorized ROS, noxious weeds, an oil and gas well, an oil and gas pipeline, and an existing oil and gas field. There are 37,717 acres of Category Improve on the range allotments that detract from the naturalness of the area. The cumulative effect of the impacts found within this area detracts from wilderness characteristics by affecting the apparent naturalness. There is an even distribution of structures that would not allow for the boundary to be redrawn capturing wilderness characteristics.

AREA REVIEW POLYGON NAME: Whistle Creek

DATE: December 17, 2010

BIGHORN COUNTY COMMISSIONERS

Jerold "Jerry" S. Ewen

Keith Grant

SOUTH BIG HORN CONSERVATION DISTRICT

Linda Hamilton

HOT SPRINGS COUNTY COMMISSIONERS

Mike Baker

John P. Lumley

HOT SPRINGS CONSERVATION DISTRICT

DeLoyd Quarberg

Terry Wilson

PARK COUNTY COMMISSIONERS

Tim A. French

Jill Shockley Siggins

MEETEETSE CONSERVATION DISTRICT

Clara Mae Yetter

WASHAKIE COUNTY CONSERVATION DISTRICT

Dan Rice

APPENDIX B

LIST OF LGCA PARTICIPANTS IN LWC REVIEW

Meeting Date	Wilderness Polygons Reviewed	Participants
10/29/2010	N YU Bench Little Dry Creek Honeycombs South CP 622 AK	Jerry Ewen - Big Horn County Commissioner Keith Grant – Big Horn County Commissioner John Lumley – Hot Springs County Commissioner Mike Baker – Hot Springs County Commissioner Terry Wilson – Hot Springs Conservation District DeLoyd Quarberg – Hot Springs Conservation District Dave Burke - Park County Commissioner Aaron Anderson – Washakie County Commissioner Terry Wolf – Washakie County Commissioner Dan Rice – Washakie County Conservation District
11/5/2010	0008 DH 0016 DH 31 PR 0048 PR 005 PR 069 JW	Jerry Ewen – Big Horn County Commissioner Keith Grant – Big Horn County Commissioner Mike Baker – Hot Springs County Commissioner DeLoyd Quarberg – Hot Springs Conservation District Terry Wilson – Hot Springs Conservation District Dave Burke – Park County Commissioner Jill Shockley-Siggins - Park County Commissioner Tim French - Park County Commissioner Clara Mae Yetter - Meeteetse Conservation District Steve Jones - Meeteetse Conservation District Aaron Anderson – Washakie County Commissioner Dan Rice – Washakie County Conservation District Tori Dietz – Washakie County Conservation District
11/12/2010	130 JW 508 AK 508 Tri-State Gooseberry N. Platte 509 AK 509 AK Dorsey Ck 516 DH 568 TS 577 AK 626 AK 639 AK	Jerry Ewen – Big Horn County Commissioner Keith Grant – Big Horn County Commissioner Linda Hamilton – South Big Horn Conservation District Mike Baker – Hot Springs County Commissioner DeLoyd Quarberg – Hot Springs Conservation District Jill Shockley-Siggins - Park County Commissioner Tim French - Park County Commissioner Clara Mae Yetter – Meeteetse Conservation District Steve Jones – Meeteetse Conservation District Dan Rice – Washakie County Conservation District Tori Dietz – Washakie County Conservation District

Meeting Date	Wilderness Polygons Reviewed	Participants
11/19/2010	651 AK 652 Lower, Upper AK 661 TS 665 CW 668 AK 669 AK 676 AK, PR 1535 PR 1536 PR Alkali Creek NW CP	Keith Grant – Big Horn County Commissioner Linda Hamilton – South Big Horn Conservation District John Lumley – Hot Springs County Commissioner Mike Baker – Hot Springs County Commissioner Terry Wilson – Hot Springs Conservation District DeLoyd Quarberg – Hot Springs Conservation District Penny Herdt – Hot Springs County Administrative Assistant Jill Shockley-Siggins – Park County Commissioner Tim French – Park County Commissioner Steve Jones – Meeteetse Conservation District Clara Mae Yetter – Meeteetse Conservation District Aaron Anderson – Washakie County Commissioner Dan Rice – Washakie County Conservation District Terry Wolf – Washakie County Commissioner
12/10/2010	Bald Ridge Bobcat Draw South CP Bobcat Draw South II CP Bobcat Draw West CP Carter Mountain Cedar Ridge Coon Creek Crystal Creek Honeycombs 164 CP Honeycombs NW 107 CP	Keith Grant – Big Horn County Commissioner Linda Hamilton – South Big Horn Conservation District John Lumley – Hot Springs County Commissioner Mike Baker – Hot Springs County Commissioner Terry Wilson – Hot Springs Conservation District DeLoyd Quarberg – Hot Springs Conservation District Penny Herdt – Hot Springs County Administrative Assistant Clara Mae Yetter – Meeteetse Conservation District Steve Jones – Meeteetse Conservation District Kristen Tilley - Shoshone Conservation District Aaron Anderson – Washakie County Commissioner Dan Rice – Washakie County Conservation District Terry Wolf – Washakie County Commissioner Tori Dietz - Washakie County Conservation District

Meeting Date	Wilderness Polygons Reviewed	Participants
12/17/2010	Medicine Lodge North CP Owl Creek CP Painted Hills Paintrock CP Rattlesnake Mountain Red Butte North CP Rough Gulch Sheep Mountain South CP Sheep Mountain Trout Creek Whistle Creek	Jerry Ewen – Big Horn County Commissioner Keith Grant – Big Horn County Commissioner John Lumley – Hot Springs County Commissioner Mike Baker – Hot Springs County Commissioner Terry Wilson – Hot Springs Conservation District DeLoyd Quarberg – Hot Springs Conservation District Penny Herdt – Hot Springs County Administrative Assistant Linda Hamilton – South Big Horn Conservation District Jill Shockley-Siggins – Park County Commissioner Tim French – Park County Commissioner Clara Mae Yetter – Meeteetse Conservation District Steve Jones – Meeteetse Conservation District Kristen Tilley – Shoshone Conservation District Dan Rice – Washakie County Conservation District

APPENDIX B

Local Government Cooperating Agencies
Bighorn Basin, Wyoming

TRACKING ROAD DEFINITIONS, SAFETY/MAINTENANCE, AND ACCESS ISSUES THROUGH TIME AND BY PROCESS

Prepared for

Bighorn Basin – Bureau of Land Management

May 3, 2011

Ecosystem Research Group
121 Hickory Street
Missoula, MT 59801
(406) 721-9420
www.ecosystemrg.com

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TABLE OF FIGURES

1. INTRODUCTION

This report documents in detail the change in road definitions in relation to Lands with Wilderness Characteristics (LWC) Inventories and previously published Bureau of Land Management (BLM) Resource Management Plans (RMP) and Environmental Impact Statements (EIS). The impetus of this report is in response to the current revision of the BLM Bighorn Basin RMP in northwestern Wyoming and the inclusion of LWCs within the planning area and LWCs proposed as "Wild Lands." This report incorporates 10 documents to illustrate the change in road definitions through time, along with safety/maintenance and access issues. Further, using the federal documents as a guide, this report works to clarify the question "what is a road" and should "two-tracks (user-created roads) be considered roads by the BLM?" The 10 documents used in the composition of this report include:

- Wilderness Act of 1964 (United States Congress 1964)
- Wilderness Inventory Handbook (U.S.Department of the Interior 1978)
- BLM Manual 9113 – Roads (U.S.Department of the Interior 1985)
- Washakie Resource Area RMP (U.S.Department of the Interior 1988)
- Cody Resource Area RMP (U.S.Department of the Interior 1990)
- Grass Creek Planning Area RMP (U.S.Department of the Interior 1998)
- H-6310-1Wilderness Inventory and Study Procedures (U.S.Department of the Interior 2001)
- BLM Roads and Trails Terminology Report (U.S.Department of the Interior 2006)
- Bighorn Basin Preliminary Draft RMP and EIS (U.S.Department of the Interior 2010b)
- 6300-1-Wilderness Inventory (U.S.Department of the Interior 2010a)

2. WILDERNESS ACT OF 1964

The Wilderness Act of 1964 discusses the relationship between roads and wilderness in the following excerpt:

> Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

The previous statement is found in "Prohibition of Certain Uses, Part C" of the Wilderness Act of 1964 (United States Congress 1964). The Wilderness Act mandates there shall be no permanent or temporary road within areas considered for wilderness. Two-track roads (two-tracks) can be either permanent or temporary depending upon their use. Established two-tracks are used for accessing resources such as range improvements or oil and gas infrastructure and are driven on by highway vehicles, not limited to off-highway vehicles (OHV), such as all terrain vehicles (ATV).

3. WILDERNESS INVENTORY HANDBOOK

The Wilderness Inventory Handbook discusses roads in the following excerpts:

> Definition of "Road" – Of all the issues raised by the public, the road definition received the most comment. There were strongly stated points of view in opposition to the definition. In addition, it was pointed out that the definition did not follow what Congress had said in developing the law. Therefore, this handbook now uses the one definition found in the legislative history, exactly. This is, however, a relatively minor change from the definition BLM proposed. Given any definition, the interpretation of that definition on the ground is what is important and this leads to the second major issue raised.
>
> Public Involvement – Many people felt that public participation in the wilderness review process was not adequate, particularly because the inventory deals with such subjective judgments: "What is or is not a road?" "What is solitude?" "What is outstanding?" "What is naturalness?" and so on. BLM agrees and believes that the best way to arrive at these subjective judgments is to provide the opportunity for the fullest possible public involvement in the process, including direct participation in the inventory and thorough public review. These concepts are incorporated in this handbook.

The previous statement is found in the "Preface" of the Wilderness Inventory Handbook (U.S.Department of the Interior 1978). The issue of road definitions is convoluted in association with two-tracks. The intent of this report is to relate two-tracks/routes/trails to road definitions and classifications from multiple sources to show that two-tracks are indeed roads and therefore, should be considered as such in a LWC Inventory.

The Wilderness Inventory Handbook discusses "naturalness" and "outstanding opportunities for solitude." Naturalness and outstanding opportunities are two of the three criteria for designating LWCs. Outstanding is a subjective designation for determining opportunities for solitude.

> Definition of a "Road" – For the purposes of the BLM's wilderness inventory, the following definition is adopted: "The word 'roadless' refers to the absence of roads which have been improved and maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road." This language is quoted exactly from the legislative history of FLPMA[1], the House of Representatives Report 94-1163, page 17, May 15, 1976. It is the only statement regarding the definition of a road in the law or legislative history.
>
> For a variety of reasons, and from a number of different points of view, the road definition generated the most public comment and concern. Some people felt the definition should require formal construction, such as graded and graveled roads, while many on the other hand, felt that any vehicle: track or trail, would be more appropriate. One question that was asked, "Why not use some other definition, such as the one used by the Forest Service or the Park Service?"
>
> Therefore, the BLM has adopted and will use the following sub-definitions of certain words and phrases in the BLM road definition stated above:

[1] Federal Land Policy Management Act (FLPMA).

> **"Improved and maintained"** – Actions taken physically by man to keep the road open 10 vehicular traffic. "Improved" does not necessarily mean formal construction. "Maintained" does not necessarily mean annual maintenance."
>
> **"Mechanical means"** – Use of hand or power machinery or tools.
>
> **"Relatively regular and continuous use"** – Vehicular use which has occurred and will continue to occur on a relatively regular basis. Examples are: access roads for equipment to maintain a stock water tank or other established water sources; access roads to maintained recreation sites or facilities; or access roads to mining claims.

In adopting this definition it is recognized that there will still be a wide range of opinions as to what constitutes a "road." Therefore, in determining "roadlessness"; the BLM will be guided by the following principles:

> The widest possible range of public opinion from diverse points of view will be sought in looking for the presence or absence of "roads." Good judgment based on common sense and a balanced and objective analysis of what people say and how they feel is the best guide that can be given.
>
> Knowing that some cases will be hard to judge, State Directors and District Managers will remember that it is the purpose of the wilderness inventory to find those places on the public lands which, by their very nature, truly have the attributes and the character of wilderness, so that the American people will have the opportunity through the process of study, recommendation, and determination by Congress to choose which of these places should become part of the National Wilderness Preservation System. That is certainly the intent of the law.
>
> Wise, unbiased, and careful use of the road definition as adopted, with full public involvement, will insure that this intent will be achieved.

The previous definitions and statements are found in "Part 3" of the Wilderness Inventory Handbook (U.S.Department of the Interior 1978). The public record shows that there was general disagreement at the time of the adoption of FLPMA regarding what is and how should a road be defined. Two-tracks that have road cuts, waterbars, cattleguards, culverts, dugways for creek crossings, or any other minor mechanical maintenance should be inventoried for maintenance and considered a road in an LWC Inventory.

4. BLM MANUAL 9113 – ROADS

The BLM Manual 9113 – Roads, disseminates the best management practices (BMPs) concerning the design and construction of roads. The following excerpts concern the data collection and design guidelines in conjunction with public safety and road management found in "Section 1, Road Program Management" of the BLM Manual 9113 (U.S.Department of the Interior 1985):

> Design Guidelines. Design guidelines reflect the Bureau philosophy for road design. Bureau roads are designed and constructed primarily to support the protection, development, use, and administration of public lands and resources, while the primary purpose for most non-Bureau roads and highways is to move traffic rapidly and economically from point to point. Bureau roads must ensure the safety of the user, but should respect the natural setting of the area.

> Road Program Management. The management of the road program requires data collection, information dissemination, and inter and intra-Bureau coordination to determine the need to construct, improve, maintain, acquire, transfer jurisdiction, restrict use, or close and obliterate certain roads. Coordination is particularly important, since almost all Bureau roads affect or are affected by resource management decisions or by road management decisions made by other organizations.

The BLM Geographic Information System (GIS) Transportation Geodatabase is incomplete when comparing it to the BLM Surface Management Status 1:100,000 Scale Topographic Map, Wyoming Department of Transportation (WYDOT) data, and the United States Geological Survey (USGS) Topographic Quadrangles. According to the Road Program Management, the BLM is required to maintain this data in conjunction with other agencies. Given the incompleteness of their GIS, it is questionable as to whether this has taken place.

BLM Manual 9113, "Section 16, Functional Classification," provides guidance to the BLM for classifying roads under their control (U.S.Department of the Interior 1985). A review of Section 16 provides additional evidence that two-tracks should be considered roads in a BLM LWC Inventory.

> Functional Classification. The method and terminology recommended by the National Highway Functional Classification Study of 1968 provides guidelines for classifying Bureau roads. The Bureau has added resource roads as a category in addition to those identified in the 1968 study as recommended by an interagency task group study on low-volume road standards, 1976-77. As Bureau roads are predominately low volume and are generally extensions of, or connectors to State or county systems, an "arterial" category does not apply to Bureau roads. Classify Bureau roads as follows:
>
> A. Collector Roads. These Bureau roads normally provide primary access to large blocks of land, and connect with or are extensions of a public road system. Collector roads accommodate mixed traffic and serve many uses. They generally receive the highest volume of traffic of all the roads in the Bureau road system. User cost, safety, comfort, and travel time are primary road management considerations. Collector roads usually require application of the highest standards used by the Bureau. As a result, they have the potential for creating substantial environmental impacts and often require complex mitigation procedures.
>
> B. Local Roads. These Bureau roads normally serve a smaller area than collectors, and connect to collectors or public road systems. Local roads receive lower volumes, carry fewer traffic types, and generally serve fewer uses. User cost, comfort, and travel time are secondary to construction and maintenance cost considerations. Low volume local roads in mountainous terrain, where operating speed is reduced by effort of terrain, may be single lane roads with turnouts. Environmental impacts are reduced as steeper grades, sharper curves, and lower design speeds than would be permissible on collector roads are allowable.
>
> C. Resource Roads. These Bureau roads normally are spur roads that provide point access and connect to local or collector roads. They carry very low volume and accommodate only one or two types of use. Use restrictions are applied to prevent conflicts between users needing the road and users attracted to the road. The location and design of these roads are governed by environmental compatibility and minimizing Bureau costs, with minimal consideration for user cost, comfort, or travel time.

Figure 1 Two-track or resource road (USDI 2009)

If resource roads are used to access resources, are visibly two-tracks, and designated two-tracks by the BLM, then clearly they should be considered roads as defined in BLM Manual 9113 – Roads. Two-tracks would fall under the "Regular and Continuous Use" definition used by the BLM. The caption under Figure 1 on the BLM website reads, "BMPs reduce the amount of area disturbed for development. In some cases, two-track roads are used to lessen disturbance..."

5. WASHAKIE RESOURCE AREA RMP

The following excerpts concerning road issues are from the Washakie Resource Area RMP.

> All roads and vehicle trails in Dry Medicine Lodge Canyon above the dugway, will be closed and rehabilitated where accelerated erosion is occurring. Additional off-road vehicle (ORV) restrictions will be applied as described in the ORV discussion in this plan.

The previous statement is found in "Management Actions" of the Washakie Resource Area RMP (U.S.Department of the Interior 1988). The mention of the term "dugway" ("a way or road dug through a hill, or sunk below the surface of the land," *Webster's Revised Unabridged Dictionary, 1996*) is used in this management direction and can be related to construction-related activities or maintenance on possible two-track motorized trails. For the purpose of LWC Inventories, dugways should be identified. Two-tracks with maintenance for erosion control should meet the standards of mechanical maintenance and be considered a road in an LWC inventory

> Rights-of-way are required for all facilities, tank batteries, pipelines, truck depots, power lines, and access roads that occupy federally owned land outside the lease or unit boundary. When a third party (someone other than the oil or gas company and the federal government) constructs a facility or installation on or off the lease, a right-of-way is also required.

The previous statement is found in "Appendix A," under "Issuance of Rights-of-Way" of the Washakie Resource Area RMP (U.S. Department of the Interior 1988). Further, the following statement is found in "Appendix A" under "Surface Disturbance Associated with Exploratory Drilling" of the Washakie Resource Area RMP (U.S.Department of the Interior 1988).

> Upon receiving approval to drill the proposed well, the operator moves construction equipment over existing roads to the point where the access road will begin. Generally, the types of

> equipment include track-mounted or rubber-tired dozers, scrapers, and motorgraders. Moving equipment to the construction site requires moving several loads (some overweight and overwidth) over public and private roads. Existing roads and trails are improved in places and occasionally culverts and cattleguards are installed if required.

The improvements stated in the last sentence of the preceding excerpt pertain to road improvements that may have been performed in and around oil and gas wells located within LWCs. Improvements on roads can be related to safety issues associated with the movement of heavy machinery. Improvements are also mechanical maintenance which would classify a two-track as a road according to BLM wilderness inventory documents cited within this report.

6. CODY RESOURCE AREA RMP

The Cody Resource Area RMP discusses road safety and maintenance and access issues in the excerpts that follow. The first statement is contained in the section "Management Actions" of the Cody Resource Area RMP. The next statement, regarding access, is found in "Lands and Realty Management Decisions under Management Actions" of the Cody Resource Area RMP (U.S.Department of the Interior 1990).

> **Other Hazards.** If hazards should be identified, the BLM will provide appropriate warnings and establish precautions for safety hazards associated with the use of any areas on BLM-administered public lands.
>
> **Access.** The BLM access policy in Wyoming is to acquire permanent exclusive easements (BLM controls and includes rights for the public) over mainline roads on the BLM transportation plan. A BLM mainline road is considered the principal access into larger blocks of BLM-administered public lands or into tracts of BLM-administered lands with high resource values. All access actions will be consistent with this and other provisions of the Wyoming BLM access policy.

If a two-track is the principal access road to a BLM tract of land considered to be of high resource value and/or is a resource road as defined in BLM Manual 9113-Roads, then the two track should be considered a road.

7. GRASS CREEK PLANNING AREA RMP

The Grass Creek Planning Area RMP discusses road definitions and maintenance issues. The following statements are found in the "Management Actions Section, Subsection Access" of the Grass Creek Planning Area RMP (U.S.Department of the Interior 1998).

> The BLM will pursue public access on important roads and trails identified in the BLM transportation plan. The transportation plan will be updated as necessary and implemented to provide access to large blocks of public land or to smaller parcels of land having high public values. The BLM will maintain or improve existing opportunities for public access in the upper Grass Creek area.
>
> Access to specific areas may be closed or restricted to protect public health and safety. Before access is upgraded in the vicinity of important cultural, paleontological, natural history, wildlife habitat, or other sensitive resources, the security and protection of these resources will be carefully considered.

> On areas designated as limited to existing roads and trails, the performance of necessary tasks requiring off-road use of a vehicle will be allowed provided resource damage does not occur. Examples of necessary tasks include constructing or repairing authorized range improvements.

The Grass Creek RMP calls for the maintenance and improvements to public access in the planning area. Such improvements that have been performed on two-tracks should be identified by the BLM. Those two-tracks should be considered roads in an LWC Inventory.

> **Surface-Disturbing Activities (or Surface Disturbance):** The physical disturbance and movement or removal of the land surface and vegetation. It ranges from the very minimal to the maximum types of surface disturbance associated with such things as off-road vehicle travel or use of mechanized, rubbertired, or tracked equipment and vehicles; some timber cutting and forest silvicultural practices; excavation and development activities associated with use of heavy equipment for road, pipeline, power line and other types of construction; blasting; strip, pit and underground mining and related activities, including ancillary facility construction; oil and gas well drilling and field construction or development and related activities; range improvement project construction; and recreation site construction.
>
> At the completion of drilling, disturbed areas will be recontoured to facilitate drainage and seeded (preferably with native species) to provide effective watershed cover within one year. If erosion problems occur, additional stabilization may be required, such as construction of cross drains or water bars on access roads, or the application of mulch or erosion blankets on slopes.
>
> Culverts, arches, ellipses, and fords will be built on streams to minimize alteration of natural stream characteristics, provide fish passage, and reduce erosion and stream sedimentation. The use of natural stream crossings, such as fords, without structural armoring, generally will be prohibited.

The previous statements are found in "Appendix 3" of the Grass Creek Planning Area RMP (U.S.Department of the Interior 1998). The definition of surface disturbing activities includes very minimal off road vehicle travel or mechanized equipment and vehicle travel. Barely overgrown two-tracks should be considered a surface disturbing activity and would detract from wilderness characteristics.

8. H-6310-1-WILDERNESS INVENTORY AND STUDY PROCEDURES

The H-6310-1-Wilderness Inventory and Study Procedures discusses roads in the following excerpts:

> A. Analysis of Roads. It is important to evaluate whether the area being inventoried contains roads. Any roads should be clearly identified and their impact on the naturalness of the area evaluated. If an access route meets the road definition, its use and possible long term need should be described.
>
> > 1. In order to insure a consistent identification of "roads" as opposed to a vehicle way, the following definition has been adopted: "The word 'roadless' refers to the absence of roads which have been improved and maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicle does not constitute a road.
>
> This language is from the House of Representatives Committee Report 94-1163, page 17, dated May 15, 1976, on what became the FLPMA. It is the only statement regarding the definition of a

road in the law or legislative history.

> 2. The BLM will continue to base the definition of what constitutes a "road" from the FLPMA's legislative history. The BLM previously adopted and will continue to use the following sub-definitions of certain words and phrases in the BLM road definition stated above:
>
> > a. **"Improved and maintained"** – Actions take physically by people to keep the road open to vehicle traffic. "Improved" does not necessarily mean formal construction. "Maintained" does not necessarily mean annual maintenance.
> >
> > b. **"Mechanical means"** – Use of hand or power machinery or tools.
> >
> > c. **"Relatively regular and continuous use"** – Vehicular use which has occurred and will continue to occur on a relatively regular basis. Examples are: access roads for equipment to maintain a stock water tank or other established water sources; access roads to maintained recreation sites or facilities; or access roads to mining claims.
>
> 3. A route which was established or has been maintained solely by the passage of vehicles would not be considered a road, even if it is used on a relatively regular and continuous basis. Vehicle routes constructed by mechanical means but which are no longer being maintained by mechanical methods are not roads. Sole use of hands and feet to move rocks or dirt without the use of tools or machinery does not meet the definition of "mechanical means." Roads need not be "maintained" on a regular basis but rather "maintained" when road conditions warrant actions to keep it in a usable condition. A dead-end (cherry-stem) road can form the boundary of an inventory area, and does not by itself disqualify an area from being considered "roadless".

The previous statements are found in "Section 13, Subsection A" of the H-6310-1-Wilderness Inventory and Study Procedures (U.S.Department of the Interior 2010a). The preceding provides further clarification that two-tracks are roads as defined by BLM policy guidance.

9. BLM ROADS AND TRAILS TERMINOLOGY REPORT

The following excerpts are from the BLM Roads and Trails Terminology Report.

> **Road:** A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.
>
> **Primitive Road**: A linear route managed for use by four-wheel drive or high-clearance vehicles. These routes do not normally meet any BLM road design standards.
>
> **Trail:** A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

The preceding excerpts are found in "Attachment 5 – Terms, Definitions, and Maintenance Intensity Standards" under Section "Definitions" of the BLM Roads and Trails Terminology Report (U.S.Department of the Interior 2006).

Two-tracks are considered trails in the BLM Geographic Information Systems (GIS) Transportation geodatabase and not considered roads in the BLM LWC Inventory. The attribute columns of the BLM Transportation geodatabase files CYFO_Roads (CYFO is Cody Field Office) and WFO_AllRoads (WFO is Worland Field Office) "Comments - Truck 4 wheel" and "CLASS_100K - 4WD" are associated with "2-track trail" and "TWOTRACK," respectively. According to the above definitions, "trails" are generally not managed for use by four-wheel drive (4WD) or high clearance vehicles.

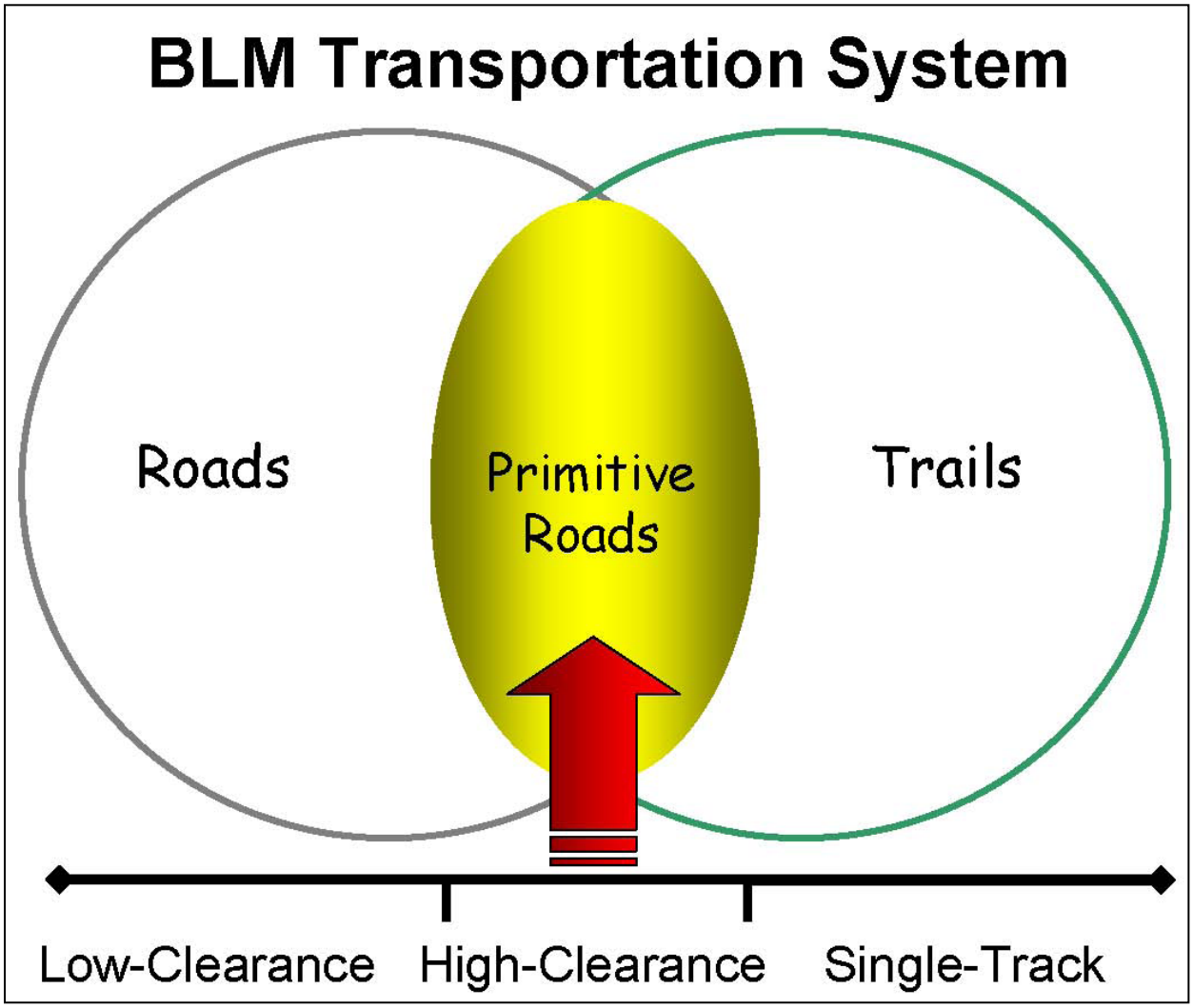

Figure 2 BLM transportation system (U.S.Department of the Interior 2006)

> **Roads** and **Trails** are currently identified and defined in a number of BLM manuals and publications, yet none of those definitions appears to provide sufficient clarity to allow either the Team or BLM field personnel to classify transportation system linear assets consistently. Research into common practices by other agencies as well as state and local governments identified **"primitive roads"** as a third category of routes currently utilized by a number of organizations to describe high-clearance and 4x4 routes that are not designed to an engineering standard, but are available for use and should be identified on transportation systems.

Figure 2 and the quote regarding roads and trails can be found in "Objective 1 – Establish Bureau Definitions and Standards for Transportation Linear Features" under Section "Analysis" of the BLM Roads and Trails Terminology Report (U.S.Department of the Interior 2006).

The BLM Transportation System graphic associates "trails" with single-track trails. According to BLM GIS Transportation attributes, two-track roads are associated with high clearance or 4WD. Therefore, according the preceding sources, two-track roads should be considered "primitive roads."

10. BIGHORN BASIN PRELIMINARY DRAFT RMP AND EIS

The current Bighorn Basin Preliminary Draft RMP and EIS discuss road definitions and safety/maintenance issues in the excerpts that follow.

> The BLM considered an alternative limiting travel to existing roads and trails within the entire Planning Area, but eliminated it from detailed analysis. The BLM comprehensive trails and travel management (CTTM) program is guided by resource values and user needs. A broad travel designation for the entire Planning Area would make this type of resource-driven management impossible to implement because it would eliminate the BLM's ability to, for example, close areas where resource damage or user safety are at issue. The BLM analyzes a range of travel management designations in the alternatives considered in detail.

The previous statement is found in "Section 2.3.5" under "Limit Travel to Existing Roads and Trails Only" of the Bighorn Basin Preliminary Draft RMP and EIS (U.S.Department of the Interior 2010b). The CTTM is guided by user needs and resource values. Two-tracks are needed and used by producers and stakeholders in the Bighorn Basin to access range improvements and other infrastructure. The following statements are found in "Section 4.6.4" of the Bighorn Basin Preliminary Draft RMP and EIS (U.S.Department of the Interior 2010b).

> For the purposes of this analysis, adverse impacts to trails and travel management are those that restrict travel (e.g., managing areas as closed or limited to motorized travel, or road closures). In general, adverse impacts to CTTM are greater when areas are closed to motorized travel than when travel is limited. Management limiting motorized travel to designated roads and trails is more restrictive than limiting travel to existing roads and trails and would therefore result in greater adverse impacts to CTTM. Limiting travel to designated roads and trails only allows motorized vehicle use in areas defined with specific signage or areas identified in travel management plans. Beneficial impacts result from management that increases the number or quality of roads and trails, or that provides opportunities for access on or off-road using motorized, mechanized, equestrian, or foot travel. Beneficial impacts also include improvements to travel that reduce potential health and safety concerns associated with trails and travel use in the Planning Area.

> Direct impacts to CTTM include actions that restrict or enhance road or trail use in the Planning Area. Direct impacts include closures or rerouting of trails and roads due to safety concerns such as shooting ranges and H_2S related health concerns. Indirect impacts result from management that limits, restricts, or enhances development or activities that require trails and travel use and access (e.g., ROW development, recreation, withdrawals).

According to the CTTM, adverse impacts are when the BLM closes roads and trails rather than limiting the use, for example, to existing roads and trails. Beneficial impacts to the CTTM are when improvements are made to travel that reduce potential health and safety concerns associated with roads and trails. These improvements may involve mechanical means, therefore defining that route as a road.

> Analysis assumes that within 5 years of the completion of the RMP revision, travel management plans will have been completed by the CYFO and WFO[2]. These would include inventories of roads and the establishment of authorized travel networks for all means of travel.

The previous statement is found in "Section 4.6.4.1" of the Bighorn Basin Preliminary Draft RMP and EIS (U.S.Department of the Interior 2010b). The BLM LWC Inventory ignored the use of the current BLM GIS roads data and should be considered draft or should be put on hold until travel management plans and road inventories are updated. A review of the BLM GIS roads data shows that the Inventory is incomplete when compared to other data sources and should be updated before the BLM LWC Inventory can be considered final.

> Under all alternatives, travel designations, closures, or 1 routing of roads and trails in areas that pose health and safety risks would result in long-term impacts to CTTM. Areas closed year-round to motorized and mechanized vehicle use to protect visitor safety include the Cody Shooting Complex, the Lovell shooting range, the rifle range west of Worland, and the Cody Archery Range.
>
> Under all alternatives, implementing existing travel management plans in the following areas would benefit CTTM by providing site-specific travel designations that accommodate appropriate access while considering resource protection and user safety:
>
> - McCullough Peaks
> - Carter Mountain ACEC[3]
> - Little Mountain
> - Upper Nowood
> - South Brokenback
> - Renner (Upper and Lower) Wildlife Habitat Management Units
> - Medicine Lodge Wildlife Habitat Management Units
> - Paint Rock Area
> - Cooperative Agreement with LU Sheep Company
> - Rattlesnake Mountain

[2] Cody Field Office (CYFO) and Worland Field Office (WFO)
[3] Area of Critical Environmental Concern (ACEC).

The previous statements are found in "Section 4.6.4.3" under "Impacts Common to All Alternatives" of the Bighorn Basin Preliminary Draft RMP and EIS (U.S.Department of the Interior 2010b). Closing roads such as in an LWC polygon would pose long term impacts to the CTTM according to the BLM.

11. 6300-1-WILDERNESS INVENTORY

The following excerpts are from the 6300-1-Wilderness Inventory Manual.

> Analysis of Roads and Other Impacts to Naturalness. Offices undertaking an inventory may take different approaches to addressing the effect of roads and other impacts on wilderness characteristics. Offices may:
>
> > 1. Identify any roads and their influence on the boundary of the area described (see Glossary for definitions).
> >
> > Or
> >
> > 2. Determine the impact of an area's transportation system and other visual remnants of human activities on naturalness.

The previous statements are found in "Section 13, Subsection A" of the 6300-1-Wilderness Inventory Manual (U.S.Department of the Interior 2010a). Well established two-tracks will have a lasting visual remnant on the landscape and the naturalness of an area. This could impact the naturalness of any LWC polygon containing two-tracks, especially in polygons containing multiple two-tracks. Noxious weeds are also associated with disturbance areas, such as two-tracks, and there is a legitimate risk of two-tracks becoming infested with noxious weeds due to vehicle-introduced seeds and the disturbance itself. If this were to occur, noxious weeds would affect the naturalness of the area.

> For the purpose of inventorying wilderness characteristics only, the BLM will continue to base the wilderness inventory "road" definition from the FLPMA's legislative history. The language below is from the House of Representatives Committee Report 94-1163, page 17, dated May 15, 1976, on what became the FLPMA.
>
> > "The word 'roadless' refers to the absence of roads which have been improved and maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road."
>
> The BLM previously adopted and will continue to use the following sub-definitions of certain words and phrases in the BLM road definition stated above:
>
> > a. **"Improved and maintained" –** Actions taken physically by people to keep the road open to vehicle traffic. "Improved" does not necessarily mean formal construction. "Maintained" does not necessarily mean annual maintenance.
> >
> > b. **"Mechanical means" –** Use of hand or power machinery or tools.
> >
> > c. **"Relatively regular and continuous use" –** Vehicular use that has occurred and will continue to occur on a relatively regular basis. Examples are: access roads for equipment to maintain a stock water tank or other established water sources, which may entail lengthy return intervals for this purpose; access roads to maintained recreation sites or facilities; or access roads to mining claims.

> A route that was established or has been maintained solely by the passage of vehicles would not be considered a road, even if it is used on a relatively regular and continuous basis. Vehicle routes constructed by mechanical means but that are no longer being maintained by mechanical methods are not roads. Sole use of hands and feet to move rocks or dirt without the use of tools or machinery does not meet the definition of "mechanical means." Roads need not be "maintained" on a regular basis but rather "maintained" when road conditions warrant actions to keep it in a usable condition. A dead-end (cherry-stem) road can form the boundary of an inventory area and does not by itself disqualify an area from being considered "roadless."
>
> **Route**: Any linear feature located within areas that have been identified as having wilderness characteristics and not meeting the wilderness inventory road definition.

The previous statements are found in the "Glossary of Terms" of the 6300-1-Wilderness Inventory Manual (U.S.Department of the Interior 2010a). The road definitions identified within the BLM wilderness inventory documents have remained consistent throughout the progression of drafts. However, the gray area of two-track designation has not been undertaken by the BLM. Mechanical maintenance remains the identifier used to define roads. For a proper LWC Inventory, mechanical maintenance of two-tracks should be identified for all two-tracks within the planning area. The BLM should have maintenance records for these projects.

12. PROPOSED BIGHORN BASIN LGCA ROAD DEFINITION

Webster's Dictionary defines a "road" as "an open way for vehicles, persons, and animals; *esp*: one lying outside an urban district: HIGHWAY, ROADBED, ROUTE, and PATH." Further, a "route" is defined as "a traveled way" or "means of access." The definition of a road and a route establish a physical entity on the ground, a prescriptive use, and a purpose of use. In comparison to other reference material that defines roads, the definition in Webster's Dictionary is both the broadest and objective. Elsewhere, such as described above in the various federal definitions, additional adjectives describing characteristics of a road, such as standards and maintenance, are superfluously included in the definition. Such adjectives could be construed as arbitrary and biased when viewed in the context of Webster's basic definition of a road. The basic definition of a road does not speak to the level of use, standard of construction or maintenance, surface disturbance, or shape of the prism. As a matter of clarification, each document should indicate, and occasionally does, that their definition was modified from a basic definition.

The issue then of what is a road, beyond that of the dictionary definition, is subjective. In the opinion of the Bighorn Basin LGCA, the most applicable guidance for defining a road is provided in the Wilderness Inventory Handbook (p. 6):

> Wise, unbiased, and careful use of the road definition as adopted, with full public involvement, will insure that this intent will be achieved (U.S.Department of the Interior 1978).

The Bighorn Basin LGCA, employing the Wilderness Inventory Handbook direction for defining a road, asserts that the following definition of a road should be adopted for use in the LWC inventory process:

> A way or route which has been improved and maintained by mechanical means or historical use, as exhibited by a disturbed surface, to insure relatively regular present and future use by highway-legal motor vehicles.

13. DATA COMPARISON

Ecosystem Research Group (ERG) has reviewed multiple sources of roads data, including the BLM GIS Transportation geodatabase, the BLM 100k surface maps, USGS Topographic Quadrangles, and the Wyoming Department of Transportation (WYDOT). Figure 3, Figure 4, and Figure 5 clearly demonstrate the difference in data sources for roads within the Bighorn Basin and will also reflect that other agencies (USGS and WYDOT) consider two-tracks roads.

13.1 BLM GIS TRANSPORTATION DATASET VS. BLM 100K SURFACE MAP

Inconsistencies were found when comparing the BLM GIS Transportation GIS dataset with the BLM 100K Surface hard copy map. The BLM 100K Surface maps can be purchased at any BLM field office location. The maps used for comparison in this report were purchased at the Cody Field Office in Cody, Wyoming. The roads data source differences are pointed out on Figure 3, Figure 4, and Figure 5. Review of the maps in detail will reveal more inconsistencies than shown in arrowed examples. The BLM 100K Surface Map legend describes the roads or routes as "4WD, Rough Bladed or Two-Track Surface."

13.2 BLM GIS TRANSPORTATION DATASET VS. USGS TOPOGRAPHIC QUADRANGLE

When comparing the BLM GIS Transportation geodatabase with the USGS Topographic Quadrangles, inconsistencies were found concerning road lines. USGS Topographic Quadrangles are available for download and were downloaded from the USGS National Map Viewer website (http://nationalmap.gov/). The differences in roads are pointed out on the map and the differences in the dataset are consistent with the differences pointed out when comparing the BLM 100K Surface map. The USGS legend describes these roads as "Other Road or Street; Trail."

13.3 BLM GIS TRANSPORTATION DATASET VS. WYOMING DEPARTMENT OF TRANSPORTATION

The WYDOT data was reviewed as a consistency comparison of roads between datasets. Inconsistencies were found between the WYDOT roads data and the BLM GIS Transportation geodatabase. Jeff Van Dorn from WYDOT was contacted regarding roads data on January 27, 2011 (Wyoming Department of Transportation 2011). During that phone conversation, Mr. Van Dorn stated that the WYDOT data was originally digitized from the USGS Topographic Quadrangles and have been updated based on changes to road status from governing entities such as the BLM, U.S. Forest Service, and the State of Wyoming. This data reflects the most current road status changes received by WYDOT from the aforementioned agencies. Figure 3, Figure 4, and Figure 5 disclose differences in data. Beyond the arrowed examples, many more inconsistencies can be found within this map.

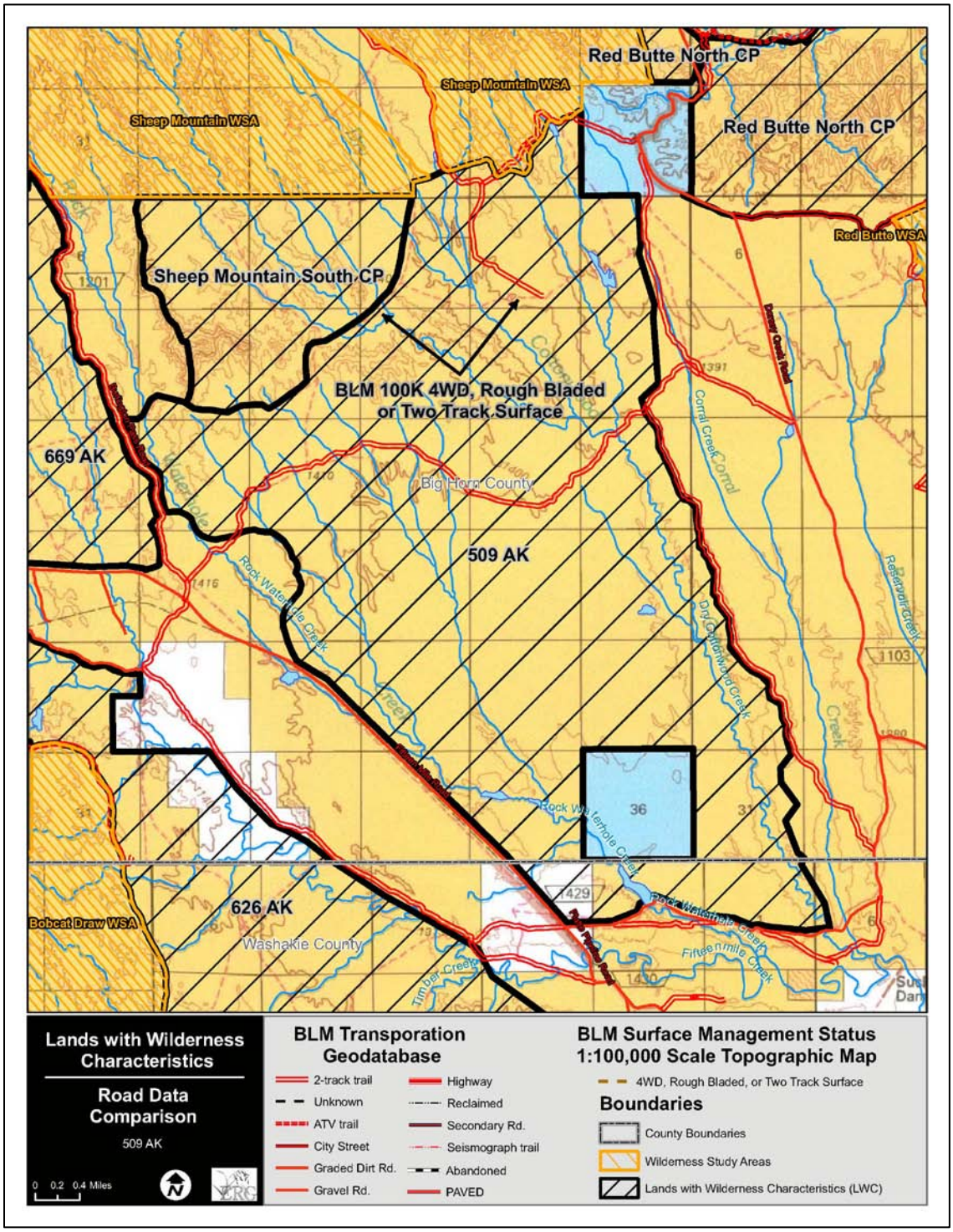

Figure 3 BLM GIS Transportation Dataset vs. BLM Surface Management Status 1:100,000 Scale Topographic Map

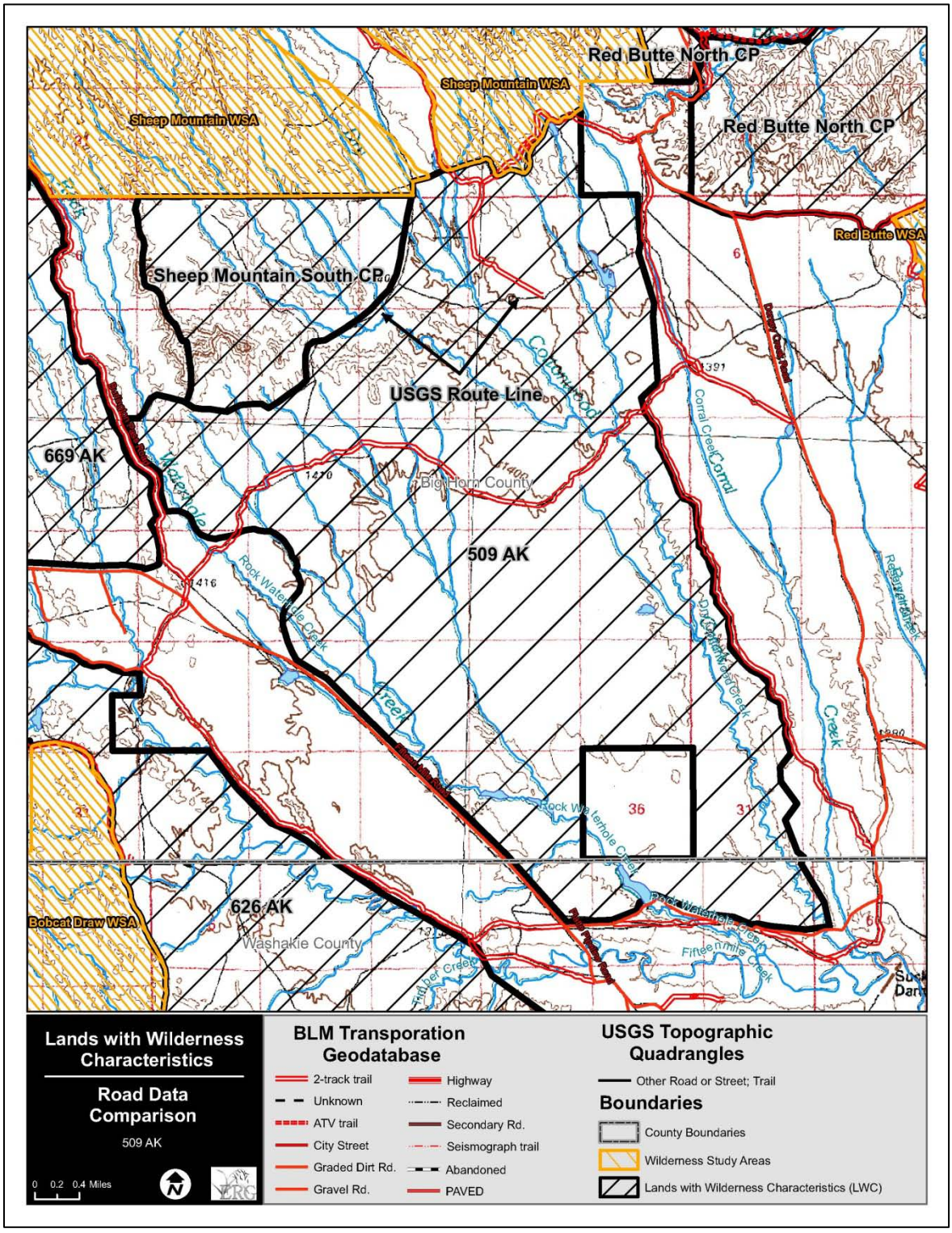

Figure 4 BLM GIS Transportation Dataset vs. USGS Topographic Quadrangle

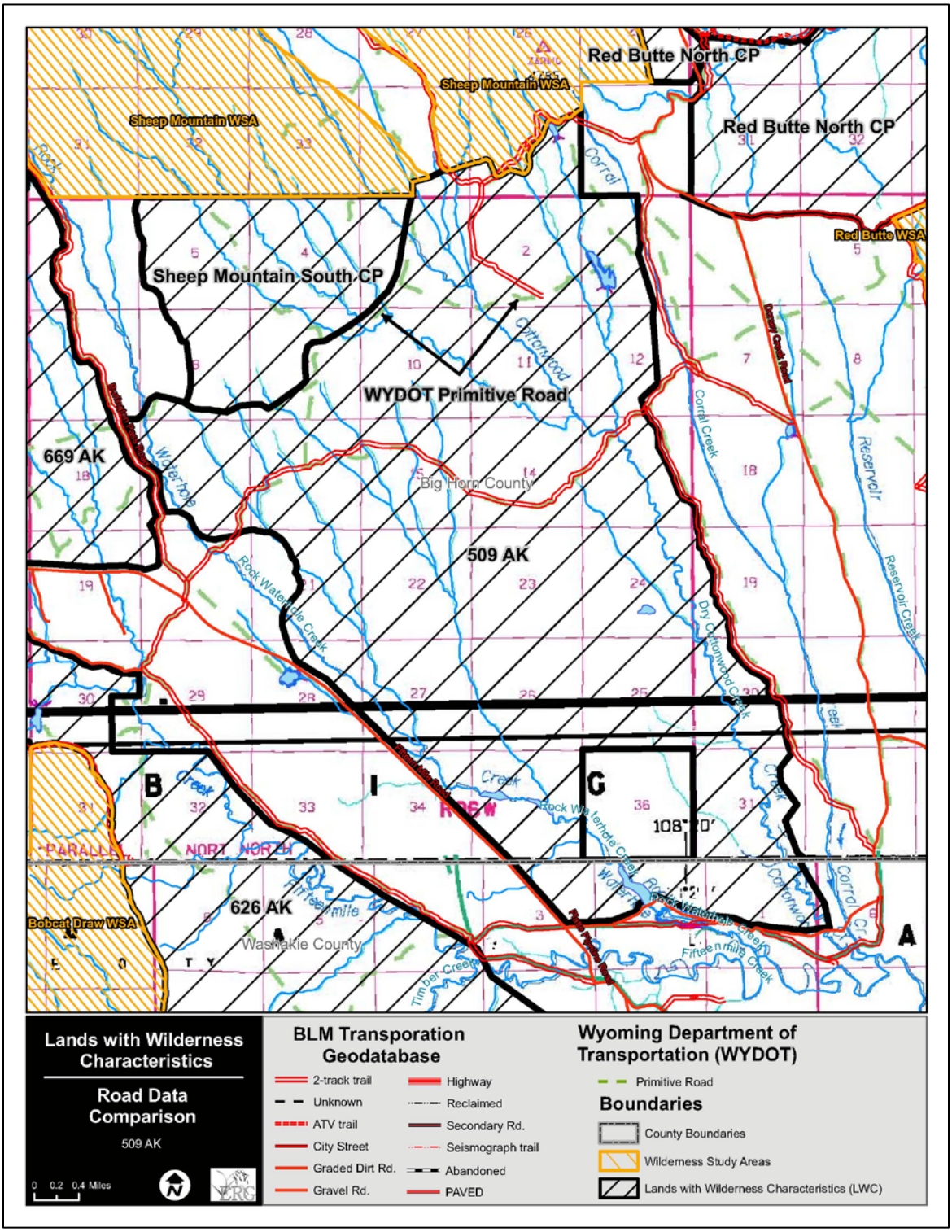

Figure 5 BLM GIS Transportation Dataset vs. WYDOT Roads Dataset.

14. SUMMARY

In summary, road definitions have remained consistent throughout the succession of documents published from 1964 to 2010 regarding what constitutes a road in relation to wilderness or wilderness characteristics. Yet, a tangible definition of two-track roads/trails is absent in the litany of road definitions. According to the research performed by ERG and supported by the Bighorn Basin LGCA, if any construction-related activities have been performed to improve or maintain a two-track, such as dugways or waterbars, then they should be considered roads due to maintenance and improvement.

Inconsistencies were found when reviewing roads data from other sources (BLM 100K Surface Map, USGS Topographic Quadrangle, and WYDOT) in comparison to the BLM GIS Transportation geodatabase. For the purpose of a LWC Inventory, the agency conducting the Inventory should review not only their agency's roads layer(s), but also other data sources to gain a clear understanding of the roads contained within an area under review as part of a LWC Inventory. Verification of these roads should take place either on the ground or with other agencies maintaining roads data for that area. Concerning two-track roads/routes/trails in comparison to the BLM GIS dataset, WYDOT considers those roads as primitive roads, not two-track trails. Interagency cooperation in applying the road definition consistently is critical when conducting a LWC Inventory.

According to BLM Manual 9113, the BLM is required to maintain a database of roads as part of their "Road Program Management." Two-tracks appear in the BLM Transportation GIS geodatabase and are attributed as sufficient for trucks or 4WDs. The definition of "Resource Roads" in BLM Manual 9113 – Roads, could be applied to two-tracks when two-tracks service resources such as range improvement projects, reservoirs, and/or energy development infrastructure. Thus, resource roads should be covered in the "Regular and Continuous Use" definition found within BLM road definitions included in the reference documents cited for this report. All RMPs reviewed for this report define range and energy development as "resources."

According to the BLM Roads and Terminology Report (U.S.Department of the Interior 2006), "primitive roads" are those routes utilized by high clearance and 4WD vehicles and are available for use and should be recorded in the transportation data system. This can be related to the BLM GIS Transportation geodatabase attributes which associates two-track trails with "truck 4 wheel" and two-track with "4WD," respectively. Therefore, two-tracks should be considered roads, especially in relation to a LWC Inventory.

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APPENDIX C

BIGHORN BASIN LANDS WITH WILDERNESS CHARACTERISTICS

ECONOMIC ANALYSIS

Prepared for

Local Government Cooperating Agencies

April 28, 2011

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1. EXECUTIVE SUMMARY

On December 22, 2010, Secretary of the Interior Ken Salazar issued Order No. 3310: *Protecting Wilderness Characteristics on Lands Managed by the BLM*. The following analysis was conducted in response to Order No. 3310. The analysis includes an economic valuation of the resource uses that would be foregone should the lands currently identified as Lands with Wilderness Characteristics (LWCs) in the Bighorn Basin be managed for the protection of wilderness characteristics. These resource uses include oil and gas production, grazing, and motorized recreation.

Order 3310 directs the Bureau of Land Management (BLM) to "maintain wilderness resource inventories on a regular and continuing basis… [And] to protect wilderness characteristics through land use planning and project level decisions." In response to Order 3310, the BLM subsequently issued three new planning manuals: 6301– Wilderness Characteristics Inventory, 6302 – Consideration of Lands with Wilderness Characteristics in the Land Use Planning Process, and 6303 – Consideration of LWCs for Project-Level Decisions in Areas Not Analyzed in Accordance with BLM Manual 6302. The combination of Order 3310 and the three manuals provide the BLM a means to effectively manage areas that are designated as LWCs as "Wild Lands," without the advice and consent of the U.S. Congress.

Areas qualify for the LWC inventory based on characteristics found in the Wilderness Act of 1964, and detailed in manuals 6301, 6302, and 6303. They must be of sufficient size, demonstrate naturalness, and provide opportunities for solitude or primitive and unconfined recreation.

During the process of updating the Bighorn Basin Resource Management Plan, the BLM initially identified 571,295 acres (18% of the surface lands administered by the BLM) as LWCs. These acres span across all four counties of the Bighorn Basin: Big Horn County, Hot Springs County, Park County, and Washakie County. In April, a provision of the federal fiscal year 2011 Budget prohibited federal funds from being used to implement, administer, or enforce Order 3310. In addition, the BLM substantially reduced the acres of LWCs. This report analyzes the original LWC Inventory.

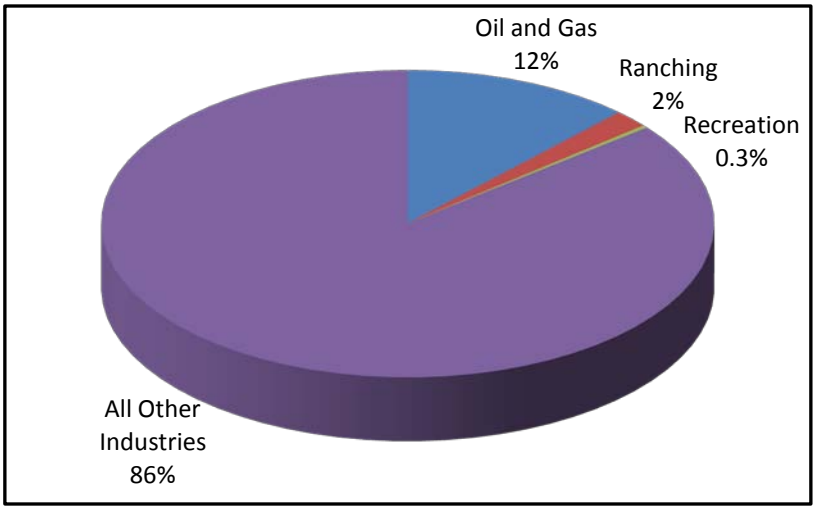

Figure 1 Economic contribution of specified LWC resources based on 2009 value of output

The primary resources uses that would be foregone should the initial Bighorn Basin LWC Inventory be managed as wilderness are oil and gas, grazing (which would affect agriculture), and motorized recreation. Each of these resources uses provide unique benefits to the public. Oil and gas has the highest monetary benefit; grazing provides monetary, cultural and ecological benefits and recreation provides both monetary and personal satisfaction benefits). Based on the value of output, oil and gas contributes 12% of the total output in the region, agriculture contributes 2%, and recreation contributes 0.3% (Figure 1).

The difficulty of assigning market values to the cultural, ecological and personal satisfaction of grazing and recreation, as well as the wilderness characteristics the BLM would be managing, has fueled debate in the literature over the last several decades focused on jobs versus the environment. Most agree that the primary goal is to maximize the net public benefit; however it depends on the values that are assigned to each level of the public (local versus state versus national public) and the value assigned to various benefits. A person who lives in Florida would assign very little value to motorized vehicle use in the LWC, while a person who lives adjacent to the lands might place a very high value on the benefit. What weight should each have?

In order to determine the net public benefit a necessary first step is to understand the values of the resources of an area. The current and potential value of the oil and gas, grazing, and motorized recreation are included in this report. While the other resources of the area are important, they will not be foregone should the areas be managed as wilderness.

1.1 OIL AND GAS VALUATION

From an economic value perspective, the highest loss from the foregone uses of the LWC areas would be due to the lost opportunities of drilling and extracting oil and gas. A majority of the LWC acres currently have oil and gas activity and possess significant potential.

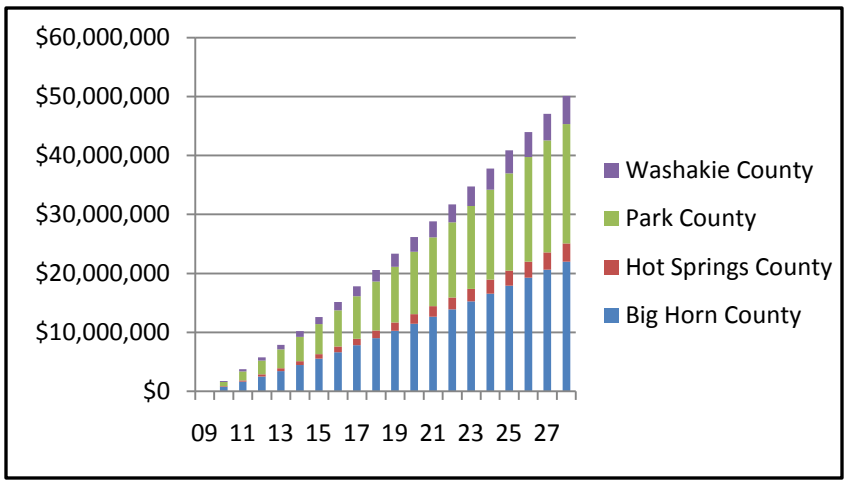

Figure 2 Potential Tax Revenue per year (2009 $s)

The LWCs currently contain eight active oil and gas wells, 248,244 acres of current oil and gas leases, and 531,464 acres within the five-mile buffer zone of current wells. Based on information in the Reasonable Foreseeable Development (RFD) completed by the BLM, input from industry experts, and GIS data, the LWC acres have the potential for 569 wells during the next twenty years.

These potential wells could generate $1,896,757,252 in output and $460,034,865 in tax revenue over the planning period. Figure 2 shows the potential tax revenue per year that would be generated, Park County and Big Horn County would generate the highest level of taxes.

In addition, drilling and completion could create up to 434 jobs per year and $21,703,368 in labor income per year. Over a twenty year time period this equates to $434,067,360 in labor income for the local region.

Table 1 Drilling and Completion Employment and Labor Income per year (2009 $s)

County	Employment	Labor Income
Big Horn	200.7	$10,266,250
Hot Springs	22.3	$1,110,175
Park	133.1	$5,877,891
Washakie	77.9	$4,449,052
Total	434.0	$21,703,368

1.2 GRAZING VALUATION

There are 687 grazing allotments in the planning area, and of those, 203 have all or a portion of identified LWCs within their boundaries. The inventoried LWCs cover 569,277 acres or approximately 27% of the acres in allotments. There are 154 range improvements (wells, guzzlers, cattle guards, and stock water tanks), 296 miles of fence, 442 reservoirs, and 10 miles of water pipelines located throughout the LWCs in the allotments. For BLM dependent ranches the grazing allotments with LWCs support 382 jobs, $12.4 million in earnings, and $26.9 million in livestock production per year. Over the twenty year life of the plan that equates to $248 million in earnings and $538 million in output

1.3 MOTORIZED RECREATION

There are 634 miles of two-track trails, gravel roads, and minimally paved roads within the LWCs. Quantifying the economic impact of motorized recreation on specific land areas would require collection of on-site user data. While this was beyond the scope of this project, conversations with local users provide insight into the economic impact. In general, recreational use on BLM lands in the area has a much lower economic impact on the local communities in terms of generating jobs and income. However, they provide personal economic benefit to local recreational users through enjoyment. Other areas would still be available for motorized recreational enjoyment, but access is more difficult and the open areas would experience more crowding (lowering personal economic benefit).

2. IMPORTANCE OF CONDUCTING ANALYSIS

2.1 PUBLIC LANDS POLICY

On December 22, 2010 the Secretary of Interior issued Executive Order 3310, *Protecting Wilderness Characteristics on Lands Managed by the BLM.* Subsequently, the Bureau of Land Management (BLM) issued manuals 6301- Wilderness Characteristics Inventory, 6302 – Consideration of Lands with Wilderness Characteristics (LWCs) in the Land Use Planning Process, and 6303 – Consideration of LWCs for Project-Level Decisions in Areas Not Analyzed in Accordance with BLM Manual 6302. The combination of Order 3310 and the three manuals provide the BLM a means to effectively manage areas that are designated as LWCs as "Wild Lands," without the consent of the U.S. Congress.

Manual 6302 requires that the BLM: "Consider and document both the extent to which other resource values and uses of an LWC would be forgone or adversely affected. Consider uses that could be accommodated and mitigated, as well as the benefits that may accrue to other resource values and uses as a result of designating the LWC as Wild Lands." The following should be considered in the aforementioned process: 1) presence of other resources, 2) development potential, 3) resource availability, 4) economic importance, and 5) compatibility with protection (USDI 2011). The economic importance criteria includes, "local, regional, or traditional (i.e., Tribal) economic value of various resources in the LWC (USDI 2011)." The resource values and uses of an LWC that may be foregone include mineral extraction, motorized use (recreational and commercial), and grazing management practices, which are the focus of this analysis.

2.2 CURRENT SITUATION IN THE BIGHORN BASIN

The Bighorn Basin in Wyoming provides an opportunity to assess the impacts of Order 3310, as well as the BLM's manuals related to LWCs, due to the current revision taking place to the region's Resource Management Plans (RMPs). In October 2008, the BLM issued a Notice of Intent to prepare a RMP revision for the Bighorn Basin. The planning area includes four counties in northwest Wyoming: Big Horn County, Hot Springs County, Park County, and Washakie County. The plan will "provide future direction for approximately 3.2 million surface acres and 4.2 million acres of federal mineral estate (USDI 2010)." This constitutes 57% of the four-county region's 5,649,161 surface acres (USDI 2010).

Table 2 provides the acres of the individual counties in the Bighorn Basin, along with acres of federal mineral estates, current Wilderness Study Areas (WSAs), existing Areas of Critical Environmental Concern (ACECs), proposed ACECs, and proposed LWC acres. Big Horn County and Park County have the most acres with additional proposed management.

Table 2 Acres of Land Designations in the Counties of the Bighorn Basin

County	Total Surface Acres in Planning Area	BLM Administered Surface Acres	Federal Mineral Estate Acres	Current WSAs	Existing ACECs	Proposed ACECs	Proposed LWC Acres
Big Horn County	1,669,885	1,160,656	1,291,613	64,297	50,785	55,761	261,712
Hot Springs County	961,277	485,321	719,438	4,776	13,687	13,556	39,190
Park County	1,618,869	624,548	1,049,114	25,172	10,944	49,721	159,415
Washakie County	1,399,130	919,256	1,147,340	51,162	264	264	110,961
Total Bighorn Region	5,649,161	3,189,781	4,207,505	145,407	75,680	119,311	571,278

As part of the planning process, the BLM is required to invite "tribal, state, and local governments, as well as other federal agencies to serve as cooperating agencies in the preparation of the RMP (USDI 2010)." The Local Government Cooperating Agencies (LGCA) consist of a county commissioners from each of the counties and seven conservation districts[1] that have been participating in the BLM land use planning process since 2008.

During the planning process the LGCAs have voiced their concerns with the inventory process. The LGCAs have documented that most of the lands within the LWC inventory area do not qualify given the requirements in Manual 6301. It is the contention of the LGCAs that not only has the BLM not adequately inventoried the LWCs, but they have also not considered the economic importance of the various resources within the LWCs.

[1] Cody, Hot Springs, Meeteetse, Powell-Clarks Fork, Shoshone, South Big Horn, and Washakie

3. LITERATURE REVIEW

Over the last several decades a theoretical and empirical debate has occurred in the economic and ecological literature on the economic impacts of wilderness. The debate is complicated by the difficulties of placing values on the "assets" of the public lands. Assets of public lands include both consumptive uses, such as fishing, hunting, grazing, and resource extraction, and non-consumptive uses, such as hiking, solitude, wildlife viewing, habitat and watershed preservation, and waste assimilation. Those in favor of designating additional wilderness areas typically either attempt to 1) quantify the nonmarket values of wilderness characteristics through contingent valuation, option valuation, and willingness to pay methods or 2) utilize qualitative methods to put forth arguments for preserving the environment for future generations and preserving ecosystem in their natural state for activities such as wilderness enjoyment, research and education, habitat preservation and ecosystem services. Those opposed to the designation of additional wilderness areas use impact analysis to quantify the economic potential of resource extraction and production on public lands.

In order to analyze the value of the uses that would be foregone or adversely affected by designating and managing the lands currently in the LWC Inventory in the Bighorn Basin RMP process, it is necessary to determine which assets to value and how to value them. Below is a review of the most relevant literature applicable to the economics of wilderness designation; the valuation of oil and gas exploration and development on public lands; and the valuation of grazing on public lands, including regional studies of the Bighorn Basin Region and similar regions of the West.

3.1 ECONOMIC ANALYSIS OF WILDERNESS

Spurred by the Clinton Administration's 58.5 million-acre "roadless rule" in January 2001, the debate over protection of federal lands from road building, grazing, mining, timber extraction, and agriculture is often reduced to one of "jobs vs. the environment." Those in favor of expanding wilderness protection provide arguments and studies showing that increased wilderness designation promotes economic growth of local communities. The arguments focus on the nonmarket values of wilderness and the amenities provided, which according to their argument spur population growth and employment in non-resource sectors. The studies generally analyze the growth of population, employment, and income in rural communities of the West during the last quarter of the century. However, by focusing on total income rather than wage income, they fail to recognize that the increase in income is exogenous, rather than endogenous.

Czech (2000) in his article, "Economic Growth, Ecological Economics, and Wilderness Preservation," argued that economic growth and wilderness preservation are mutually exclusive due to the neoclassical paradigm that there is no limit to growth. He further stated that economic growth could be considered the "ultimate challenge" to wilderness preservation. In contrast to his arguments, others argue that wilderness preservation leads to stable economic growth.

Power (1996) argued that "substantial additional wilderness potential can contribute directly to the economic well-being of local residents and to the vitality of their economy." According to his argument, natural resource industries will most likely be a source of instability and decline in future, decreasing the opportunity costs associated with protecting natural landscapes. However, it should be examined whether the instability and decline in natural resource industries are market-based or policy based.

Lorah and Southwick (2003) studied 11 Western states to dispute the notion promulgated by pro-development advocates who claim locking up federal lands to development is detrimental to economic and population growth in Western rural communities. During the study period from 1970 to 2000, they found that population, employment, and total income grew faster in areas with greater amounts of protected lands. However, their statistical findings would have been more relevant if they had used wage income, rather than total income, and if they had tested for the presence of other amenities. While this study does not prove that protected lands alone cause growth, it does support the argument that economic vitality is associated with counties that use the environment as a magnet to attract new residents, small businesses, and tourists.

A different conclusion was made by Lewis et al. (2002) in a study of the in-migration rates in the Northern Forest Region of the U.S. Forest Service. They conducted studies in 92 non-metropolitan counties. They found that the increase in conservation lands had a relatively small effect on in-migration rates and no effect on employment growth during the period from 1990 to 1997. Interestingly, they completed an extension of their model to test for preservationist lands and multiple-use lands. They found that in-migration were higher in counties with greater shares of public lands under multiple-use.

Forsyth (2000) and Buttle and Rondeau (2004) studied the economic value of expanding a wilderness area to adjacent parcels. Forsyth uses an option value approach and concludes that the park should be expanded. Buttle and Rondeau (2004) determined the incremental value using a simple discrete difference approach and conclude that the best use of the adjacent parcels would be logging.

Keith and Fawson (1995) studied the local economic effects of wilderness users in rural Utah. Using input-output multipliers, they found that wilderness users contributed less than 1% in most counties. They, like others, state that "any reduction in traditional production will have negative economic effects at least as significant as the positive effects of wilderness expenditures, particularly since the income to gross sales (gross output) ratios for traditional production activities are larger than those for the retail and service sectors affected by wilderness expenditures."

Jakus et al. (2008) conducted an analysis, "Economic Impact of Land Use Restrictions on OHV Recreation in Utah." They found that while trip destination appeared sensitive to the open, limited, and closed areas available, the economic impacts to the local communities were negligible.

3.2 VALUATION OF OIL AND GAS PRODUCTION ON PUBLIC LANDS

The valuation of the oil and gas on public lands has the advantage of using market prices for the amount extracted; however, quantifying the potential development of the resource on public lands is dependent on technological advances, private and public cost curves, and the political environment.

Runge (1984) examined the issues surrounding energy exploration on wilderness after the 1973 Arab Oil Embargo raised oil prices and created a push to lease wilderness areas for oil and gas exploration. While the preceding situation is leasing of lands already designated as wilderness, as opposed to creating additional wilderness areas, his examination of the issues provides useful insights. The question he is addressing is: "Should wilderness areas have been made available for oil and gas exploration and development which would alter their wilderness qualities? If not, why should these lands be protected by government against such incursions?" He reviews three perspectives to answer this question. The first is the technical perspective - the potential for oil and gas developments on these lands. The second perspective is concerned with economic efficiency, both private and public costs and benefits, of changes in property rights. The third perspective examines the social welfare perspective, including current public attitudes and consideration of future generations. His conclusions are that the potential for oil and gas on the lands considered wilderness at the time was negligible compared to other sources; that assuming future technological advances society would find alternative fuel sources as substitutes decreasing the value of that particular resource; there are no perfect substitutes for wilderness therefore the value of wilderness would increase; and, "like all aspects of life in a democracy, such decisions will require discussion and debate" built on sound technical basis and improved economic appraisal.

Several empirical studies have been completed valuing the impact of oil and gas on local communities. A common theme among the studies is that the sector contributes substantial amounts in terms of wage income, indirect employment, and tax revenues to the local communities. Three studies are reviewed below.

Davies et al. (2007) studied the impact to local communities of Moffat County in the Little Snake Planning Area from BLM land use alternatives for oil and gas. Using IMPLAN and production potential and estimated value from the BLM's Reasonably Foreseeable Development (RFD), they estimated the impact to labor and income. In addition, they calculate the potential tax revenues generated under different alternatives. They find that the on the 1.1 million acres of federal mineral estate within the BLM Planning Area, 3,031 wells could be drilled over the twenty year planning period. They concluded that the multiplier for employment was as high as 9.55, meaning that for each direct job created in oil and gas, 9.55 indirect and induced jobs were created.

Another study which concluded that the employment multiplier for oil and gas is higher than originally thought was completed by Booz et al. (2008). They studied the impact of the oil and gas industry on the Wyoming economy. The total contribution of oil and gas in Wyoming in 2007 was $15.5 billion. The

estimated employment multiplier for oil and gas was 3.65 in 2007. There were 20,090 jobs in oil and gas and 73,229 jobs in other sectors that could be attributed to the oil and gas sector.

The Bureau of Economic and Business Research (2009) conducted a study for Utah's Public Lands Policy Coordination Office that developed economic impacts for three scenarios: 1) reference case, 2) low growth, and 3) high growth. They calculated and projected the impacts on employment, personal income, earnings, population, local government revenues, and state government revenues to 2038 for the Unita Basin and the State as a whole. The results indicated that for the low growth scenario in the Unita Basin, 12,458 new jobs, $2.8 billion in earnings, $32 million on local government revenues, and $235 million in state government revenues would be generated by oil and gas through 2038.

3.3 VALUATION OF GRAZING ON PUBLIC LANDS

Secretary of Interior's Order No. 3310, *Protecting Wilderness Characteristics on Lands Managed by the BLM*, affirmed that the protection of wilderness characteristics of public lands is a high priority for the BLM, and is an integral component of its multiple-use mission. It further directs the BLM to inventory and protect wilderness characteristics through land use planning and project-level decisions. The land use designation of LWCs will have a significant economic impact to the State of Wyoming and livestock producers who graze on BLM lands.

Taylor et al. {5592 /d} studied the economic impact of a reduction of grazing on BLM land in Fremont County, Wyoming. The study analyzed how profitability at the ranch level might be affected by a reduction in BLM grazing and then analyzed the regional level impacts on jobs and income at the county level. They found that federal livestock grazing is an important part of livestock production in terms of the number of producers affected, the acres of land involved, and economic effects on the individual agriculture operations. Federal livestock grazing also has important economic implications for the local community. The total economic impact estimates for BLM grazing in Fremont County range from 277 to 681 jobs and $3.9 to $9.7 million in labor income.

Van Tassel and Richardson {5596 /d} conducted a study that examined the profitability of a ranching operation that adjusted to a reduced stocking rate resulting from a decrease in public land use. A linear programming model of production alternatives was developed to assess how a ranch would adjust to a reduction in federal Animal Unit Months (AUMs). Van Tassel and Richardson {5596 /d} found that federal grazing permits were important to the success of the representative ranch used in the study. Economies of size, obtained through the additional cows the ranch was able to maintain because of the federal grazing permits, were an important aspect of this success. Equity rapidly eroded as federal permits were removed or reduced, potentially causing the loss of the ranch. The potential exists, therefore, that without federal grazing permits, much of the land around national forest could change ownership. The danger is those lands would be subdivided into ranchettes or other residences rather than stay in open space or productive agriculture use.

Foulke et al. (2006) studied the role of federal grazing on the economy of Park County, Wyoming and how changes in permitted use may affect individual agricultural producers, land use patterns, and the local economy. The results of their study indicated that the availability of federal grazing may be critical to the economic viability of many federal grazing-dependent ranches. The ranch-level analysis showed the net profits for federal grazing-dependent ranches without federal grazing approaches zero. In regards to land use patterns, they found that if grazing is lost these base ranch properties, which are vitally important as open space and wildlife habitat, are in jeopardy of being developed into ranchettes or high density residential areas. Results show that replacing 35 acres of agricultural land with one average size household generates more revenues, but considerably more county expenditures.

A similar study to the Park County analysis was conducted by Torell et al. (1981). Their study looked at an increase in grazing fees, elimination of spring grazing, and reductions in BLM grazing allotments of 20%, 40%, and 60%. They found that grazing fee increases have obvious impacts on net ranch income, but do not appreciably affect the production of beef or the use of forage resources. On the other hand, allotment reductions and elimination of early spring grazing have significant effects. One of their conclusions was allotment reductions have, perhaps, the most serious impact on the ranching sector.

Lewandrowski and Ingram (2011) and Taylor et al. {5592 /d} looked at impacts of restricting grazing on federal lands to protect threatened and endangered species. Lewandrowski et al. (2011) found that a 10% reduction in grazing would have relatively minor impacts on economic activity at the regional, state, and national level. But, for many ranches at the local level, the negative impacts of even a relatively modest reduction in grazing on federal lands would be significant. Taylor et al. found that designating critical habitat would have the potential to significantly impact agricultural operations and the economy of local communities.

Resource Concepts Incorporated {5594 /d}, in a study prepared for the State of Nevada and Nevada Association of Counties, looked at the economic changes that have occurred as a result of grazing allocation changes. They also found that decisions to increase or decrease livestock numbers on federal lands in Nevada have an important trickle down negative impact to the economy.

Bartlett et al. {5595 /d} found that forage value studies in the last 40 years have resulted in low or negative estimates of public land forage value. Livestock production returns are low when compared to any standard investment criteria. Yet, ranchers still graze livestock on public lands and purchase ranches with grazing permits. Their conclusion was that public land forage values include not only traditional livestock production value but also other quality-of-life values.

4. GENERAL METHODOLOGY

Geographic Information System (GIS) data is combined with economic modeling in order to determine the economic potential of the lands within the LWC Inventory. The economic potential of resources contained in public lands is assessed for individual resources. Resources included in the analysis include oil and gas, grazing lands, recreation uses, and ecosystem services. GIS provided detailed data on the well potential for oil and gas, the allotments and AUMs for grazing, roads, rivers, hunting areas used for recreational purposes, and the potential for ecosystem services. IMPLAN®, a regional input-output model, provides 2009 data on individual sectors and is used to assess potential future impacts from resource uses.

4.1 GIS METHODOLOGY

Ecosystem Research Group (ERG) analyzed the BLM's LWCs according to the guidelines set forth by the BLM Manual 6300-1-Wilderness Inventory. At the time the confirmation inventory was performed only the Draft guidance on LWC inventory procedures was available. Since that time, the BLM has formally released Manual 6301 Wilderness Characteristics Inventory. There are no substantial differences between the two Manuals and the guidance remains the same.

ERG used BLM GIS data sets for roads, oil and gas fields, and range improvements; aerial photo interpretation data sets for additional reservoirs; Wyoming Pipeline Authority data for oil and gas pipelines; and Wyoming Oil and Gas Commission data for existing oil and gas wells to perform a confirmation inventory of the BLM's LWC Inventory.

4.2 ECONOMIC ANALYSIS METHODOLOGY

In general, the purpose of the economic analysis is to quantify the economic value of oil and gas, grazing, and motorized recreational use of the lands within the inventory, which theoretically would represent the uses that would be foregone. It is beyond the scope of this study to quantify the socially optimal use of the lands. Rather, this should be viewed as the first step in providing decision makers with the necessary economic information to make decisions based on quantified economic values. For each resource, the economic contribution in 2009 is examined, the methodology is detailed, and then the potential economic impact to the areas is measured. The potential economic impact is presented first in terms of employment and labor income, based on the estimated production of oil and gas, then in terms of tax revenue generated based on the sales value of production.

IMPLAN, with 2009 data, is utilized throughout the analysis to examine the contribution of resource uses to the local economies and to measure potential impacts of additional resource use to local economies through indirect and induced effects. Indirect impacts are changes in industries that sell inputs to the industries that are directly impacted. Induced impacts are changes in household spending that result from increases or decreases in household income.

5. ECONOMIC ANALYSIS OF THE LWC INVENTORY OF THE BIGHORN BASIN

5.1 OIL AND GAS

The oil and gas industry has a significant impact on the local economies of the planning area. In 2009, oil and gas employment (extraction, drilling, and support activities) represented 3% of total employment, 9% of total labor income, and 12% of total output. Table 3 provides details of oil and gas employment in each county.

Table 3 Oil and Gas Contribution by County (2009)

County	Employment	Labor Income	Labor Income Per Worker	Output
Big Horn County	83	$6,358,896	$76,613	$22,969,171
Hot Springs County	242.9	$16,408,894	$67,554	$116,489,765
Park County	642.8	$69,151,682	$107,579	$273,239,982
Washakie County	203	$14,861,046	$73,207	$83,063,907
Total Oil and Gas in Bighorn Basin	**1,171.7**	**$106,780,518**	**$ 91,133**	**$495,762,825**
All Industries in the Bighorn Basin	**34,331.6**	**$1,253,659,513**	**$ 36,516**	**$4,095,255,746**

Within the LWCs there are currently eight active oil and gas wells. Of the 571,291 acres (from executive summary) within LWCs, 248,244 acres have current oil and gas leases. There are 83,245 acres within the 2-mile buffer zone of existing wells and an additional 448,219 acres within the 2–5 miles buffer zone of existing wells. These areas are of interest to oil companies as sites of future wells.

5.1.1 Geology

An evaluation of the regional geology indicates that there are opportunities for undiscovered oil and gas reserves in the Bighorn Basin. In consideration with the fact that the Bighorn Basin RFD may have understated the potential for new oil and gas discoveries, the Secretary of the Interior's Order No. 3310 could notably impact future oil and gas production.

Based on the geochemistry of past production, there are two petroleum systems within the Bighorn Basin; one is sourced from the Permian Phosphoria Formation and equivalents and the other is sourced from Cretaceous formations such as the Thermopolis, Mowry, and Cody Shales (Herrod 2010a; USDI 2008). It has been established that Phosphoria-derived oils to the west in the Idaho-Wyoming Thrust Belt subsequently migrated into reservoirs older than the Cretaceous formations in the Bighorn Basin (Stone 1967; USDI 2009). While migrating through western and central basin areas, some of these hydrocarbons were certainly diverted into prevailing structural and stratigraphic traps. These traps have not been commonly targeted for exploration because there have always been more economical, shallower targets to

drill. Those opportunities of historical focus are diminishing and potential resources are merely waiting on economic incentives and new technology (Herrod and Trudell 2010).

5.1.1.1 *Oil and Gas Production*

Oil and gas in the Planning Area occurs in multiple geologic formations that range in age from the oldest producing formation, the Cambrian Flathead Sandstone, upward in time to the Tertiary Fort Union Formation (USDI 2009). Cumulative production (through 2008) in the Planning Area has been reported as more than two trillion cubic feet of gas and roughly 2.87 billion barrels of oil (USDI 2009). The most successful oil producing formations have been the Phosphoria Formation, Pennsylvanian Tensleep Sandstone, and Mississippian Madison Limestone (USDI 2009).

Historically, hydrocarbon production has been from large, anticlinal traps that rim the Basin and approximately 90% of the oil discovered is found in late Paleozoic reservoirs associated with these anticlines (Herrod 2010a). More than 110 anticlines, many of which are productive, have been mapped around the Basin margin and were the first targets drilled, since they were often recognizable surface structures and were located on the shallower Basin flanks (Herrod 2010a). With the exception of Cottonwood Creek Field, a Phosphoria carbonate stratigraphic trap on the eastern border of the Basin, practically all hydrocarbon production has come from Basin-edge anticlinal traps (Herrod 2010a). Roughly 12,000 exploration and development wells have been drilled, with the majority being concentrated on the basin margins. Only about 100 wells have been drilled in the deeper portion of the Basin and there are vast areas between the Basin center and the shallower flanks that have only a few wells or no wells per township (Herrod 2010a).

5.1.1.2 *Unexploited Resource Potential*

Nearly all of the conventional petroleum traps in the Basin are anticlinal traps and hardly any of these structures remain untested by drilling (USDI 2008). Future conventional opportunities for development include stratigraphic traps located within carbonate mounds in the Phosphoria Formation (known as the Park City Formation) and in sandstone stratigraphic pinch-out traps in the Upper Cretaceous Frontier Formation and Cody Shale (USDI 2008). Additionally, unconventional hydrocarbon accumulations are interpreted to be present in the Mowry Shale (Herrod 2010b).

The Phosphoria Formation is productive in more fields than any other formation in the Basin, and 42% of the active wells in the Planning Area occur in Phosphoria fields (Stone 1967; USDI 2009). Stratigraphic variations rarely contribute to trap limits within the Basin and therefore production from this formation is unique in that it is not only found in structural traps, but in stratigraphic traps as well (USDI 2009). In at least 16 Bighorn Phosphoria fields, stratigraphic variation contributes greatly to the structure of the Phosphoria trap and is essential in at least three fields (Cottonwood Creek, Manderson, and Water Creek) (Stone 1967). Considering this stratigraphic variation, and that one petroleum system in the Basin is

sourced from the Phosphoria Formation, it is probable that there are opportunities for discovering new reserves in this formation (USDI 2008).

The Frontier formation (locally termed the Peay, Torchlight, or Heart Mountain Sandstone) generally consists of stacked coarsening-upward marine sands, and individual layers can range from less than 10 feet to greater than 25 feet (Herrod 2010a). Due to its complexity (owing in part to several significant unconformities within the section), the formation also exhibits a strong stratigraphic trapping component even on large structures and this enhances its prospectively as an exploration target (Herrod 2010a). The underlying Mowry Shale and the overlying Cody Shale are the principle source rocks for Frontier oil and gas production.

The Mowry Fractured Shale shares many of the characteristics of the Bakken Shale and other successful fractured shale reservoirs in the United States. These characteristics include a significant thickness of source-rock quality shale (upwards of 700 feet in the Bighorn Basin), adequate maturation, the capacity to maintain open fractures, and susceptibility to fracture stimulation (Herrod 2010b). Limited production has been reported from the Mowry Shale in the Bighorn Basin (primarily because it has never been specifically targeted), but it is known to produce from several fields in the Powder River Basin (Herrod 2010c).

Recent drilling has successfully targeted the Mowry Shale in the Bighorn Basin. In March 2008, a horizontal well (Ainsworth 13-35) was drilled in the Manderson field (a field with known Mowry Shale production). The well was completed in Ocht Louie sandstone at the base of the Mowry Shale. In the northwest corner of the Basin, near the Absaroka Range Front, two wells (Crosby 25-2 and Crosby 25-3 in the Terry Field) were completed in the Mowry Shale in 2007. Cumulative production from Crosby 25-2 from June 2007 to November 2009 was 14,766 barrels oil and 291,841 cubic feet of gas. Cumulative production from Crosby 25-3 from May 2007 to November 2009 was 13,217 barrels oil and 582,982 cubic feet of gas. These successful Mowry Shale completions will likely lead to additional development and drilling of Mowry Shale targets in the Basin.

The U.S. Geologic Service (USGS) evaluated the Mowry Fractured Shale play in their assessment of undiscovered oil and gas resources of the Bighorn Basin (USDI 2008). The Mowry Fractured Shale was included in the Cretaceous-Tertiary Composite Total Petroleum System Muddy-Frontier Sandstone and Mowry Fractured Shale Continuous Gas assessment unit (AU) and was also evaluated separately as the Mowry Fractured Shale Oil AU. Estimated (mean) undiscovered continuous oil and gas reserves are five million barrels of oil in the Mowry Fractured Shale AU and 348 billion cubic feet of gas (BCFG) in the Muddy-Frontier-Mowry AU. The USGS assessment of undiscovered oil and gas resources of the Bighorn Basin is included in the RFD as Table 4 and the estimates may be significantly understated. For example, once a Mowry Fractured Shale continuous oil play is unlocked there could be 50 times that amount of oil recovered, or approximately 250,000,000 barrels and 100 billion cubic feet of gas (BCFG) (Marathon Oil Company 2010). Furthermore, the combined Muddy-Frontier Sandstone and the Mowry-

fractured Shale continuous gas play are given mean estimates of only 348 BCFG, the Cody Sandstone continuous gas play is given a mean estimate of 38 BCFG, and the Mesaverde Sandstone continuous gas play a mean estimate of 32 BCFG. If there is successful discovery of these gas plays, the recovery for each could easily be between 25 to 50 times the estimated mean amounts, and for planning purposes, it would be appropriate to include the peak potential for each of these plays (Marathon Oil Company 2010).

5.1.2 Methodology, Data, and Assumptions

There are three stages in oil and gas production which impact local communities: 1) drilling oil and gas wells, 2) completion of wells and 3) production (extraction of oil and gas). In order to determine the economic value of the oil and gas resources on the lands in the LWC inventory a four step process is completed for each of the counties in the Bighorn Basin and for the region. First, the number of potential wells is determined using GIS data provided by BLM. Second, the total amount produced and sales value of output is calculated. Third, the labor and income impacts of the potential wells during drilling, completion, and production were calculated. Lastly, the tax revenues generated were calculated.

5.1.2.1 *Well Potential*

The RFD Scenario for Oil and Gas for the Bighorn Basin Planning Area, Wyoming provides potential well development by township. The ranges provided in the RFD are: none, very low potential (<2 wells), low potential (2 to 20 wells), and moderate (20 to100 wells) (USDI 2009). The majority of the LWCs are very low and low potential. Table 4 details the percentage of LWC areas in each classification. Based on information from industry experts, in particular information provided to the BLM from Marathon Oil, that recovery could be twenty to fifty times greater than that of the RFD (the high level of each range is used to calculate potential wells) {5544}. Therefore, areas of very low potential were assigned 2 wells per township, areas with low potential 20, and areas of moderate potential 100. Using the GIS layer provided by the BLM for well potential, the RFD is intersected with the LWCs to determine the acres and percentages of each category within the LWCs within each township. Using those percentages, the weighted average of future projected wells per LWC is determined. The estimated number of potential wells during the planning period (2009 to 2028) in the LWC's is 569.

Table 4 Oil and Gas Potential of the LWCs

Classification	Percentage of LWC Area
No Potential	1
Very Low Potential (< 2 wells per township)	45
Low Potential (2 to < 20 wells per township)	44
Moderate Potential (2 to 100 wells per township)	10

In order to see effects on individual counties, the percentage of LWCs in each of the counties is calculated. This percentage is then applied to the number of potential wells to determine the number of

potential wells per county. Maps containing the LWCs and the potential in each county are in Appendix A.

For analysis purposes, the number of potential wells is divided by the planning period of 20 years to obtain the average number of wells drilled per year. The number of wells drilled per year is then multiplied by 64.72% to determine the average number of competed and newly productive wells per year, since not all wells drilled become productive (USDI 2009). The numbers for each county and the Bighorn Basin are detailed in Table 5.

Table 5 Estimate of Potential Wells

County	Acres of LWCs	Percentage	# of Potential Wells	# of Wells Drilled per Year	# of Completed and New Productive Wells per Year
Big Horn County	261,712	46	261	13.03	8.44
Hot Springs County	39,190	7	39	1.95	1.26
Park County	159,415	28	159	7.94	5.14
Washakie County	110,961	19	111	5.53	3.58
Total Bighorn Region	**571,278**	**100**	**569**	**28.45**	**18.41**

5.1.2.2 *Estimation of the Output and Value of Output*

Using the estimated number of wells in production each year, the production is estimated using the five year average output per producing well of oil and gas in each County from 2005 to 2009 {5607}. After the volume of production is estimated, the sales value of the output in 2009 $s is calculated using prices from the Energy Information Administration's Annual Energy Outlook 2011 for future prices of crude oil and natural gas. This amount is then discounted at a 4% discount rate. (See Appendix B, Table 4 for calculations.)

5.1.2.3 *Estimation of Employment and Income Impacts using IMPLAN*

Calculations for direct labor impacts utilize numbers from other studies completed for the Bighorn Basin. The estimation used for drilling is 3.45, an average of conventional drilling with and without directional drilling. The estimation used for completion is 4.1. The estimated direct employment is listed in Table 6 for each County. The estimation used for production is 0.001604 employees per million cubic feet of natural gas production and 0.025320 per thousand barrels of crude oil production {5608}. The estimation of direct labor for each year of production is detailed in the tables in Appendix B.

Table 6 Direct Employment for Drilling and Completion per Year

County	# of Potential Wells	# of Wells Drilled per Year	Direct Employment per Year - Drilling	# of Completed and New Productive Wells per Year	Direct Employment per Year - Completion
Big Horn County	261	13.03	44.97	8.44	34.58
Hot Springs County	39	1.95	6.73	1.26	5.18
Park County	159	7.94	27.39	5.14	21.07
Washakie County	111	5.53	19.06	3.58	14.66
Total Bighorn Region	**569**	**28.45**	**102.42**	**18.41**	**75.49**

The direct labor impact is used in IMPLAN to measure the indirect and induced impacts to employment and the direct, indirect, and induced impacts to labor income and total value. Since the average number of wells drilled per year is constant for purposes of this analysis the impacts for drilling and completion are calculated on a per year basis. For production, since the number of producing wells increases each year, the impacts per year also increase. The impacts are assessed for every 5th year of the planning period: 2013, 2018, 2023, and 2028.

The purpose of the analysis is to determine the economic potential of oil and gas, not just for the particular counties, therefore for purposes of this analysis is it assumed that all workers will reside within the County. Consequently, the employment impacts during the drilling and completion stages are overstated for some individual counties, but not for the region or state.

5.1.2.4 *Estimation of Tax Revenues*

Using the sales value of production in Appendix B, the Federal Mineral Royalty (FMR), severance tax, and ad valorem taxes were calculated. The FMR is calculated as 12.5% of the sales valuation of production. Severance tax is calculated at 6% of the valuation of production net of FMR. And ad valorem tax is calculated using the average rate for each county over the last ten years, with the year 2000 omitted, of the valuation net of FMR. The rates are listed tables in Appendix C.

After the tax revenues are collected they are then distributed according to various laws. Of the FMRs, 52% is retained by the federal government and 48% is returned to the state of Wyoming. Of the portion that is returned to the state of Wyoming it is assumed for this analysis that 4% is distributed to the local governments. Therefore, the state effectively receives 45.6% and local governments 2.4%. The severance tax is collected by the state and it is assumed that it retains 96% and distributes 4% to the local governments. The local governments collect and retain 100% of the ad valorem tax.

5.1.3 Impacts to the Counties of the Bighorn Basin

The oil and gas resource use that would be foregone should current LWCs remain and be managed as wilderness, have the potential to create significant economic impact on the four counties of the Bighorn Basin. The largest potential impact both in total and percentage impact would be in Big Horn County, while the smallest potential impact is in Hot Springs County which has the lowest acres of LWCs.

5.1.3.1 *Big Horn County*

The oil and gas industry in Big Horn County consist primarily of extraction and support activities. In 2009, these two sectors accounted for 1.3% of employment, 3% of labor income, and 3.2% of output. The average wage of all industries was $34,023, while it was $76,613 for those in oil and gas. The contributions of the oil and gas industry are detailed in Table 7. While there are new wells drilled in Big Horn County the companies are not from the county itself. Therefore, the oil and gas drilling sector is zero in the contribution table. However, out analysis of the potential of the LWCs includes oil and gas drilling since

Table 7 Contribution of Oil and Gas in Big Horn County (2009)

Sector	Employment	Labor Income	Labor Income Per Worker	Output
Oil and Gas Drilling	0	$ -	$-	$-
Oil and Gas Extraction	50.6	$4,698,416	$92,853	$17,296,656
Oil and Gas Support Activities	32.4	$1,660,480	$51,308	$5,672,515
Total Oil and Gas	83	$6,358,896	$76,613	$22,969,171
Total All Industries	6,220.6	$1,645,299	$34,023	$706,809,455
Percentage Oil and Gas	1.3%	3.0%	225.2%	3.2%

Almost half, 46% of the lands in the LWC inventory are contained in Big Horn County. Of this area, 12,589 acres (4.8%) are characterized as moderate potential, 132,360 acres (51%) as low potential, and 111,364 acres (43%) as very low potential. The potential numbers of wells over the planning period is estimated to be 261, which equates to an average of 13.03 wells drilled per year and 8.44 wells completed and newly producing each year. The impacts from drilling and completion are listed in Table 8 and Table 9.

Table 8 Potential Impacts per Year from Drilling in Big Horn County (2009 $s)[2]

Impact Type	Employment	Labor Income	Value Added
Direct Effect	45	$3,218,708	$13,772,748
Indirect Effect	45.6	$1,940,410	$3,064,553
Induced Effect	22.9	$644,442	$1,282,526
Total Effect	113.5	$5,803,561	$18,119,827

Table 9 Potential Impacts per Year from Completion in Big Horn County (2009 $s)[3]

Impact Type	Employment	Labor Income	Value Added
Direct Effect	34.6	$2,475,049	$10,590,652
Indirect Effect	35	$1,492,092	$2,356,510
Induced Effect	17.6	$495,548	$986,207
Total Effect	87.2	$4,462,689	$13,933,369

For Big Horn County the potential impacts from production on LWCs is significant. By the year 2023, the sales value of the output could reach $62,578,122 (2009$s) and the tax revenues generated could reach $8,796,551. Over the twenty year planning period the LWCs have the potential to generate $201,836,925 ($121,348,793 in NPV) in tax revenues. The local governments would receive $58.9 million, the state of Wyoming would receive approximately $89 million, and the federal government would receive $53.9 million.

Table 10 Potential Production Impacts in Selective Years in Big Horn County (2009 $s)

Year	Impact Type	Employment	Labor Income	Value Added	Sales Value of Output	Tax Revenues Generated
2013	Direct Effect	4	$371,410	$831,004	$14,173,906	$2,949,258
	Indirect Effect	0.4	$17,332	$30,120		
	Induced Effect	1.1	$23,334	$56,600		
	Total Effect	5.5	$412,077	$917,724		
2018	Direct Effect	9	$835,673	$1,869,760	$37,086,620	$6,342,695
	Indirect Effect	1	$38,998	$67,770		
	Induced Effect	2.4	$52,501	$127,350		

[2] An oil and gas drilling sector does not exist in Big Horn County. Companies from outside the county perform drilling and completion. In order to determine the employment impacts, the four county region model was used in IMPLAN. These effects will occur outside of the County, but are a result of the resource within Big Horn County.
[3] See Footnote 2.

Year	Impact Type	Employment	Labor Income	Value Added	Sales Value of Output	Tax Revenues Generated
	Total Effect	12.4	$927,173	$2,064,879		
2023	Direct Effect	15	$1,392,789	$3,116,266	$62,578,122	$8,796,551
	Indirect Effect	1.6	$64,997	$112,950		
	Induced Effect	4.1	$87,502	$212,250		
	Total Effect	20.7	$1,545,288	$3,441,465		
2028	Direct Effect	20	$1,857,052	$4,155,021	$90,295,086	$10,432,474
	Indirect Effect	2.1	$86,662	$150,599		
	Induced Effect	5.4	$116,670	$283,000		
	Total Effect	27.6	$2,060,384	$4,588,620		

5.1.3.2 *Hot Springs County*

Oil and gas constituted a significant portion of the output in Hot Springs County in 2009. While only 8.6% of total employment was in oil and gas sectors, the sectors accounted for 16.6% of labor income and 34.7% of total output. The contributions of oil and gas are detailed in Table 11.

Table 11 Contribution of Oil and Gas in Hot Springs County (2009 $s)

Sector	Employment	Labor Income	Labor Income Per Worker	Output
Oil and Gas Drilling	98.2	$6,200,010	$63,155	$79,297,386
Oil and Gas Extraction	88.2	$7,339,119	$83,182	$27,324,144
Oil and Gas Support Activities	56.5	$2,869,765	$50,817	$9,868,235
Total Oil and Gas	242.9	$16,408,894	$67,554	$116,489,765
Total All Industries	2,817.8	$99,044,848	$35,150	$335,941,108
Percentage Oil and Gas	8.6%	16.6%	192.2%	34.7%

Hot Springs County contains the smallest amount of lands within the LWC Inventory. The 39,190 acres of LWCs in Hot Springs County are only 7% of the total. Of this area, approximately 60% is characterized as low potential and 40% as very low potential. The potential number of wells over the planning period is estimated to be 39 or 1.95 wells drilled per year and 1.26 wells completed and newly producing each year.

The potential impacts from drilling and completion per year is 22.3 annual equivalents of employment, 12.6 from drilling and 9.7 from completion. In 2009, employment in oil and gas drilling in the County

was 98.2. The LWC area could potentially account for 23% of the oil and gas drilling employment. The potential impacts per year from the drilling and completion stages are detailed in Table 12 and Table 13.

Table 12 Potential Impacts per Year from Oil and Gas Drilling in Hot Springs County (2009 $s)

Impact Type	Employment	Labor Income	Value Added
Direct Effect	6.7	$425,034	$1,825,699
Indirect Effect	3.7	$147,549	$231,260
Induced Effect	2.1	$54,745	$110,364
Total Effect	12.6	$627,328	$2,167,322

Table 13 Potential Impacts per Year from Completion in Hot Springs County (2009 $s)

Impact Type	Employment	Labor Income	Value Added
Direct Effect	5.2	$327,144	$1,405,218
Indirect Effect	2.8	$113,567	$177,998
Induced Effect	1.6	$42,137	$84,946
Total Effect	9.7	$482,847	$1,668,162

While the potential employment impacts for production is small in Hot Springs County, at less than 4 annual equivalents of employment, the 7% of the LWCs in the Bighorn Basin have the potential to generate $5,327,208 in sales output per year by 2018 and $12,888,198 per year by 2028. This could generate $1,278,296 in tax revenue in 2018 and $3,092,602 in 2028. Over the life of the twenty year planning period the LWCs in Hot Springs County have the potential to generate $28,478,980 (NPV=$17,125,520) in tax revenues. The local governments would receive approximately $8 million, the state $12.7 million, and the federal government $7.7 million.

Table 14 Potential Production Impacts for Selective Years in Hot Springs County (2009 $s)

Year	Impact Type	Employment	Labor Income	Value Added	Sales Value of Output	Tax Revenues Generated
2013	Direct Effect	1	$83,182	$188,221	$2,024,285	$485,740
	Indirect Effect	0.1	$2,772	$4,179		
	Induced Effect	0.3	$8,194	$16,511		
	Total Effect	1.4	$94,147	$208,911		
2018	Direct Effect	1	$83,182	$188,221	$5,327,208	$1,278,296
	Indirect Effect	0.1	$2,772	$4,179		
	Induced Effect	0.3	$8,194	$16,511		
	Total Effect	1.4	$94,147	$208,911		
2023	Direct Effect	2	$166,363	$376,442	$8,961,941	$2,150,472

Year	Impact Type	Employment	Labor Income	Value Added	Sales Value of Output	Tax Revenues Generated
	Indirect Effect	0.2	$5,544	$8,358		
	Induced Effect	0.6	$16,388	$33,022		
	Total Effect	2.8	$188,295	$417,822		
2028	Direct Effect	3	$249,545	$564,663	$12,888,198	$3,092,602
	Indirect Effect	0.2	$8,316	$12,537		
	Induced Effect	1	$24,582	$49,533		
	Total Effect	4.2	$282,442	$626,733		

5.1.3.3 *Park County*

Park County, with its access to Yellowstone National Park, contains the largest tourism industry in the Basin. However, the oil and gas industry still accounts for 3.2% of employment and 9.4% of wages in the County. The average wage for all industries is $36,828.93, as opposed to an average wage of $107,579 in oil and gas. The contributions of oil and gas are detailed in Table 15.

Table 15 Contribution of Oil and Gas in Park County (2009 $s)

Sector	Employment	Labor Income	Labor Income Per Worker	Output
Oil and Gas Drilling	47.6	$3,627,594	$76,135	$42,122,204
Oil and Gas Extraction	284.7	$47,055,775	$165,308	$173,847,305
Oil and Gas Support Activities	310.5	$18,468,313	$59,477	$57,270,473
Total Oil and Gas	642.8	$69,151,682	$107,579	$273,239,982
Total All Industries	19,918.7	$733,584,412	$36,828.93	$2,197,062,445
Percentage Oil and Gas	3.2%	9.4%	292.1%	12.4%

Park County contains the second highest percentage of LWCs in the planning area with 159,415 acres (28%). Of these acres, 45% are classified as very low potential, 27% as low potential, and 28% as moderate potential. The potential number of wells during the planning period is 159, averaging to 7.94 drilled per year and 5.14 completed and newly producing per year. The potential impacts in employment, labor income, and value for production and completion each year are listed in Table 16 and Table 17.

Table 16 Potential Impacts per Year from Oil and Gas Drilling in Park County (2009 $s)

Impact Type	Employment	Labor Income	Value Added
Direct Effect	27.4	$2,085,336	$8,883,811
Indirect Effect	31.5	$1,325,020	$2,050,017

Induced Effect	16.3	$477,085	$929,495
Total Effect	75.2	$3,887,442	$11,863,323

Table 17 Potential Impacts per Year from Completion in Park County (2009 $s)

Impact Type	Employment	Labor Income	Value Added
Direct Effect	21.1	$1,604,163	$6,833,950
Indirect Effect	24.3	$1,019,284	$1,576,994
Induced Effect	12.5	$367,002	$715,022
Total Effect	57.9	$2,990,449	$9,125,966

The potential impacts from production over the life of the planning period are substantial. Over the life of the plan, the LWC areas in the County have the potential to generate $185,733,017 (NPV= $111,666,246) in tax revenues. Of this amount the local governments would receive $53.8 million, the state $82.2 million, and the federal government $49.7 million.

Table 18 Potential Impacts from Production in Selective Years in Park County (2009 $s)

Year	Impact Type	Employment	Labor Income	Value Added	Sales Value of Output	Tax Revenues Generated
2013	Direct Effect	4	$661,233	$1,484,732	$13,078,060	$3,175,104
	Indirect Effect	2.1	$89,914	$137,558		
	Induced Effect	3.5	$103,005	$200,418		
	Total Effect	9.6	$854,152	$1,822,708		
2018	Direct Effect	9	$1,487,774	$3,340,646	$34,214,547	$8,306,640
	Indirect Effect	4.7	$202,305	$309,506		
	Induced Effect	7.9	$231,762	$450,940		
	Total Effect	21.6	$1,921,841	$4,101,092		
2023	Direct Effect	14	$2,314,314	$5,196,560	$57,736,108	$14,017,227
	Indirect Effect	7.2	$314,697	$481,453		
	Induced Effect	12.3	$360,519	$701,463		
	Total Effect	33.6	$2,989,531	$6,379,476		
2028	Direct Effect	19	$3,140,855	$7,052,474	$83,315,157	$20,227,333
	Indirect Effect	9.8	$427,089	$653,401		
	Induced Effect	16.7	$489,276	$951,985		
	Total Effect	45.5	$4,057,220	$8,657,861		

5.1.3.4 *Washakie County*

In Washakie County in 2009, oil and gas accounted for 3.8% of employment, 7.1% of earnings, and 9.7% in output. The average wage in oil and gas was $73,207, as opposed to the average wage in all industries of $38,959.

Table 19 Contribution of Oil and Gas in Washakie County (2009 $s)

Sector	Employment	Labor Income	Labor Income Per Worker	Output
Oil and Gas Drilling	54.5	$4,510,934	$82,751	$50,474,304
Oil and Gas Extraction	31.2	$2,694,467	$86,443	$10,190,637
Oil and Gas Support Activities	117.3	$7,655,645	$65,271	$22,398,966
Total Oil and Gas	203	$14,861,046	$73,207	$83,063,907
Total All Industries	5,374.5	$209,384,958	$38,959	$855,442,692
Percentage Oil and Gas	3.8%	7.1%	187.9%	9.7%

Nineteen percent of the LWCs, or 110,961 acres, are located in Washakie County with a potential for 111 wells over the planning period. Of the LWCs acres, 45% are considered very low potential, 54% low potential, and 1% moderate potential. There were 203 jobs in oil and gas in 2009, the potential wells could account for 38.8 direct jobs by 2028.

Table 20 Potential Impacts per Year from Oil and Gas Drilling in Washakie County (2009 $s)

Impact Type	Employment	Labor Income	Value Added
Direct Effect	19.1	$1,577,236	$6,737,172
Indirect Effect	16	$683,979	$1,110,306
Induced Effect	9	$253,581	$514,688
Total Effect	44	$2,514,796	$8,362,166

Table 21 Potential Impacts per Year from Completion in Washakie County (2009 $s)

Impact Type	Employment	Labor Income	Value Added
Direct Effect	14.7	$1,213,131	$5,181,896
Indirect Effect	12.3	$526,083	$853,992
Induced Effect	6.9	$195,042	$395,872
Total Effect	33.9	$1,934,256	$6,431,760

Table 22 details the potential impacts from production for selective years. The potential wells could generate over $20 million in sales output by the end of the planning period and close to $5 million in tax

revenues. Over the life of the plan, the potential tax revenues generated is $43,985,943 (NPV=$26,438,003). The local governments would receive approximately $12.3 million, while the state would receive $19.7 million and the federal government $12 million.

Table 22 Potential Impacts from Production in Selective Years in Washakie County (2009 $s)

Year	Impact Type	Employment	Labor Income	Value Added	Sales Value of Output	Tax Revenues Generated
2013	Direct Effect	1	$86,443	$198,699	$3,153,178	$754,274
	Indirect Effect	0.1	$6,539	$10,480		
	Induced Effect	0.4	$10,968	$22,438		
	Total Effect	1.5	$103,950	$231,617		
2018	Direct Effect	2	$172,885	$397,397	$8,183,087	$1,957,483
	Indirect Effect	0.3	$13,078	$20,959		
	Induced Effect	0.8	$21,936	$44,876		
	Total Effect	3.1	$207,899	$463,233		
2023	Direct Effect	3	$259,328	$596,096	$13,867,023	$3,317,142
	Indirect Effect	0.4	$19,617	$31,439		
	Induced Effect	1.2	$32,904	$67,315		
	Total Effect	4.6	$311,849	$694,850		
2028	Direct Effect	5	$432,213	$993,494	$20,103,982	$4,809,091
	Indirect Effect	0.7	$32,695	$52,399		
	Induced Effect	2	$54,840	$112,191		
	Total Effect	7.7	$519,748	$1,158,084		

5.1.4 Regional Analysis of the Bighorn Basin

In 2009 employment in the oil and gas industry in the Bighorn Basin was 1,172. The LWCs have the potential to provide 434 jobs per year or 40% of the total jobs. Table 23 provides a summary of the employment and labor income per year for each of the counties of the region.

Table 23: Employment and Labor Income per Year due to Drilling and Completion (2009 $s)

County	Employment	Labor Income
Big Horn	200.7	$10,266,250
Hot Springs	22.3	$1,110,175
Park	133.1	$5,877,891
Washakie	77.9	$4,449,052

Total	434.0	$21,703,368

Over the twenty year planning period $1,896,757,252 in total output and $460,034,865 in tax revenue could be generated. Table 24 provides the potential sales value of output per year over the planning period and the net present value of the output based on a 4% discount rate. By the end of the 20 year period, the LWCs have the potential to generate over $200 million in output and close to $100 million in tax revenue per year. Table 25 contains the potential tax revenues generated by type over the life of the plan.

Table 24 Potential Sales Value of Output in the Bighorn Basin LWCs (2009 $s)

Year	Total Value of Output	Net Present Value of Output
2009	$0	$0
2010	$7,265,008	$6,985,584
2011	$15,432,771	$14,268,464
2012	$23,671,147	$21,043,564
2013	$32,429,429	$27,720,812
2014	$42,049,460	$34,561,591
2015	$51,992,618	$41,090,521
2016	$62,500,898	$47,495,546
2017	$73,443,077	$53,664,137
2018	$84,811,461	$59,587,407
2019	$96,272,843	$65,038,483
2020	$107,788,482	$70,017,343
2021	$118,913,552	$74,273,054
2022	$130,737,825	$78,517,749
2023	$143,143,194	$82,661,628
2024	$155,826,569	$86,524,962
2025	$168,543,933	$89,986,984
2026	$181,233,139	$93,040,245
2027	$194,099,424	$95,812,934
2028	$206,602,422	$98,062,275
Total	**$1,896,757,252**	**$1,140,353,283**

Table 25 Potential Oil and Gas Tax Revenue Generated by LWCs

Year	FMR Taxes	Severance Taxes	Ad Valorem Taxes	Total Taxes	Net Present Value of Taxes
2009	$0	$0	$0	$0	$0
2010	$908,126	$381,413	$472,480	$1,762,019	$1,694,249

Year	FMR Taxes	Severance Taxes	Ad Valorem Taxes	Total Taxes	Net Present Value of Taxes
2011	$1,929,096	$810,220	$1,003,691	$3,743,008	$3,460,622
2012	$2,958,893	$1,242,735	$1,539,499	$5,741,127	$5,103,841
2013	$4,053,679	$1,702,545	$2,109,110	$7,865,333	$6,723,320
2014	$5,256,182	$2,207,597	$2,734,784	$10,198,563	$8,382,476
2015	$6,499,077	$2,729,612	$3,381,480	$12,610,170	$9,966,000
2016	$7,812,612	$3,281,297	$4,064,942	$15,158,851	$11,519,481
2017	$9,180,385	$3,855,762	$4,776,622	$17,812,768	$13,015,615
2018	$10,601,433	$4,452,602	$5,516,018	$20,570,053	$14,452,246
2019	$12,034,105	$5,054,324	$6,261,460	$23,349,890	$15,774,349
2020	$13,473,560	$5,658,895	$7,010,408	$26,142,863	$16,981,905
2021	$14,864,194	$6,242,961	$7,733,925	$28,841,080	$18,014,054
2022	$16,342,228	$6,863,736	$8,502,928	$31,708,892	$19,043,539
2023	$17,892,899	$7,515,018	$9,309,706	$34,717,623	$20,048,562
2024	$19,478,321	$8,180,895	$10,134,562	$37,793,778	$20,985,544
2025	$21,067,992	$8,848,557	$10,961,625	$40,878,173	$21,825,191
2026	$22,654,142	$9,514,740	$11,786,856	$43,955,739	$22,565,700
2027	$24,262,428	$10,190,220	$12,623,612	$47,076,259	$23,238,165
2028	$25,825,303	$10,846,627	$13,436,746	$50,108,676	$23,783,703
Total	**$237,094,657**	**$99,579,756**	**$123,360,453**	**$460,034,865**	**$276,578,562**

5.2 GRAZING AND RANCHING

This section looks at the economic value of the BLM grazing allotments within the LWCs in the planning area. The Draft BLM Manual 6302-Consideration of Lands with Wilderness Characteristics in the Land Use Planning Process (USDI 2011) states:

> "Grazing management may be consistent with protection of wilderness characteristics. In some cases, however, grazing management practices—including proposals for major new range

projects, large vegetation manipulation, or significant needs for motorized access—could conflict with protection of wilderness characteristics."

Therefore, based on this policy this analysis looks at the economic value grazing has to the Planning Area based on AUMs, both on BLM allotments and at the ranch level. In addition, the potential cumulative impacts of protecting these lands are discussed.

Table 26 Contribution of Cattle and Ranching in the Bighorn Basin in 2009

County	Employment	Output	Employee Compensation
Big Horn	107.4	$24,076,639	$813,233
Hot Springs	72.9	$9,617,654	$633,600
Park	81.9	$25,279,015	$611,152
Washakie	61.9	$17,581,913	$993,227
Total Bighorn Basin	**324.1**	**$76,555,221**	**$3,051,212**

5.2.1 Methodology

Valuation of stock grazing was determined by intersecting the LWCs with the allotments in the Bighorn Basin. Each allotment has a designated number of AUMs associated with the entire allotment system. Using the intersection file, ERG determined the percentage of acreage of each allotment within each LWC. Using those percentages, ERG calculated the number of AUMs within each LWC that may be affected from future management of the LWCs.

5.2.2 Summary of Grazing

There are 687 grazing allotments in the Planning Area, and of those, 203 have all or a portion of LWCs identified within their boundaries. These inventoried LWCs cover 569,277 acres or approximately 27% of the acres in the allotments. The permitted AUMs on these allotments are approximately 138,508. In addition, there are 154 range improvements (wells, guzzlers, cattle guards, and stock water tanks), 296 miles of fence, 442 reservoirs, and 10 miles of water pipelines located throughout the LWCs in the allotments. There are also 634 miles of two-track trails, gravel roads, and minimally paved roads within the LWCs (BLM GIS Transportation Geodatabase 2009). This information does not appear to include roads adjacent to fences that are used for maintenance or roads used to maintain stock water tanks or reservoirs. Therefore, the miles of road within the LWCs could be considerably greater.

5.2.3 Economic Value of Grazing in the Bighorn Basin

Federal grazing is an important part of livestock production in the Planning Area. Table 27 details the value of grazing to the Planning Area based on AUMs. The value of total production in column three is based on research completed by Van Tassel and Richardson {5596 /d} and Taylor {5597 /d} for Wyoming counties that found that one AUM of BLM grazing actually supported the equivalent of 1.45

AUMs of livestock production for a typical BLM-dependent ranch. In addition, BLM AUMs are critical to the economic viability of ranching operations and this same research indicates that one AUM of BLM grazing would support 2.46 AUMs of livestock production for a typical BLM-dependent ranch.

Table 27 Value of BLM Grazing Allotments in LWCs (based on 138,508 AUMs and 2009 $s)*

Economic Indicators	Value of BLM AUMs	Value of Total Production	Value to Ranch Viability
Value of Livestock Production (Millions of Dollars)	$10.9	$15.8	$26.9
Earnings (Millions of Dollars)	$3.5	$5.0	$12.4
Employment (Number of Employees)	107	155	382

*IMPLAN 2010

5.2.4 Grazing Management Practices – Cumulative Impacts

According to the draft policy, grazing may be consistent with wilderness characteristics. However; grazing management practices (range improvement projects, vegetation manipulation, and motorized access) "could conflict with protection of wilderness characteristics." Reservoirs, stock water tanks, water pipelines, and fences have all been installed (often at permittee expense) to distribute livestock across the allotments and improve the range resources (water, wildlife, soil, and vegetation). These projects and there maintenance are vital to the economic viability of the ranching unit. Treating grazing and grazing management practices differently under this policy will have significant cumulative impacts to the grazing industry in the Planning Area. Those impacts include:

- Restrictions on placement, construction, or maintenance of range improvement projects will unduly hamper grazing activities.
- Increased labor cost of maintaining range management projects because of restrictions on motorized use of 5% to 35% (Phillips 2010).
- Loss of vital water sources (used heavily by wildlife, as well as livestock) because of maintenance restrictions. This in turn causes concentrated use by livestock around remaining water sources making it difficult or impossible to achieve the Wyoming Standards for Healthy Rangelands (a permit requirement).
- Reduction in stocking rates (AUMs) because of loss of range improvements due to lack of maintenance.
- Difficulty of managing grazing in an area designated as having wilderness characteristics and public perception of allowed uses.

- Increased risk of losing permit because of litigation associated with wilderness characteristics/wildlands designation
- Predator control would be severely limited due to motorized use restrictions, which in turn would increase predation on livestock as well as wildlife.

Given the cumulative effects described above, the value of grazing allotments that would be foregone would best be characterized by the ranch viability above. Over the twenty year life of the plan, the grazing allotments within the LWCs have the potential to support 382 jobs per year, $248 million in earnings, and $538 million in production output.

5.3 MOTORIZED RECREATIONAL USE AND TOURISM

The value of recreational use and tourism is not as easily quantified as oil and gas, and ranching. Separating motorized recreation from general recreation poses additional challenges. Completing surveys and conducting on-site use statistics could provide data to determine the economic value of motorized recreation use, however the data compilation process would be expensive and the economic impact would most likely be minimal compared to other resource values. Instead, the recreational uses of BLM lands are summarized and the contribution of recreation related industries is detailed.

According to the Public Land Statistics for 2009, there were 183,181 wildlife viewers, 1,500 lake anglers, 8,890 stream anglers, and 29,058 hunters that utilized Wyoming's BLM lands in Wyoming. They spent $159,498,961, $32,573,432, and $46,119,274, respectively (USDI 2010). While specific data is not provided, the BLM has seen an increase in motorized use relative to other forms of recreational use of public lands over the last twenty years (USDI 2010). There are18.3 million acres of BLM lands in Wyoming. The proposed LWCs represent 3.1% of the total BLM lands. Assuming that the use and money spent are uniform across all acres then 3.1% of the expenditures could be attributed to the lands in the LWC inventory. However, this does not provide details of how much, if any, was dependent on motorized access or use in the area.

To gain an understanding of the contributions of the recreational use and tourism sector to the local communities it is useful to focus on three particular sectors: 1) retail stores, 2) scenic and sightseeing transportation, and 3) other amusement and recreation industries. Table 28 details the employment, output, employee compensation, and proprietor income in each of these industries for the four counties in the Planning Area. Table 29 details the source of demand in these industries. It should be noted that the location of Yellowstone National Park in Park County is a large contributor to the recreation and tourism industry and should be taken into account.

Table 28 Contribution of Outdoor Recreational Industries in 2009

County	Industry Code	Description	Employment	Output	Employee Compensation	Proprietor Income

County	Industry Code	Description	Employment	Output	Employee Compensation	Proprietor Income
Big Horn	328	Retail Stores - Sporting goods, hobby, book and music	41	$720,879	$155,523	$209,175
	338	Scenic and sightseeing transportation and support activities for transportation	2.7	$228,292	$8,117	$135,580
	410	Other amusement and recreation industries	15.3	$571,585	$215,600	$556
Hot Springs	328	Retail Stores - Sporting goods, hobby, book and music	11.9	$218,261	$86,374	$25,564
	338	Scenic and sightseeing transportation and support activities for transportation	5.4	$444,189	$264,169	$14,471
	410	Other amusement and recreation industries	3.7	$204,588	$86,404	$32
Park	328	Retail Stores - Sporting goods, hobby, book and music	110.8	$3,216,997	$1,171,932	$474,045
	338	Scenic and sightseeing transportation and support activities for transportation	34.5	$1,809,017	$591,430	$356,222
	410	Other amusement and recreation industries	93.4	$2,898,805	$1,011,838	$5,904
Washakie	328	Retail Stores - Sporting goods, hobby, book and music	10.6	$427,678	$205,996	$14,765
	338	Scenic and sightseeing transportation and support activities for transportation	4.5	$386,245	$48,601	$195,142
	410	Other amusement and recreation industries	4.8	$85,990	$19,775	$431

Table 29 Institutional Demand for Tourism and Recreational Industries (2009)

County	Code	Description	Household Demand	Federal Government Demand	State and Local Government Demand	Domestic Exports	Foreign Exports
Big Horn	328	Retail Stores - Sporting goods, hobby, book and music	$597,895	$6	$1,098	$3,586	$0

County	Code	Description	Household Demand	Federal Government Demand	State and Local Government Demand	Domestic Exports	Foreign Exports
	338	Scenic and sightseeing transportation and support activities for transportation	$12,187	$781	$40,101	$53,780	$14,064
	410	Other amusement and recreation industries	$487,448	$0	$0	$11,060	$0
Hot Springs	328	Retail Stores - Sporting goods, hobby, book and music	$190,875	$0	$231	$109	$0
	338	Scenic and sightseeing transportation and support activities for transportation	$28,611	$815	$74,414	$99,486	$56,956
	410	Other amusement and recreation industries	$183,521	$0	$0	$4	$0
Park	328	Retail Stores - Sporting goods, hobby, book and music	$2,643,497	$68	$3,048	$1,087	$0
	338	Scenic and sightseeing transportation and support activities for transportation	$160,109	$14,338	$188,882	$155,465	$279,595
	410	Other amusement and recreation industries	$2,338,040	$0	$0	$250,608	$0
Washakie	328	Retail Stores - Sporting goods, hobby, book and music	$353,328	$6	$299	$43	$0
	338	Scenic and sightseeing transportation and support activities for transportation	$25,462	$1,657	$42,417	$68,327	$34,460
	410	Other amusement and recreation industries	$74,643	$0	$0	$0	$0

Whether or not these are affected by restricting motorized recreation on the LWCs would require an in depth analysis of how these particular areas are utilized by residents and visitors to the area. According to local residents the bulk of the users are local, implying that the economic impact would be minimal, although the social benefit for locals would decrease.

6. **CONCLUSION**

Executive Order 3310, *Protecting Wilderness Characteristics on Lands Managed by the BLM* issued by U.S. Secretary of Interior on December 22, 2010 provides a method for the BLM to manage public lands as wilderness without the consent of Congress. In order to comply with this order the BLM issued three new manuals 6301, 6302, and 6303, to guide the development and management of LWCs. During the time that this study was conducted the Federal FY 2011 budget was approved which prohibited the use of funds for implementing Order 3310. However, the initial inventory still exists as a document of record, For this reason, the information contained in this report is an important supporting document for that inventory.

The inventory process requires the economic value of the foregone uses, should the area be managed as wilderness, to be analyzed. This report provides economic values for the resource uses that would be foregone for the lands currently being considered for the inventory within the Bighorn Basin. The resource uses evaluated were oil and gas, grazing for the local ranching community, and motorized recreation.

Oil and gas resources in the region have the highest economic value. Over the twenty year life of the plan, the LWC areas have the potential to produce close to $2 billion in output and $500 million in tax revenue. The local region would receive the economic benefit of employment, labor income and tax revenue.

The grazing allotments within the LWCs also have significant economic value, with the ability to support 382 jobs per year and $248 million in earnings over the life of the plan. These same AUMs have the potential to produce $538 million in production. While to monetary value of this resource are not as substantial as oil and gas, they provide a lifestyle that is culturally important and services that are ecologically important.

While it is difficult to capture to monetary value of motorized use on LWCs, it is also culturally important and provides personal satisfaction benefits to many people. Motorized recreation leads to the next steps in the process of understanding if these areas should be categorized as LWCs - to gain a more complete understanding of the market value of motorized recreation, the non-market values of grazing and motorized recreation, and the benefits of wilderness. Once this is accomplished, public planners will be better able to decide which uses maximize net public benefit.

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APPENDIX A

Bighorn Basin Reasonably Foreseeable Development

Lands with Wilderness Characteristics

Big Horn County

- Bighorn Basin Planning Area
- Counties
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- Bureau of Reclamation
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Water
- Lands with Wilderness Characteristics
- Wilderness Study Areas
- Producing Oil and Gas Wells

Reasonably Foreseeable Development Potential

- Low
- Moderate
- None
- Very Low

N W E S

0 2.5 5 10 Miles

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Ecosystem Research Group
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DRAFT

Bighorn Tack-on WSA
Pryor Mountain WSA
Frannie
Trout Creek
310
Cowley
Lovell
Powell
14
Crystal Creek
310
Coon Creek
McCullough Peaks WSA
Whistle Creek 2
Rough Gulch
Park County
Whistle Creek
Painted Hills
Little Dry Creek
Big Horn County
1536 PR
Whistle Creek 1
Greybull
Trapper Creek WSA
1535 PR
Burlington
16
North YU Bench
Johnson County
Alkali Creek NW CP
Cedar Ridge
Basin
Medicine Lodge North CP
20
Alkali Creek WSA
639 AK
Medicine Lodge WSA
Sheep Mountain WSA
668 AK
Paintrock CP 1
509 AK Dorsey Ck
Manderson
Red Butte North CP
Paintrock CP 2
652 Lower, Upper AK
Sheep Mountain South CP
577 AK
005 PR
669 AK
Red Butte WSA
651 AK
509 AK
31 PR
508 TriState Gooseberry N Platte
Meeteetse
626 AK
676 AK, PR
Bobcat Draw WSA
Washakie County
16

Bighorn Basin Reasonably Foreseeable Development

Lands with Wilderness Characteristics
Hot Springs County

- Bighorn Basin Planning Area
- Counties
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- Bureau of Reclamation
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Water
- Lands with Wilderness Characteristics
- Wilderness Study Areas
- Producing Oil and Gas Wells

Reasonably Foreseeable Development Potential

- Low
- Moderate
- None
- Very Low

N W E S

0 2.5 5 10
Miles

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Ecosystem Research Group
www.ecosystemrg.com

DRAFT

Carter Mountain
Meeteetse
Park County
Big Horn County
Sheep Mountain WSA
Sheep Mountain South CP
652 Lower, Upper AK
669 AK
509 AK
Red Butte North CP
577 AK
Red Butte WSA
651 AK
508 TriState Gooseberry N Platte
676 AK, PR
Bobcat Draw WSA
Inholding
626 AK
Bobcat Draw West CP
Bobcat Draw South CP
Bobcat Draw South II CP
508 AK
120
622 AK
Worland
Washakie County
20
665 CW
Cedar Mountain WSA
0048 PR
Kirby
Honeycombs South CP
0008 DH
516 DH
661 TS
Owl Creek CP 1
Owl Creek CP 2
Owl Creek WSA
Owl Creek WSA
Owl Creek WSA
Owl Creek CP 1
Owl Creek CP 3
Hot Springs County
568 TS
Thermopolis
East Thermopolis
Fremont County
Natrona County

Bighorn Basin Reasonably Foreseeable Development

Lands with Wilderness Characteristics
Park County

- Bighorn Basin Planning Area
- Counties
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- Bureau of Reclamation
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Water
- Lands with Wilderness Characteristics
- Wilderness Study Areas
- Producing Oil and Gas Wells

Reasonably Foreseeable Development Potential

- Low
- Moderate
- None
- Very Low

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Bighorn Tack-on WSA
Fryor Mountain WSA
Frannie
Cowley
Lovell
Byron
Powell
Bald Ridge
212
310
Coon Creek
McCullough Peaks WSA
Whistle Creek 2
Rough Gulch
Whistle Creek
Whistle Creek 1
Big Horn County
Little Dry Creek
Rattlesnake Mountain
Yellowstone Regional
Cody
14
20
Park County
Sheep Mountain
North YU Bench
Cedar Ridge
Burlington
1536 PR
Trapper Creek WSA
1535 PR
Greybull
16
Basin
Alkali Creek NW CP
Alkali Creek WSA
639 AK
Sheep Mountain WSA
668 AK
509 AK Dorsey Ck
Red Butte North CP
577 AK
Manderson
652 Lower, Upper AK
669 AK
Sheep Mountain South CP
Red Butte WSA
509 AK
651 AK
508 TriState Gooseberry N. Platte
Carter Mountain
Meeteetse
676 AK, PR
626 AK
Bobcat Draw WSA
Inholding
Bobcat Draw West CP
Bobcat Draw South CP
Bobcat Draw South II CP
508 AK
Washakie County
Worland
Honeycombs 164 CP
0016 DH
Honeycombs WSA
Teton County
Hot Springs County
120
622 AK
Fremont County
Fremont County
665 CW
Cedar Mountain WSA
Honeycombs South CP

Bighorn Basin Reasonably Foreseeable Development

Lands with Wilderness Characteristics
Washakie County

- Bighorn Basin Planning Area
- Counties
- NPS National Recreation Area
- USFS National Forest
- USFS Wilderness Area
- USFWS National Wildlife Refuge
- Bureau of Reclamation
- BLM
- Native American Reservation
- Department of Defense
- Wyoming State Lands
- Private
- Water
- Lands with Wilderness Characteristics
- Wilderness Study Areas
- Producing Oil and Gas Wells

Reasonably Foreseeable Development Potential

- Low
- Moderate
- None
- Very Low

N W E S

0 2.5 5 10
Miles

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Sheep Mountain WSA
509 AK Dorsey Ck
668 AK
Red Butte North CP
Manderson
Paintrock CP 1
Paintrock CP 2
Sheep Mountain South CP
669 AK
577 AK
005 PR
Big Horn County
Red Butte WSA
651 AK
509 AK
31 PR
676 AK, PR
508 TriState Gooseberry N_Platte
626 AK
Bobcat Draw WSA
inholding
Bobcat Draw South CP
Bobcat Draw South II CP
508 AK
Ten Sleep
Worland
Honeycombs 164 CP
0016 DH
Honeycombs NW 107 CP
622 AK
Honeycombs WSA
20
Washakie County
0008 DH
Johnson County
665 CW
Cedar Mountain WSA
0048 PR
130 JW
Honeycombs South CP
Kirby
069 JW
Hot Springs County
Thermopolis
East Thermopolis
Natrona County
Fremont County

APPENDIX B

Big Horn County Production

Year	Estimated Prices: Oil $s per barrel (2009$s)	Estimated Prices: Gas $s per Mcf (2009$s)	# of New Wells in Production	Total # of Wells in Production	Estimated Oil (bbls)	Direct Employment	Sales Value of Oil Output (2009$s)	Estimated Gas Output (mcf)	Direct Employment	Sales Value of Gas Output (2009$s)	Total Oil and Gas Production Direct Employment	Total Sales Value of Oil and Gas Output (2009$)
2009	89.66	3.71	0.00	0.00	-	-	-	-	-	-	-	-
2010	78.75	4.20	8.44	8.44	37,641	1	2,958,039	55,584	0	215,610	1	$ 3,173,649
2011	84.06	4.18	8.44	16.88	75,283	2	6,314,992	111,169	0	429,167	2	$ 6,744,158
2012	86.14	4.15	8.44	25.32	112,924	3	9,706,877	166,753	0	639,130	3	$ 10,346,006
2013	88.50	4.27	8.44	33.76	150,565	4	13,297,092	222,338	0	876,814	4	$ 14,173,906
2014	91.95	4.33	8.44	42.20	188,206	5	17,269,316	277,922	0	1,111,418	5	$ 18,380,734
2015	94.88	4.37	8.44	50.64	225,848	6	21,383,526	333,507	1	1,346,022	6	$ 22,729,549
2016	97.93	4.39	8.44	59.08	263,489	7	25,749,405	389,091	1	1,577,546	7	$ 27,326,951
2017	100.80	4.44	8.44	67.52	301,130	8	30,290,324	444,676	1	1,823,444	8	$ 32,113,768
2018	103.54	4.51	8.44	75.96	338,772	9	35,002,903	500,260	1	2,083,716	9	$ 37,086,620
2019	105.82	4.58	8.44	84.40	376,413	10	39,748,538	555,845	1	2,351,175	10	$ 42,099,713
2020	107.65	4.70	8.44	92.84	414,054	10	44,479,523	611,429	1	2,654,056	11	$ 47,133,579
2021	108.72	4.85	8.44	101.28	451,695	11	49,005,417	667,014	1	2,987,738	13	$ 51,993,155
2022	110.25	4.98	8.44	109.72	489,337	12	53,836,318	722,598	1	3,323,474	14	$ 57,159,792
2023	111.96	5.15	8.44	118.16	526,978	13	58,876,817	778,182	1	3,701,304	15	$ 62,578,122
2024	113.64	5.31	8.44	126.60	564,619	14	64,028,877	833,767	1	4,088,889	16	$ 68,117,766
2025	115.12	5.46	8.44	135.04	602,260	15	69,186,946	889,351	1	4,484,687	17	$ 73,671,634
2026	116.41	5.59	8.44	143.48	639,902	16	74,334,874	944,936	2	4,878,432	18	$ 79,213,306
2027	117.68	5.70	8.44	151.92	677,543	17	79,566,190	1,000,520	2	5,267,043	19	$ 84,833,234
2028	118.62	5.78	8.44	160.36	715,184	18	84,657,399	1,056,105	2	5,637,687	20	$ 90,295,086
Total Amounts (2009-2028)					**7,151,843**		**$ 779,693,374**	**10,561,048**		**$ 49,477,354**		**$ 829,170,728**
					(bbls)			**(Mcf)**				

(1) Of the new wells drilled per year 64.72 are estimated to be productive. This is based on the RFD. (p. 10)
(2) Based on 5-year average from 2005-2009. Estimated Production and Sales Value of Oil per well per pear =

	Average Oil Production per active well	Average Oil Sales per active well	Average Gas Production per active well	Average Gas Sales per active well
Big Horn	4,460	4,451	6,586	6,082

(3) Mcf - Thousand Cubic Feet

Hot Springs County Production

Year	Estimated Prices: Oil $s per barrel (2009$s)	Estimated Prices: Gas $s per Mcf (2009$s)	# of New Wells in Production	Total # of Wells in Production	Estimated Oil (bbls)	Direct Employment	Value of Oil Output (2009$s)	Estimated Gas Output (mcf)	Direct Employment	Value of Gas Output (2009$s)	Total Oil and Gas Production Direct Employment	Total Value of Oil and Gas Output (2009$)
2009	89.66	3.71	0.00	0.00	-	-	-	-	-	-	-	-
2010	78.75	4.20	1.26	1.26	5,702	0	449,043	782	0	1,409	0	$ 450,452
2011	84.06	4.18	1.26	2.52	11,404	0	958,643	1,564	0	2,804	0	$ 961,447
2012	86.14	4.15	1.26	3.78	17,106	0	1,473,546	2,346	0	4,176	0	$ 1,477,722
2013	88.50	4.27	1.26	5.04	22,809	1	2,018,556	3,128	0	5,729	1	$ 2,024,285
2014	91.95	4.33	1.26	6.30	28,511	1	2,621,557	3,910	0	7,262	1	$ 2,628,819
2015	94.88	4.37	1.26	7.56	34,213	1	3,246,112	4,692	0	8,795	1	$ 3,254,907
2016	97.93	4.39	1.26	8.82	39,915	1	3,908,871	5,474	0	10,308	1	$ 3,919,179
2017	100.80	4.44	1.26	10.08	45,617	1	4,598,203	6,256	0	11,914	1	$ 4,610,117
2018	103.54	4.51	1.26	11.34	51,319	1	5,313,593	7,039	0	13,615	1	$ 5,327,208
2019	105.82	4.58	1.26	12.60	57,021	1	6,034,001	7,821	0	15,363	1	$ 6,049,363
2020	107.65	4.70	1.26	13.86	62,723	2	6,752,185	8,603	0	17,342	2	$ 6,769,526
2021	108.72	4.85	1.26	15.12	68,426	2	7,439,235	9,385	0	19,522	2	$ 7,458,757
2022	110.25	4.98	1.26	16.38	74,128	2	8,172,587	10,167	0	21,716	2	$ 8,194,303
2023	111.96	5.15	1.26	17.64	79,830	2	8,937,757	10,949	0	24,184	2	$ 8,961,941
2024	113.64	5.31	1.26	18.90	85,532	2	9,719,862	11,731	0	26,717	2	$ 9,746,579
2025	115.12	5.46	1.26	20.16	91,234	2	10,502,879	12,513	0	29,303	2	$ 10,532,182
2026	116.41	5.59	1.26	21.42	96,936	2	11,284,357	13,295	0	31,876	2	$ 11,316,233
2027	117.68	5.70	1.26	22.68	102,638	3	12,078,493	14,077	0	34,415	3	$ 12,112,908
2028	118.62	5.78	1.26	23.94	108,341	3	12,851,361	14,859	0	36,837	3	$ 12,888,198
Total Amounts (2009-2028)					**1,083,406**		**$ 118,360,841**	**148,592**		**$ 323,287**		**$ 118,684,127**
					(bbls)			**(Mcf)**				

(1) Of the new wells drilled per year 64.72 are estimated to be productive. This is based on the RFD. (p. 10)
(2) Based on 5-year average from 2005-2009. Estimated Production and Sales Value of Oil per well per pear =

	Average Oil Production per active well	Average Oil Sales per active well	Average Gas Production per active well	Average Gas Sales per active well
Hot Springs	4,526	4,516	621	266

(3) Mcf - Thousand Cubic Feet

Park County Production

Year	Estimated Prices: Oil $s per barrel (2009$s)	Estimated Prices: Gas $s per Mcf (2009$s)	# of New Wells in Production	Total # of Wells in Production	Estimated Oil (bbls)	Direct Employment	Value of Oil Output (2009$s)	Estimated Gas Output (mcf)	Direct Employment	Value of Gas Output (2009$s)	Total Oil and Gas Production Direct Employment	Total Value of Oil and Gas Output (2009$)
2009	89.66	3.71	0.00	0.00	-	-	-	-	-	-	-	-
2010	78.75	4.20	5.14	5.14	34,644	1	2,725,214	60,173	0	203,502	1	$ 2,928,716
2011	84.06	4.18	5.14	10.28	69,289	2	5,817,942	120,347	0	405,066	2	$ 6,223,008
2012	86.14	4.15	5.14	15.42	103,933	3	8,942,854	180,520	0	603,238	3	$ 9,546,092
2013	88.50	4.27	5.14	20.56	138,578	4	12,250,485	240,693	0	827,575	4	$ 13,078,060
2014	91.95	4.33	5.14	25.70	173,222	4	15,910,058	300,867	0	1,049,005	5	$ 16,959,063
2015	94.88	4.37	5.14	30.84	207,867	5	19,700,441	361,040	1	1,270,434	6	$ 20,970,875
2016	97.93	4.39	5.14	35.98	242,511	6	23,722,684	421,213	1	1,488,957	7	$ 25,211,640
2017	100.80	4.44	5.14	41.12	277,156	7	27,906,190	481,387	1	1,721,046	8	$ 29,627,236
2018	103.54	4.51	5.14	46.26	311,800	8	32,247,845	541,560	1	1,966,702	9	$ 34,214,547
2019	105.82	4.58	5.14	51.40	346,445	9	36,619,953	601,734	1	2,219,142	10	$ 38,839,094
2020	107.65	4.70	5.14	56.54	381,089	10	40,978,565	661,907	1	2,505,014	11	$ 43,483,578
2021	108.72	4.85	5.14	61.68	415,734	11	45,148,228	722,080	1	2,819,957	12	$ 47,968,185
2022	110.25	4.98	5.14	66.82	450,378	11	49,598,892	782,254	1	3,136,839	13	$ 52,735,731
2023	111.96	5.15	5.14	71.96	485,023	12	54,242,656	842,427	1	3,493,452	14	$ 57,736,108
2024	113.64	5.31	5.14	77.10	519,667	13	58,989,200	902,600	1	3,859,271	15	$ 62,848,471
2025	115.12	5.46	5.14	82.24	554,311	14	63,741,281	962,774	2	4,232,843	16	$ 67,974,124
2026	116.41	5.59	5.14	87.38	588,956	15	68,484,018	1,022,947	2	4,604,477	17	$ 73,088,494
2027	117.68	5.70	5.14	92.52	623,600	16	73,303,580	1,083,120	2	4,971,265	18	$ 78,274,845
2028	118.62	5.78	5.14	97.66	658,245	17	77,994,063	1,143,294	2	5,321,095	19	$ 83,315,157
Total Amounts (2009-2028)					**6,582,449**		**$ 718,324,146**	**11,432,937**		**$ 46,698,879**		**$ 765,023,025**
					(bbls)			**(Mcf)**				

(1) Of the new wells drilled per year 64.72 are estimated to be productive. This is based on the RFD. (p. 10)
(2) Based on 5-year average from 2005-2009. Estimated Production and Sales Value of Oil per well per pear =

	Average Oil Production per active well	Average Oil Sales per active well	Average Gas Production per active well	Average Gas Sales per active well
Park	6,740	6,733	11,707	9,427

(3) Mcf - Thousand Cubic Feet

Washakie County Production

Year	Estimated Prices: Oil $s per barrel (2009$s)	Estimated Prices: Gas $s per Mcf (2009$s)	# of New Wells in Production	Total # of Wells in Production	Estimated Oil (bbls)	Direct Employment	Value of Oil Output (2009$s)	Estimated Gas Output (mcf)	Direct Employment	Value of Gas Output (2009$s)	Total Oil and Gas Production Direct Employment	Total Value of Oil and Gas Output (2009$)
2009	89.66	3.71	0.00	0.00	-	-	-	-	-	-	-	-
2010	78.75	4.20	3.58	3.58	7,611	0	599,522	28,763	0	112,668	0	$ 712,190
2011	84.06	4.18	3.58	7.16	15,222	0	1,279,893	57,525	0	224,264	0	$ 1,504,157
2012	86.14	4.15	3.58	10.74	22,832	1	1,967,345	86,288	0	333,981	1	$ 2,301,326
2013	88.50	4.27	3.58	14.32	30,443	1	2,694,993	115,050	0	458,185	1	$ 3,153,178
2014	91.95	4.33	3.58	17.90	38,054	1	3,500,066	143,813	0	580,779	1	$ 4,080,844
2015	94.88	4.37	3.58	21.48	45,665	1	4,333,915	172,575	0	703,372	1	$ 5,037,287
2016	97.93	4.39	3.58	25.06	53,276	1	5,218,771	201,338	0	824,357	2	$ 6,043,128
2017	100.80	4.44	3.58	28.64	60,887	2	6,139,104	230,100	0	952,852	2	$ 7,091,956
2018	103.54	4.51	3.58	32.22	68,497	2	7,094,227	258,863	0	1,088,859	2	$ 8,183,087
2019	105.82	4.58	3.58	35.80	76,108	2	8,056,051	287,625	0	1,228,622	2	$ 9,284,672
2020	107.65	4.70	3.58	39.38	83,719	2	9,014,905	316,388	1	1,386,894	3	$ 10,401,799
2021	108.72	4.85	3.58	42.96	91,330	2	9,932,193	345,150	1	1,561,262	3	$ 11,493,454
2022	110.25	4.98	3.58	46.54	98,941	3	10,911,297	373,913	1	1,736,702	3	$ 12,648,000
2023	111.96	5.15	3.58	50.12	106,552	3	11,932,883	402,675	1	1,934,140	3	$ 13,867,023
2024	113.64	5.31	3.58	53.70	114,162	3	12,977,078	431,438	1	2,136,675	4	$ 15,113,753
2025	115.12	5.46	3.58	57.28	121,773	3	14,022,492	460,200	1	2,343,502	4	$ 16,365,994
2026	116.41	5.59	3.58	60.86	129,384	3	15,065,850	488,963	1	2,549,256	4	$ 17,615,106
2027	117.68	5.70	3.58	64.44	136,995	3	16,126,110	517,725	1	2,752,327	4	$ 18,878,437
2028	118.62	5.78	3.58	68.02	144,606	4	17,157,972	546,488	1	2,946,009	5	$ 20,103,982
Total Amounts (2009-2028)					**1,446,057**		**$ 158,024,667**	**5,464,876**		**$ 25,854,705**		**$ 183,879,372**
					(bbls)			**(Mcf)**				

(1) Of the new wells drilled per year 64.72 are estimated to be productive. This is based on the RFD. (p. 10)
(2) Based on 5-year average from 2005-2009. Estimated Production and Sales Value of Oil per well per pear =

	Average Oil Production per active well	Average Oil Sales per active well	Average Gas Production per active well	Average Gas Sales per active well
Washakie	2,126	2,127	8,034	7,493

(3) Mcf - Thousand Cubic Feet

APPENDIX C

Big Horn County Taxes
2009$s

0.0753374

Year	Total Sales Value of Output	Net Present Value of Output	Federal Mineral Royalty Tax	Net Present Value of FMR Tax	Severance Tax	Net Present Value of Severance Tax	Ad Valorem Tax (Rate=0.0753374)	Net Present Value of Ad Valorem Tax	Total Taxes	Net Present Value of Total Taxes
2009	-	$0	$0	$0	$0	$0	$0	$0	$0	$0
2010	$ 3,173,649	$3,051,586	$396,706	$381,448	$166,617	$160,208	$209,208	$201,161	$772,530	$742,818
2011	$ 6,744,158	$6,235,353	$843,020	$779,419	$354,068	$327,356	$444,576	$411,036	$1,641,664	$1,517,811
2012	$ 10,346,006	$9,197,562	$1,293,251	$1,149,695	$543,165	$482,872	$682,011	$606,305	$2,518,427	$2,238,873
2013	$ 14,173,906	$12,115,914	$1,771,738	$1,514,489	$744,130	$636,085	$934,347	$798,684	$3,450,215	$2,949,258
2014	$ 18,380,734	$15,107,624	$2,297,592	$1,888,453	$964,989	$793,150	$1,211,662	$995,898	$4,474,242	$3,677,501
2015	$ 22,729,549	$17,963,492	$2,841,194	$2,245,437	$1,193,301	$943,083	$1,498,337	$1,184,157	$5,532,832	$4,372,677
2016	$ 27,326,951	$20,766,237	$3,415,869	$2,595,780	$1,434,665	$1,090,227	$1,801,399	$1,368,915	$6,651,933	$5,054,922
2017	$ 32,113,768	$23,465,216	$4,014,221	$2,933,152	$1,685,973	$1,231,924	$2,116,947	$1,546,832	$7,817,141	$5,711,908
2018	$ 37,086,620	$26,056,567	$4,635,827	$3,257,071	$1,947,048	$1,367,970	$2,444,758	$1,717,655	$9,027,633	$6,342,695
2019	$ 42,099,713	$28,441,058	$5,262,464	$3,555,132	$2,210,235	$1,493,156	$2,775,223	$1,874,841	$10,247,922	$6,923,129
2020	$ 47,133,579	$30,617,074	$5,891,697	$3,827,134	$2,474,513	$1,607,396	$3,107,056	$2,018,284	$11,473,266	$7,452,815
2021	$ 51,993,155	$32,474,771	$6,499,144	$4,059,346	$2,729,641	$1,704,925	$3,427,400	$2,140,744	$12,656,186	$7,905,016
2022	$ 57,159,792	$34,328,690	$7,144,974	$4,291,086	$3,000,889	$1,802,256	$3,767,986	$2,262,955	$13,913,849	$8,356,297
2023	$ 62,578,122	$36,137,306	$7,822,265	$4,517,163	$3,285,351	$1,897,209	$4,125,164	$2,382,179	$15,232,780	$8,796,551
2024	$ 68,117,766	$37,823,377	$8,514,721	$4,727,922	$3,576,183	$1,985,727	$4,490,338	$2,493,326	$16,581,242	$9,206,975
2025	$ 73,671,634	$39,333,888	$9,208,954	$4,916,736	$3,867,761	$2,065,029	$4,856,451	$2,592,899	$17,933,166	$9,574,664
2026	$ 79,213,306	$40,665,992	$9,901,663	$5,083,249	$4,158,699	$2,134,965	$5,221,759	$2,680,711	$19,282,121	$9,898,925
2027	$ 84,833,234	$41,876,070	$10,604,154	$5,234,509	$4,453,745	$2,198,494	$5,592,226	$2,760,480	$20,650,125	$10,193,482
2028	$ 90,295,086	$42,857,879	$11,286,886	$5,357,235	$4,740,492	$2,250,039	$5,952,272	$2,825,201	$21,979,650	$10,432,474
Total	**$829,170,728**	**$498,515,655**	**$103,646,341**	**$62,314,457**	**$43,531,463**	**$26,172,072**	**$54,659,121**	**$32,862,264**	**$201,836,925**	**$121,348,793**
NPV	**$498,515,655**		**$62,314,457**		**$26,172,072**		**$32,862,264**		**$121,348,793**	

(1) Of the new wells drilled per year 64.72 are estimated to be productive. This is based on the RFD. (p. 10)
(2) For Value Calculations see Excel Workbook "2009 County Oil and Gas Production" in the project file.

Hot Springs County Taxes
2009$s

0.0713784

Year	Total Value of Output	Net Present Value of Output	Federal Mineral Royalty Tax	Net Present Value of FMR Tax	Severance Tax	Net Present Value of Severance Tax	Ad Valorem Tax (rate=0.0713784)	Net Present Value of Ad Valorem Tax	Total Taxes	Net Present Value of Total Taxes
2009	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2010	$450,452	$433,127	$56,307	$54,141	$23,649	$22,739	$28,133	$27,051	$108,089	$103,931
2011	$961,447	$888,912	$120,181	$111,114	$50,476	$46,668	$60,048	$55,518	$230,705	$213,300
2012	$1,477,722	$1,313,690	$184,715	$164,211	$77,580	$68,969	$92,293	$82,048	$354,588	$315,228
2013	$2,024,285	$1,730,368	$253,036	$216,296	$106,275	$90,844	$126,429	$108,072	$485,740	$415,212
2014	$2,628,819	$2,160,698	$328,602	$270,087	$138,013	$113,437	$164,186	$134,949	$630,801	$518,473
2015	$3,254,907	$2,572,400	$406,863	$321,550	$170,883	$135,051	$203,289	$160,662	$781,035	$617,263
2016	$3,919,179	$2,978,254	$489,897	$372,282	$205,757	$156,358	$244,777	$186,010	$940,431	$714,650
2017	$4,610,117	$3,368,567	$576,265	$421,071	$242,031	$176,850	$287,930	$210,388	$1,106,226	$808,308
2018	$5,327,208	$3,742,826	$665,901	$467,853	$279,678	$196,498	$332,717	$233,762	$1,278,296	$898,114
2019	$6,049,363	$4,086,733	$756,170	$510,842	$317,592	$214,553	$377,820	$255,241	$1,451,582	$980,637
2020	$6,769,526	$4,397,355	$846,191	$549,669	$355,400	$230,861	$422,798	$274,642	$1,624,389	$1,055,172
2021	$7,458,757	$4,658,718	$932,345	$582,340	$391,585	$244,583	$465,845	$290,965	$1,789,774	$1,117,888
2022	$8,194,303	$4,921,286	$1,024,288	$615,161	$430,201	$258,368	$511,784	$307,364	$1,966,273	$1,180,893
2023	$8,961,941	$5,175,298	$1,120,243	$646,912	$470,502	$271,703	$559,728	$323,229	$2,150,472	$1,241,844
2024	$9,746,579	$5,411,929	$1,218,322	$676,491	$511,695	$284,126	$608,733	$338,008	$2,338,751	$1,298,625
2025	$10,532,182	$5,623,218	$1,316,523	$702,902	$552,940	$295,219	$657,799	$351,204	$2,527,261	$1,349,325
2026	$11,316,233	$5,809,451	$1,414,529	$726,181	$594,102	$304,996	$706,768	$362,836	$2,715,399	$1,394,013
2027	$12,112,908	$5,979,272	$1,514,114	$747,409	$635,928	$313,912	$756,525	$373,442	$2,906,566	$1,434,763
2028	$12,888,198	$6,117,285	$1,611,025	$764,661	$676,630	$321,157	$804,947	$382,062	$3,092,602	$1,467,880
Total	**$118,684,127**	**$71,369,387**	**$14,835,516**	**$8,921,173**	**$6,230,917**	**$3,746,893**	**$7,412,548**	**$4,457,454**	**$28,478,980**	**$17,125,520**
NPV	**$71,369,387**		**$8,921,173**		**$3,746,893**		**$4,457,454**		**$17,125,520**	

(1) Of the new wells drilled per year 64.72 are estimated to be productive. This is based on the RFD. (p. 10)
(2) For Value Calculations see Excel Workbook "2009 County Oil and Gas Production" in the project file.

Park County Taxes
2009$s

0.0746068

Year	Total Value of Output	Net Present Value of Output	Federal Mineral Royalty Tax	Net Present Value of FMR Tax	Severance Tax	Net Present Value of Severance Tax	Ad Valorem Tax (rate=0.0746068)	Net Present Value of Ad Valorem Tax	Total Taxes	Net Present Value of Total Taxes
2009	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2010	$2,928,716	$2,816,073	$366,089	$352,009	$153,758	$147,844	$191,189	$183,836	$711,036	$683,689
2011	$6,223,008	$5,753,521	$777,876	$719,190	$326,708	$302,060	$406,244	$375,595	$1,510,828	$1,396,845
2012	$9,546,092	$8,486,441	$1,193,262	$1,060,805	$501,170	$445,538	$623,178	$554,003	$2,317,609	$2,060,346
2013	$13,078,060	$11,179,181	$1,634,758	$1,397,398	$686,598	$586,907	$853,748	$729,788	$3,175,104	$2,714,092
2014	$16,959,063	$13,939,113	$2,119,883	$1,742,389	$890,351	$731,803	$1,107,104	$909,959	$4,117,337	$3,384,151
2015	$20,970,875	$16,573,587	$2,621,359	$2,071,698	$1,100,971	$870,113	$1,368,999	$1,081,940	$5,091,329	$4,023,751
2016	$25,211,640	$19,158,775	$3,151,455	$2,394,847	$1,323,611	$1,005,836	$1,645,840	$1,250,703	$6,120,906	$4,651,386
2017	$29,627,236	$21,648,331	$3,703,404	$2,706,041	$1,555,430	$1,136,537	$1,934,094	$1,413,224	$7,192,928	$5,255,802
2018	$34,214,547	$24,038,687	$4,276,818	$3,004,836	$1,796,264	$1,262,031	$2,233,558	$1,569,268	$8,306,640	$5,836,135
2019	$38,839,094	$26,238,300	$4,854,887	$3,279,788	$2,039,052	$1,377,511	$2,535,453	$1,712,861	$9,429,392	$6,370,160
2020	$43,483,578	$28,246,103	$5,435,447	$3,530,763	$2,282,888	$1,482,920	$2,838,649	$1,843,932	$10,556,984	$6,857,616
2021	$47,968,185	$29,960,787	$5,996,023	$3,745,098	$2,518,330	$1,572,941	$3,131,409	$1,955,869	$11,645,762	$7,273,908
2022	$52,735,731	$31,671,713	$6,591,966	$3,958,964	$2,768,626	$1,662,765	$3,442,639	$2,067,560	$12,803,231	$7,689,289
2023	$57,736,108	$33,341,164	$7,217,014	$4,167,645	$3,031,146	$1,750,411	$3,769,068	$2,176,543	$14,017,227	$8,094,599
2024	$62,848,471	$34,897,525	$7,856,059	$4,362,191	$3,299,545	$1,832,120	$4,102,808	$2,278,144	$15,258,412	$8,472,454
2025	$67,974,124	$36,291,940	$8,496,765	$4,536,493	$3,568,641	$1,905,327	$4,437,415	$2,369,172	$16,502,822	$8,810,992
2026	$73,088,494	$37,521,678	$9,136,062	$4,690,210	$3,837,146	$1,969,888	$4,771,286	$2,449,451	$17,744,494	$9,109,549
2027	$78,274,845	$38,638,665	$9,784,356	$4,829,833	$4,109,429	$2,028,530	$5,109,856	$2,522,369	$19,003,641	$9,380,732
2028	$83,315,157	$39,544,908	$10,414,395	$4,943,114	$4,374,046	$2,076,108	$5,438,893	$2,581,529	$20,227,333	$9,600,750
Total	**$765,023,025**	**$459,946,492**	**$95,627,878**	**$57,493,312**	**$40,163,709**	**$24,147,191**	**$49,941,430**	**$30,025,744**	**$185,733,017**	**$111,666,246**
NPV	**$459,946,492**		**$57,493,312**		**$24,147,191**		**$30,025,744**		**$111,666,246**	

(1) Of the new wells drilled per year 64.72 are estimated to be productive. This is based on the RFD. (p. 10)
(2) For Value Calculations see Excel Workbook "2009 County Oil and Gas Production" in the project file.

Washakie County Taxes
2009$s

0.0705267

Year	Total Value of Output	Net Present Value of Output	Federal Mineral Royalty Tax	Net Present Value of FMR Tax	Severance Tax	Net Present Value of Severance Tax	Ad Valorem Tax (rate=0.0705267)	Net Present Value of Ad Valorem Tax	Total Taxes	Net Present Value of Total Taxes
2009	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2010	$712,190	$684,798	$89,024	$85,600	$37,390	$35,952	$43,950	$42,259	$170,364	$163,811
2011	$1,504,157	$1,390,678	$188,020	$173,835	$78,968	$73,011	$92,823	$85,820	$359,811	$332,665
2012	$2,301,326	$2,045,871	$287,666	$255,734	$120,820	$107,408	$142,017	$126,252	$550,502	$489,395
2013	$3,153,178	$2,695,350	$394,147	$336,919	$165,542	$141,506	$194,585	$166,332	$754,274	$644,757
2014	$4,080,844	$3,354,156	$510,106	$419,270	$214,244	$176,093	$251,832	$206,988	$976,182	$802,351
2015	$5,037,287	$3,981,041	$629,661	$497,630	$264,458	$209,005	$310,855	$245,673	$1,204,974	$952,308
2016	$6,043,128	$4,592,280	$755,391	$574,035	$317,264	$241,095	$372,927	$283,394	$1,445,582	$1,098,523
2017	$7,091,956	$5,182,023	$886,494	$647,753	$372,328	$272,056	$437,651	$319,787	$1,696,473	$1,239,596
2018	$8,183,087	$5,749,328	$1,022,886	$718,666	$429,612	$301,840	$504,985	$354,796	$1,957,483	$1,375,302
2019	$9,284,672	$6,272,392	$1,160,584	$784,049	$487,445	$329,301	$572,965	$387,075	$2,220,995	$1,500,424
2020	$10,401,799	$6,756,810	$1,300,225	$844,601	$546,094	$354,733	$641,904	$416,969	$2,488,223	$1,616,302
2021	$11,493,454	$7,178,777	$1,436,682	$897,347	$603,406	$376,886	$709,271	$443,009	$2,749,359	$1,717,242
2022	$12,648,000	$7,596,061	$1,581,000	$949,508	$664,020	$398,793	$780,519	$468,759	$3,025,539	$1,817,060
2023	$13,867,023	$8,007,860	$1,733,378	$1,000,983	$728,019	$420,413	$855,746	$494,172	$3,317,142	$1,915,567
2024	$15,113,753	$8,392,131	$1,889,219	$1,049,016	$793,472	$440,587	$932,683	$517,886	$3,615,374	$2,007,489
2025	$16,365,994	$8,737,938	$2,045,749	$1,092,242	$859,215	$458,742	$1,009,960	$539,226	$3,914,924	$2,090,210
2026	$17,615,106	$9,043,124	$2,201,888	$1,130,391	$924,793	$474,764	$1,087,043	$558,059	$4,213,725	$2,163,214
2027	$18,878,437	$9,318,927	$2,359,805	$1,164,866	$991,118	$489,244	$1,165,005	$575,079	$4,515,927	$2,229,189
2028	$20,103,982	$9,542,203	$2,512,998	$1,192,775	$1,055,459	$500,966	$1,240,634	$588,858	$4,809,091	$2,282,598
Total	**$183,879,372**	**$110,521,749**	**$22,984,922**	**$13,815,219**	**$9,653,667**	**$5,802,392**	**$11,347,355**	**$6,820,392**	**$43,985,943**	**$26,438,003**
NPV	**$110,521,749**		**$13,815,219**		**$5,802,392**		**$6,820,392**		**$26,438,003**	

(1) Of the new wells drilled per year 64.72 are estimated to be productive. This is based on the RFD. (p. 10)
(2) For Value Calculations see Excel Workbook "2009 County Oil and Gas Production" in the project file.

APPENDIX D

Participant Agenda (11/18/04 draft)
"Community Economic Assessment: Discovering Reality and Choices"

Craig, CO
February 24-25, 2005

Day 1

8:00 AM	**Registration/Check-in**
8:30	**Welcome and Logistics** – Charles Pregler
8:40	**Participant Introductions** – All instructors
9:10	**Discussion of Pre-class Assignment** [NS 2] – Roy Allen
10:10	Break
10:30	**Discussion of Barriers to Economic Change** – Kevin Preister
11:00	**Objectives of CEA Class / Partnership Series Themes** [NS 3] – Kevin Preister
11:20	**Partnership Series Themes**– Kevin Preister
	Principles of Community Based Ecosystem Stewardship
11:30	Lunch
12:30	**Integrated Resource Management** [NS 4] – Kevin Preister
1:15	**Economic Basics** [NS 5] – Gabe Preston
2:00	Break
2:10	**Economics of the West** [NS 6] – Gabe Preston
3:00	**Public Lands** [NS 7] – Kevin Preister
4:00	Break
4:10	**REIS** [NS 8] – Roy Allen
4:40	**Wrap Up for Day 1** - Kevin Preister
5:00	End Day 1

NS = Notebook Section

Day 2

8:00 AM	Warm up – Gabe Preston
8:15	**Review of Day 1**– Kevin Preister
8:25	**Using Social Structure to Mobilize Change** [NS 9] – Kevin Preister
9:05	Break – 15 minutes
9:20	**EPS** [NS 10] – Roy Allen
10:05	**EPS Exercise and Discussion** [NS 11] – All Instructors
	Groups break as needed on own
11:30	Lunch
12:30	**IMPLAN** [NS 12] – Roy Allen
1:00	**Local Case Study** [NS 13] **–** (Presenter to be named)
1:10	**The Action Plan Process** [NS 14] – Kevin Preister
	Break on own
	Group Reports
3:10	**Wrap up Day 2** – Kevin Preister
3:20	**Evaluation of Class** [NS 17] – Charles Pregler
3:30	End of Class – Into the Future

NS = Notebook Section

APPENDIX E

Document:	BLM Socio-economic lead:	Date:

BLM Social Science Guideline 1
Checklist for Socio-Economic Analysis in Resource Management Plans
Version 1.1 Revised 11-8-04

I. General notes and comments.

1. All socio-economic studies prepared as part of BLM's land use process should be consistent with the requirements of the BLM Land Use Planning Handbook (BLM Handbook H-1601-1, revised October 2004), particularly Appendix D: Social Science Considerations in Land Use Planning Decisions. This checklist supplements the information presented there.

2. There is no standard scope of work for socio-economic analysis, for the key topics and methods are shaped by the social context and potential resource allocation decisions of a given resource management plan. The social and economic assessment (affected environment) and impact analysis (environmental consequences) should assist the reader to understand the human context of the planning effort, and to identify the potential effects, constraints, and opportunities associated with planning alternatives.

3. Field office staff responsible for directing the socio-economic aspect of a plan can use this checklist to define the appropriate scope of work. The checklist uses three codes to prioritize 27 topics of socio-economic information:

1 - basic: topic should be addressed (example: population trends)
2 - optional: address if warranted by context and issues
3 – not currently indicated: address if indicated by new information

Identify recommended and optional topics to be included in the analysis by indicating the *priority* of each (1, 2, or 3) in the appropriate row. Some basic topics have already been coded with a '**1**.' Blank rows are provided to allow inclusion of other topics. Use the *specific guidance* field to suggest groups, issues, and activities to receive particular attention on a given topic.

4. Field office staff should use Section III to provide suggested data sources, contacts, and other plan-specific guidance

5. Note that the required economic strategies workshop provides an excellent opportunity to discuss with interested government leaders and the public what topics should be emphasized in the socio-economic analysis.

6. This checklist is advisory only. For questions or comments, please contact Rob Winthrop, Senior Social Scientist, Planning, Assessment, and Community Support Group, BLM Washington Office (202-785-6597; robert_winthrop@blm.gov).

Document:	BLM Socio-economic lead:	Date:

II. Topics for analysis. [Field office staff should identify the *priority* (1, 2, or 3) of each topic: see note I-3, above. Add suggestions regarding which groups, issues, and activities should receive particular attention under *specific guidance.*]

	topic	planning relevance	examples	priority	specific guidance
DEMOGRAPHY AND SOCIAL INDICATORS	*population*	potential demand on BLM lands and resources	population trends; migration, distribution by age and gender	**1**	
	inequality	differences in visibility and influence; identify vulnerable populations (environmental justice)	income distribution; percent of households in poverty;	**1**	
	social difference	barriers to public involvement; different user needs and values; identify distinctive populations (environmental justice)	ethnicity; languages spoken in household; tribal affiliation		
	social indicators	can indicate community strengths and weaknesses that may have implications for planning issues	crime rates, divorce rates, unemployment, education, length of residence		
SOCIAL ORGANIZATION AND INSTITUTIONS	*government*	potential cooperating agencies; contacts for plan coordination (identified in Preparation Plan)	municipal and county governments in/near planning area; special districts; tribal governments	**1**	
	non-governmental institutions	potential partners for plan implementation; sources of economic and social resilience	Chamber of Commerce; church groups; ethnic advocacy organizations		
	communities of place	local and regional population centers relative to planning area; effects may differ by community	gateway communities; natural resource-dependent communities	**1**	

Document:	BLM Socio-economic lead:	Date:

	topic	planning relevance	examples	priority	specific guidance
	social groups and networks	opportunities for informal contacts in seeking public comment and communicating plans and proposals	networks linking ranchers or retirees		
	occupational and interest groups	provide range of perspectives on potential land use decisions; effects may differ by group	wilderness advocates; oil & gas producers, Cattlemen's Association	**1**	
ATTITUDES AND MEANINGS	*attitudes and beliefs regarding local environment and its use*	local understandings may shape acceptability of proposed land use decisions **[use formal techniques: surveys, interviews, focus groups]**[1]	survey to clarify local understanding of effects of coal bed methane technology on ground-water conditions		
	significance of proposed land management actions for various publics	while public attitudes are elicited in scoping, formal data collection can identify important differences between groups, providing further information to help identify impacts and mitigation strategies **[use formal techniques: surveys, interviews, focus groups]**[1]	interviews to assess social impacts of prescribed burning		
	quality of life	can indicate community perceptions that may have implications for planning issues	perceived access to community resources; satisfaction with community conditions, such as employment opportunity		

[1] Primary (new) data collection methods may be subject to requirements of the Paperwork Reduction Act. See Planning Handbook, Appendix D., Sec. V. C. Secondary data may also be available.

Document:	BLM Socio-economic lead:	Date:

	topic	planning relevance	examples	priority	specific guidance
HUMAN GEOGRAPHY	*distribution of communities, roads, and resources*	clarify geo-spatial context; can predict potential conflicts and impacts over proposed land use allocations	wildland-urban interface, recreational demand from nearby cities	**1**	[data usually collected by Lands & Realty / GIS]
	land ownership and access	predict potential conflicts and impacts over proposed land use allocations	split estate ownership of sub-surface minerals		[data usually collected by Lands & Realty / GIS staff]
	culturally and socially significant places and areas	identify constraints on site-specific activities, mitigation strategies **[use formal techniques: surveys, interviews, focus groups]**[1]	locally valued buildings, sites, and landscapes; sense of place; traditional religious/cultural use areas		[data usually collected by Cultural Resources staff]
ECONOMIC VALUE	*interrelationships among producing sectors*	regional economic sectors and their interrelation as a context for BLM management decisions	annual purchase and sales by economic sector (transaction matrix)	**1**	
	non-market values of resources and activities	consider the significance of the non-market values associated with resources managed or impacts by BLM when formulating the management alternatives	estimate the value of open space, improved riparian areas, improved wildlife habitat		
	dependence on BLM lands and resources	understand and quantify the potential local and regional impacts of land use decisions	value of BLM timber sales, visitor-day expenditures, grazing and mining to the local economy		

[1] Primary (new) data collection methods may be subject to requirements of the Paperwork Reduction Act. See Planning Handbook, Appendix D., Sec. V. C. Secondary data may also be available.

Document:	BLM Socio-economic lead:	Date:

	topic	**planning relevance**	**examples**	**priority**	**specific guidance**
EMPLOYMENT, INCOME, AND SUBSISTENCE	*employment*	quantify the anticipated employment impacts by sector to determine the population changes and the associated demand on the infrastructure in the study area	temporary jobs from oil & gas development versus service jobs created by increased recreational opportunities	**1**	
	personal income	forecast anticipated change in income resulting from BLM's allocation decisions	wages and salaries; non-labor income (dividends, transfer payments)	**1**	
	economic diversity and resilience	ability of stakeholder communities to respond to external change	level of dependence on single economic sector		
	regional economic organization	identify amount and geographic distribution of new indirect and induced employment resulting from additional local investment	new local jobs resulting from proposed increase in oil and gas production on public lands		
	subsistence activities	non-market production from BLM lands for local use	amount and value of subsistence hunting by local residents		
PUBLIC FINANCE AND GOVERNMENT SERVICES	*government revenues and expenditures*	fiscal capacity and resilience under change	change in tax revenues and county PILT receipts		
	public infrastructure and services	community services may be impacted by resource or recreational development of public lands	expenditures on schools, roads, social services		

Document:	BLM Socio-economic lead:	Date:

	topic	**planning relevance**	**examples**	**priority**	**specific guidance**
ENVIRON-MENTAL JUSTICE (EJ)	*characterize Environmental Justice populations in planning area*	see **Demography and Social Indicators**: inequality, social difference	ethnic networks organize much of the commercial harvesting of mushrooms and other non-timber forest products in the Pacific Northwest	**1**	
	assess potential for disproportionate impacts to EJ populations	identify whether EJ issues require further modification of alternatives, or further mitigation of impacts	oil and gas development can affect areas where American Indian populations collect medicinal plants	**1**	
[FOR ADDITIONAL TOPICS]					
[FOR ADDITIONAL TOPICS]					

Document:	BLM Socio-economic lead:	Date:

III. Recommended data sources, contacts, and other plan-specific guidance.

[to be completed by issuing field office]

APPENDIX F

DATA QUALITY ACT REQUEST FOR ACTION ON THE BUREAU OF LAND MANAGEMENT BIGHORN BASIN RESOURCE MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Prepared by

Bighorn Basin Local Government Cooperating Agencies

September 7, 2011

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1. INFORMATIONAL DEFICIENCIES

In reviewing the Bureau of Land Management (BLM) Draft Big Horn Resource Management Plan and Environmental Impact Statement (RMP/EIS), and maps and data disseminated by the BLM during the Bighorn Basin RMP revision process, it is clear that there are several issues with data and information presented as fact by the BLM. The hierarchy of federal requirements, as existing in statutes, rules and regulations, case law, and agency handbooks and manuals necessitates the integrity, extent, and manner in which data is used. The RMP/EIS document and planning process has used inaccurate data, presented unsubstantiated information as facts, and has underutilized existing data. It is for this reason that the Bighorn Basin Local Government Cooperating Agencies (LGCA) are submitting this document as a formal submittal to the BLM to recognize and correct factual errors as required by the Data Quality Act (DQA) of 2000 (also known as the Information Quality Act).

Inaccurate information has been distributed by the BLM that could lead to unnecessary socioeconomic and resource harm through misguided management. Several pieces of information have been disseminated that mischaracterize the existing conditions on BLM-managed lands or that state unfounded information or findings as fact.

In the planning process for the RMP/EIS the BLM has violated or not conformed with:

1. The DQA of 2000
2. The Federal Land Policy and Management Act of 1976
3. The Department of the Interior's Information Quality Guidelines (USDI 2002)
4. The BLM's Information Quality Guidelines (Bureau of Land Management 2002)
5. Guidance provided in BLM Handbook 1283-1 on Data Administration and Management {5663}
6. National Environmental Policy Act of 1970
    a. Section 1502.22 of the CEQ Regulations regarding incomplete or unavailable information
    b. Section. 1501.6 of the CEQ Regulations regarding Cooperating Agencies
7. Memorandum of Understanding between Park County and the BLM Regarding the Development of the RMP/EIS
8. Planning requirements under C.F.R. § 1610.4-3 regarding inventory data and information collection
9. Findings and decisions by existing Federal Court case law.

This section of the LGAC document describes key planning guidance the BLM has violated, addresses the definition and treatment of planning information as "influential," and outlines the formal submittal of this document as a data quality challenge.

We urge the BLM to comply with these requirements outlined in the DQA, FLPMA, and other direction and guidance as outlined in the BLM Manual and Handbook and codified requirements. The LGCA

submit this document not only as input to the RMP/EIS, but as a formal submittal in accordance with the DQA and associated BLM Guidelines on data challenges (BLM 2011). It is our hope that this challenge will result in the collection and use of more accurate data to better guide land management decisions.

1.1 REGULATION AND GUIDANCE

1.1.1 The DQA (Information Quality Act)

The DQA was enacted by Congress to ensure that federal agencies disseminate and use accurate information. The uncodified DQA amends the Paperwork Reduction Act of 1980 is intended to prevent harm from the dissemination of inaccurate information. Public Law 106-544 Section 515 led to the publication of DOI and BLM guidelines for data quality and integrity. DQA guidelines (FR Vol. 67 No. 36) required all federal agencies to provide the following:

- By October 1, 2002, issue its own information quality guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information that it disseminates.
- Establish administrative mechanisms to allow affected persons to seek and obtain correction of information maintained or disseminated by the agency that does not comply with OMB or agency guidelines.
- Report periodically to OMB the number and nature of complaints received by the agency regarding the accuracy of its information and how such complaints were resolved.
- Ensure that influential information, such as that used in the preparation of resource management plans, be characterized by reproducibility and transparency.

1.1.2 FLPMA and DOI and BLM Guidance

The BLM published its Information Quality Guidelines in response to the direction provided by the Office of Management and Budget (FR Vol. 67 No. 36) and the Department of the Interior's Guidelines (USDI 2002).

Inaccurate information used in the planning process is a violation of FLPMA. It is imperative that BLM use accurate data when plotting the future of lands in the Bighorn Basin. Further, planning requirements for the Department of the Interior are specified in the Code of Federal Regulations and include requirements for assembling and using existing data (i.e., BLM and LGCA LWC data):

> **§ 1610.4-3 Inventory data and information collection.**
> The Field Manager, in collaboration with any cooperating agencies, will arrange for resource, environmental, social, economic and institutional data and information to be collected, or assembled if already available. New information and inventory data collection will emphasize significant issues and decisions with the greatest potential impact. Inventory data and information shall be collected in a manner that aids application in the planning process, including subsequent monitoring requirements. [48 FR 20368, May 5, 1983, as amended at 70 FR 14566, Mar. 23, 2005]

Section H-1601-1 of the Land Use Planning Handbook, Appendix D, V. Data Management, A. Types of Data provides specific instruction to "use existing data to the extent possible."

Section H-1601-1 of the Land Use Planning Handbook, Appendix G provides guidance for the use of "standardized, accurate, and reliable data and information" as they are "critical to the development of plan assessment, alternatives, impact analyses, and planning decisions."

The BLM's Data Administration and Management Handbook states it is the responsibility of Data Administrators to establish acceptable quality data quality levels through the use of Quality Review Teams. The LGCA has been forced to critique databases in the wake of hundreds of pages of misguided analyses based on inaccurate or incomplete baseline data—essentially in the functioning a role of a Quality Review Team. This lack of quality internal data review (as evidenced in the LGCA review of the LWCs) is unacceptable as the Handbook clearly identifies procedures for meeting data quality standards, and Metadata Content Standards (see pg, 52 of Data Administration and Management Handbook).

1.1.3 **Planning Requirements under C.F.R. § 1610.4-3**

Regulations guiding planning state:

> **§ 1610.4-3 Inventory data and information collection.**
> The Field Manager, in collaboration with any cooperating agencies, will arrange for resource, environmental, social, economic and institutional data and information to be collected, or assembled if already available. New information and inventory data collection will emphasize significant issues and decisions with the greatest potential impact. Inventory data and information shall be collected in a manner that aids application in the planning process, including subsequent monitoring requirements.

This underlines requirements for the BLM to utilize already existing information provided in BLM databases and by the LGCA regarding LWC inventories.

1.1.4 **National Environmental Policy Act of 1970**

CEQ regulation § 1502.22 directs federal agencies in the case of incomplete or unavailable information when preparing a NEPA document. The regulation states in part, that:

> (a) If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

The BLM has failed to use much of the information available in BLM-maintained data bases in regards to the LWC inventory. Furthermore, with the updated LWC inventory data contained within this comment document, the BLM now has a more accurate LWC inventory and is required to consider this information and utilize it or provide a rationale its disregard. The BLM is obligated to use this data not only under NEPA but also under the RMP/EIS MOU.

The BLM has not met the spirit of Section 1501.6 in the CEQ Regulations regarding cooperating agencies. In not attending the LGCA public meetings, and diverging away from process documentation provided by the BLM (namely standards and processes identified in the contractor's scope of work), the BLM has limited information exchange and misled the LGCA. On October 6, 2008, the BLM disseminated information on the performance standards that ICF, the contractor, would prepare. This emphasis early in the NEPA process and responsibility of the BLM has not been followed. The Contractor proposal disseminated on October 6, states in part that, "Contractor will supply BLM with all intermediate and final data, documentation, metadata, and other information that leads to conclusions in the RMP/EIS." ERG has requested this data numerous times, only to told the BLM does not have this information or that it is against ICF's policy to distribute such information (see GIS Section 2 of this document).

1.1.5 **Memorandum of Understanding**

The memorandum of Understanding between Park County and the BLM states that, "The BLM will utilize the park County input and proposals to the maximum extent possible, consistent with legal requirements and its responsibility as lead agency," and that, "The BLM will ensure that input from Park County is appropriately incorporated into the draft and final EISs." Therefore the BLM is legally obligated to appropriately consider input from Park County, submitted here on behalf of the LGCA. This is true for all content within this entire DEIS comment document but also the LWC data and analysis provided by the LGCA.

The BLM has been remiss in providing several final GIS analysis files and metadata to ERG and the LGCA (see GIS Section 2). Section G of the MOU states, "Parties to this MOU will have access to all information relevant to the fulfillment of their responsibilities under this agreement."

1.1.6 **Relevant Federal Case Law**

Numerous resource areas in the RMP/EIS have inaccurate or missing information. This violates Administrative law requirements for information accuracy. In regards to air quality, fire, grazing data, wildlife information and other resource areas, the BLM has not included appropriate information to take a "hard look" at potential environmental impacts and provide accurate information. An exhaustive list of applicable case law is not included here, but following two cases provide important administrative precedent:

- **Regarding accurate information**--Earth Island Institute v. U.S. Forest Service, 351 F.3d 1291, 1299-1300 (9th Cir. 2003)--This decision was based on agency decision to ignore relevant data and pertains directly to the LGCA's LWC inventory and need for it to be incorporated into baseline data and analyses.

- **Regarding information and scientific basis**-- River Runners for Wilderness v. Martin , 574 F.3d 723, 747 (9th Cir. 2009)--This decision outlines agency responsibility for accurate scientific analysis an high quality information. This is relevant to the numerous citations in this comment document about inaccurate baseline information (e.g. LWC inventory), inaccurate statements of fact (e.g., sweeping, unsupported generalizations about mule deer population trends).

1.2 DEFINITIONS

1.2.1 "Influential Information"

For the purposes of the RMP/EIS, all baseline information presented is considered to be "influential." The DOI (USDI 2002) states the following about "influential" information:

The DOI defines "influential" information as:

> …the information will have or does have a clear and substantial impact on important public policies or important private sector decisions.

The BLM (Bureau of Land Management 2002) defines "influential" information as:

> …that which is expected to have a genuinely clear and substantial impact at the national level major public and private policy decisions as they relate to federal public lands and resources issues. The accuracy of this information is significant due to the critical nature of these decisions.

Indeed the BLM's revised RMP/EIS has important implications for both public policy and private sector decisions if for nothing else than in regards to energy policy and oil and gas production. Wyoming ranks second and sixth in proved reserves of natural gas and crude oil, respectively. Such high ranking clearly has implications for national energy supply and has an important influence on national energy policies and decisions made within the private energy sector.

- Influential information will be produced with a high degree of transparency about data and methods.
- The DOI will:
    - Use the best available science and supporting studies conducted in accordance with sound and objective scientific practices, including peer-reviewed studies where available.
    - Use data collected by standard and accepted methods or best available methods (if the reliability of the method and the nature of the decision justifies the use of the data).

1.2.2 "Dissemination"

The DOI (USDI 2002) provides a definition of dissemination:

> 5. Information means any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, graphic, cartographic, narrative, or audiovisual forms. This definition includes information that the Department disseminates from a web page, but

> does not include the provision of hyperlinks to information that others disseminate. This definition does not include opinions where Departmental presentation makes it clear that what is being offered is someone's opinion rather than fact or the Department's views.
>
> 6. Government information means information created, collected, processed, disseminated, or disposed of by or for the Federal Government.
> 7. Information dissemination product means any book, paper, map, machine-readable material, audiovisual production, CD-ROM, electronic document, web page, or other documentary material, regardless of physical form or characteristic, the Department disseminates to the public.
>
> 8. Dissemination means Department-initiated or sponsored distribution of information to the public (see 5 CFR 1320.3(d) (definition of "Conduct or Sponsor"). Dissemination does not include distribution limited to: government employees or Department contractors or grantees; intra- or inter-agency use or sharing of government information; and responses to requests for agency records under the Freedom of Information Act, the Privacy Act, the Federal Advisory Committee Act or other similar law. This definition also does not include distribution limited to: correspondence with individuals or persons, press releases, archival records, public filings, subpoenas or adjudicative processes.

Several forms of information have been disseminated during the planning process. All maps of LWCs, visual aids and printed materials presented during public meetings and all information contained within the RMP/EIS is considered to be disseminated information.

1.3 DATA QUALITY CHALLENGE

The Data Quality Guidelines BLM website states that:

> A request for correction of information covered by these guidelines should first be filed with the office that disseminated the information. That office has sixty (60) days within which to respond. If any member of the public wishes to challenge that office's response, they may do so in writing to:
>
> Assistant Director, Information Resources Management
> Bureau of Land Management
> 1849 C Street, NW
> Washington, DC 20240
>
> Or by e-mail: Information_Quality_Guidelines@blm.gov
> (BLM 2011)

Please consider this document a formal submittal as a challenge in full accordance with the DQA (FR Vol. 67 No. 36) and Information Quality Guidelines (Bureau of Land Management 2002; USDI 2002). It includes several instances of inaccurate or unsubstantiated information and inadequate documentation of methodologies and assumptions used in analyses in the documents have been distributed by the BLM Worland and Cody Filed Offices.

In the Information Quality Guidelines, the DOI (USDI 2002) has outlined information quality challenge and review procedures that described four elements to be included when challenging information:

1. Specific reference to the information being challenged.
2. Statement specifying why the complainant believes the information fails to satisfy the standards in the BLM, the DOI or OMB guidance.
3. How a complainant is affected by the challenged information. The complainant may include suggestions for correcting the challenged information, but that is not mandatory.
4. The name and address of response of the person filing the complaint. This information is used at the complainant's request for the purpose of responding to the challenge initiated by the individual. The address of response need not be the complainant's home address but should be the address that the BLM will use to respond to the complaint.

1.3.1 **Information Being Challenged**

We ask that this document be considered in its entirety, but specific examples of incorrect or inaccurate data, include Lands with Wilderness Characteristics (LWC) inventory, acreages of cheatgrass, mule deer information, and numerous GIS maps included in the RMP/EIS.

1.3.1.1 ***Lands with Wilderness Characteristics Inventory***

Section 201 of the Federal Land Policy and Management Act (FLPMA) directs the Bureau of Land Management (BLM) to inventory for LWCs. Prior to the RMP Revision, the Cody and Worland Field Offices of the BLM inventoried for LWCs. The LGCA directed Ecosystem Research Group (ERG) to conduct a confirmation inventory of LWCs.

In the confirmation inventory several data sets were used to identify things that detract from wilderness character. ERG used BLM GIS data for information pertaining to roads, range improvements, oil and gas fields. Data from other agencies, such as the Wyoming Pipeline Authority and the Wyoming Oil and Gas Commission, was used to inventory for structures within the BLM defined LWCs. The BLM was remiss in not considering readily available in-house data and other readily available data sources for structures when designating their LWCs. The BLM's resource specialist objections to the LWC designations were documented on the signature sheets and apparently ignored during the designation process.

The LGCA/ERG LWC confirmation inventory found that almost 20% of the 3.2 million acres of BLM lands in the Bighorn Basin were erroneously identified as having wilderness characteristics. In this area, the BLM has identified 56 areas comprising a total of 571,000 acres. Within this area there are numerous developments that detract from wilderness characteristics that were not identified in the BLM's inventory, including:

- 634 miles of roads, of which 518 miles are two track,
- 442 reservoirs,

- 296 miles of fence,
- 569,273 acres of active allotments,
- 154 range improvements,
- 10 miles of water pipeline,
- 17 water wells,
- 8 oil fields,
- 68 miles of oil and gas pipeline,
- 8 active oil and gas wells,
- 59 plugged and abandoned oil and gas wells, and
- 248,315 acres (43%) that have oil and gas leases.

The full results of the LGCA/ERG confirmation inventory are displayed in Appendix A. The discrepancies between the LGCA/ERG and BLM's inventories are too numerous to itemize in this document beyond those items noted in the list above and the reporting included in Appendix A. For illustration sake, we present the Whistle Creek LWC as an example of the types of discrepancies and oversights in the BLM's inventory data. The LGCA/ERG LWC maps clearly document the locations of man-made structures detracting from wilderness characteristics in the Whistle Creek LWC along with a narrative description on an inventory form that documents the structure types and amounts that detract from wilderness characteristics. The form also includes "yes or no" check boxes for "naturalness, "solitude", and "primitive or unconfined recreation". The LGCA/ERG LWC Inventory documented 27.59 miles of two track roads, 11.66 miles of graded dirt roads, 4.57 miles of unknown roads, a boundary shared with an existing oil and gas field, 4.41 miles of oil and gas pipeline, 0.84 miles of power lines, 40.43 miles of fence, 2 exclosures, 32 reservoirs, 2 stock tanks, 0.64 miles of water pipeline, and 14 gates. The BLM inventory did not capture any of these developments in their inventory. The LGCA/ERG LWC Inventory did not find wilderness characteristics in the Whistle Creek LWC.

Note that the BLM's LWC inventory and maps have been presented during public meetings and should be considered influential data. The DQA and associated agency guidelines dictate that the total of the LWC inventories be corrected.

1.3.1.2 *Conflicting/Incorrect Brome Inventories*

Section 3.4.4 states that in 2007, "...the WFO estimated that approximately 57,000 acres in the field office were infested with nonnative annual bromes." The 57,000 acre figure contradicts information from Table 3-22 of the RMP/EIS that presents acres for nonnative annual bromes at 37,505 for BLM surface estate and 46,875 for BLM mineral estate. The discrepancy seems to lay in the GIS data provided by the BLM.

A GIS layer entitled 'WFO_Invasive_NonNative' totals 57,413 acres which approximates the 57,000 acres presented in Vegetation section 3.4.4, but not incorporated in Table 3-22. See Vegetation Resources in this comment document for further discussion.

1.3.1.3 *Mule Deer*

The BLM, in their discussion of mule deer in the RMP/EIS, states the following as fact without proper support (pg. 3-97):

> (b)ecause of seasonal dependence on woody plant communities, mule deer are generally declining in numbers due to a decline in habitat quality and quantity.

It is unclear how the BLM can make a statement such as the preceding without providing evidence? Not only does the statement need supporting data and scientific literature, but an explanation that this is the only variable negatively affecting mule deer. Data requested for inclusion in the final RMP/EIS include:

- How many acres of sagebrush have been lost to dry and irrigated farming?
- Of lands still in sagebrush, how has the coverage and age class distribution of sagebrush changed due to fire suppression?

Additionally, the causes of mule deer declines are multi-fold, variable, and sometimes uncertain (Ballard et al. 2001; deVos et al. 2003; Unsworth et al. 1999). For instance, Gill et al. (1999) suggest that declines in Colorado were most attributable to competition from increasing elk populations, loss of vegetation productivity to over-grazing by deer in the 1940s, and loss of habitat to farmland conversion. The Oregon Department of Fish and Wildlife (2011) concluded that the decline of mule deer in Oregon is attributable to several factors in addition to habitat quality/quantity changes, including severe winters and drought, changing predator-prey relationships, and changing grazing and forest management practices. For further commentary, see mule deer comments in the Wildlife Resources section.

1.3.1.4 *GIS Maps*

There are several maps included in the RMP/EIS that are not reproducible from BLM baseline data or appear to conflict with the BLM's GIS data. Please refer to GIS Section 2 for the types of metadata and processes needing documentation for reproducible results. ERG found several discrepancies in GIS data. If the datasets are being highly manipulated then this should be reflected in the methods and analysis in the RMP/EIS. No such documentation of methodology is found in the RMP/EIS. Among the conflicts, are:

- **Travel Management**: Blank records in the GIS attribute table for Alternative D. RMP/EIS vs. GIS acres do not match.
- **Mineral Constraints**: Alternative D Mineral Constraints is missing all records for the "Standard Constraints".

- **Withdrawals**: Alternative A GIS files are contain blank records in the GIS attribute tables. Acres do not match RMP/EIS.
- **Rights-of-Way Avoidance and Exclusion**: GIS file contained overlapping areas resulting in conflicting management in the same areas. Also results in incorrect acres.
- **Recreation Management Areas**: Both Alternative A and D GIS files do not show a complete data set of all RMAs included in the RMP/EIS.
- **Geothermal Constraints**: Contain overlapping polygons resulting conflictions in management in those areas and double counting of acres in GIS.

1.3.2 Data Inadequacy

The information in Section the information fails to satisfy the standards in the BLM, the DOI or OMB guidance. It fails to meet standards simply because it either: (1) inaccurately portrays wilderness conditions and fails to incorporate relevant readily available data, (2) incorrectly states facts without proper scientific support, (3) conflicts with other information found within the RMP/EIS or, (4) is not supported by existing BLM databases.

1.3.3 Entities Impacted

The Bighorn Basin LGCA represent thousands of constituents that will be impacted by inaccurate data being used in the planning process. Impacts include socioeconomic, recreational, and cultural impacts as identified in relevant sections of this document.

1.3.4 Entity Filing the Complaint

Bighorn Basin LGCA
c/o Keith Grant
Big Horn County Commission
P.O. Box 31
Basin, WY 82410

APPENDIX G

LOCAL GOVERNMENT COOPERATING AGENCY PUBLIC MEETINGS
DRAFT MEETING NOTES
BIG HORN BASIN DRAFT RESOURCE MANAGEMENT PLAN REVISION & DRAFT ENVIRONMENTAL IMPACT STATEMENT
BUREAU OF LAND MANAGEMENT
TUESDAY MAY 24-WEDNESDAY JUNE 1, 2011

From Tuesday May 24, 2011 to Wednesday June 1, 2011, the Local Government Cooperating Agencies (LGCA) with the assistance of Ecosystem Research Group (ERG) held a series of public meetings throughout the Big Horn Basin. These meetings were held to introduce the public to the Bureau of Land Management's (BLM) Draft Resource Management Plan (RMP) and Draft Environmental Impact Statement (EIS) which guides how BLM will manage public lands for the next 15-20 years.

Local Government participants at several of the meetings and their affiliation included but were not limited to:

Sady Babcock	ERG	Jill Shockley Siggins	LGCA
John Sanford	ERG	Ron Harvey	LGCA
Madeleine Ruble	ERG	Mike Baker	LGCA
Tim French	LGCA	John Lumley	LGCA
Aaron Anderson	LGCA	Brad Basse	LGCA
Bucky Hall	LGCA	Dan Rice	LGCA
Terry Wolf	LGCA	Tory Dietz	LGCA
Dave Burke	LGCA	Kristin Tilley	LGCA
Loren Grosskopf	LGCA	Steve Jones	LGCA
Joe Tilden	LGCA	Clara Mae Yetter	LGCA
Keith Grant	LGCA		

Agenda Items included:

1. Introductions
2. Review of BLM RMP by Resource Area – Basin Wide and by County
3. Public comments

Washakie County, Wyoming:

Thermopolis
ERG and the LGCAs held the first of seven public meetings in the Thermopolis Middle School Commons Area on Tuesday May 24th, 2011. Fifty-eight people signed in to the meeting held from 6:00-8:00 pm. Notes were not taken on public comments at the Thermopolis meeting.

Ten Sleep
The second meeting in Washakie County took place at the Ten Sleep Community Center on Wednesday May 25th, 2011 from 11:30 am – 1:30 pm. Forty-one people signed into the meeting.

The following key points and concerns were raised during the public-comment portion of the meeting:

- Will the BLM acknowledge landowner expertise concerning wildlife on private lands?—Bob Herman
- Are Wilderness Study Area designations permanent?—Bill Greer
- Does the BLM have data supporting the economic benefit of expanding antelope, mule and whitetail deer winter range? What characteristics contribute to a *wild land* designation? Will BLM honor grazing allotments?—Jim Caines
- How will Alternative D limit rancher access to their livestock? To what extent will Alternative D limit off road vehicle use during sage grouse nesting?—Dick Loper
- Does the BLM consider livestock a wildlife management tool in Alternative D?—Belinda Daugherty
- Addressing profitability: How will cutting AUMs on BLM allotments affect local wages? Will BLM commit to an economically sustainable number of AUMs on federal lands?—Bob Herman, Keith Grant, Dan Hamilton
- Nathan Maxon of the Wyoming Outdoor Council stressed the importance multiple interests on public lands.
- Jerry Ewen, Jim Sutherl, and April Neilson stressed the importance of public comments on the draft.

Worland
The final meeting in Washakie County was held at the Worland Community Complex from 6:00-8:00 pm on May 25th, 2011. Thirty-two people signed into the meeting.

The following key points and concerns were raised during the public-comment portion of the Worland meeting:

- Does the BLM's data support a viable coexistence between wildlife and oil/gas? 'Antidotal evidence is not valid in this situation'—Dick Krogor
- What are the State Agencies' positions on the Alternatives?—Stan Wostenberg
- Standard oil and gas lease vs. moderately restricted areas? Economic analysis of a move from standard to moderate constraints? Will comments be available to public before end of BLM comment period?—Mike Greer
- How does the BLM plan to enforce restrictions put forth by new plan?—Charlie McPike
- Fred Frandson raised a number of concerns including:
    - With 78% of the land in Wyoming not drilled, and much considered 'undesirable', why impose new restrictions?
    - Will these restrictions limit oil and gas exploration and how will this affect the economy in the Big Horn Basin?
    - How will the Plan address future advances in drilling techniques and technology?
    - What about pending lease applications?
    - Does the plan address the development or repairs of water reservoirs in the Basin?
    - Will the BLM address wildlife and water issues concerning reservoirs in the Basin?

Big Horn County, Wyoming:

Greybull
On Thursday May 26th, 2011 from 6:00-8:00 pm ERG and the LGCAs held their fourth meeting at the Weed and Pest Building in Greybull, Wyoming. Seventy-eight people signed in to the meeting.

The following key points and concerns were raised during the public-comment portion of the meeting:

- Will oil and gas pipelines be considered surface occupancy or surface disturbing activity? Were ACECs developed in cooperation with SHIPO?—Phillip Hartman
- What will the affects of the Alternatives be on state leases?—Lisa Knisey
- Does the BLM address access for elderly, disabled, etc. into newly restricted areas?—Grace McCoy
- Has the BLM provided a socioeconomic analysis by alternative?—Monica Deromedi
- How will the BLM weigh local vs. out-of-state comments concerning public lands in the Basin?—Stan Foote
- Transparency of BLM concerning LWC with reservoirs, etc.—Linda Hamilton
- Where were most errors/admissions in draft (LWC, socioeconomics, etc.)?—Rod Collingwood
- Nancy Joyce and Rob Brown expressed concern over the clarity of the Draft's glossary terms such as *wild lands* and *roads*.

Park County, Wyoming:

Powell
The first of three meetings in Park County was held Tuesday May 31st, 2011 from 6:00-8:00 pm in the Multi-Purpose Room at the Park County Fair Grounds in Powell, Wyoming. Fifty-one people attended.

The following key points and concerns were raised during the public-comment portion of the Powell meeting:

- Hilary Eisen (Greater Yellowstone Collation) stressed that energy development and conservation can coexist in many but not all places. The BLM and Big Horn Basin public should prioritize land use on Absaroka Front to favor conservation.
- Tom Fitzsimmons (Legacy Reserves; Neilson & Associates)
  - Resource/Stratagraphic Plays in BHB not addressed by BLM
  - Protecting proprietary information while providing BLM with intent to drill
  - Staffing for additional restrictions
  - Leases to develop existing oil (plugged wells) on winter range
- Federal vs. state/county jurisdiction over wildlife restrictions in plan—Bill Terry
- How will the BLM address staffing/costs of additional restrictions? Socioeconomics of restrictions (in terms of affects on revenue for communities, counties, state) should balance with development/wildlife—Jim Hillberry, Terry Wolf
- How will additional restrictions affect grazing leases? BLM should commit to a sustainable amount of AUMs—Scott A. Brown
- Will BLM work toward a balance between development and conservation/wildlife?—Bon Whisouant

- *Reasonably Foreseeable Development*—how will BLM address changes in technology over the next several years (shale, horizontal drilling, for example)?—Mike Williams

Meeteetse
The Meeteetse Conservation District Office hosted the second meeting in Park County on June 1st, 2011 from 11:30 am-1:30 pm. Twenty 26 people signed in.

The following key points and concerns were raised during the public-comment portion of the meeting:

- Several issues came up during ERG's presentation including:
    - Quality of BLM data concerning roads, oil & gas leases, future development
    - How might invasive species distract from *apparent naturalness*?
    - Does the Plan address time restrictions for migratory birds or wildlife corridors?
    - Is a 20 year management plan reasonable? Can the BLM adequately address changes in technology, etc with a long-term plan?
    - Does definition of *wilderness* consider local perspectives
- Staffing/costs of additional restrictions by Alternative—Bob Whisouant
- Is the BLM adhering to stipulation of multiple use? Does this plan favor conservation over other land use?—Steve Jones

Cody
The final meeting in the Basin was held in the Grizzly Hall at the Cody Public Library in Cody, Wyoming, from 6:00-8:00 pm on June 1st, 2011. Seventy-four people attended.

The following key points and concerns were raised during the public-comment portion of the meeting:

- How will the Plan affect access to future resources, revenue, and energy security in the Basin?—Matt Vezza (Marathon Oil)
- Bob Whisouant would like to see balance between oil and gas development and conservation and wildlife in the Basin.The Big Horn Basin is unique in terms of its 'primitiveness'. Revenue (oil and gas) is not the bottom line.
- The BLM and the public need to find balance between job creation and protecting wild places in the Basin.—Warren Murphy
  Aesthetic and recreational value in Basin need to be considered by local government—Sean Sheehan
- Open spaces (wild lands, roadless areas) are as valuable as oil and gas and grazing—Betty Dominick
- Aesthetics and conservation should be considered in multiple use decisions in the Basin—Nathan Maxon (Wyoming Outdoor Council)
- Does this plan move away from multiple use by imposing restrictions that may be unnecessary?—Keith Grant
- Given that much of the Basin and adjacent public lands (Shoshone National Forest, Yellowstone National Park) are closed to oil and gas development, current BLM restrictions are adequate.—Marvin Blakesley
- Do so many management designations impede multiple use?—Lou Cisco
- How are unused leases being addresses by the Plan?—Betty Dominick
- Will development be done responsibly? Rules and regulations need to be carefully addressed in the Plan to protect quality of life in the Basin.—Marshall Dominick

- How will the BLM weigh local knowledge and opinion on federal lands in the Basin?—Randi Weaver
- How will new restriction affect revenue in the Basin? How will the BLM address staffing and costs of Alternative D?—Jim Hillberry

Summary of Attendance

Meeting Location	Date	Attendance
Thermopolis	May 24th	58
Ten Sleep	May 25th	41
Worland	May 25th	32
Greybull	May 26th	78
Powell	May 31st	51
Meeteetse	June 1st	26
Cody	June 1st	74

TOTAL ATTENDANCE: 360

APPENDIX H

Absaroka Front Management Area: Energy Exploration, Economics, Wildlife Biology and Development Issues

March 16, 2010

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EXECUTIVE SUMMARY

As Cooperating Agencies (CAs), with recognized local expertise, and as duly elected representatives of our counties and Conservation Districts, we urge the Bureau of Land Management (BLM) to select a range of management actions that will both protect our wildlife resources and promote and maintain socioeconomic opportunities in our communities by encouraging "sound, balanced exploration and development to meet national and local needs" (RMP Objective MR:1.2). Our approach for this Absaroka Front analysis considers (1) the socioeconomic benefits of multiple resources including wildlife, recreation, and energy development; (2) the geological potential of the area; and (3) identifying those important wildlife habitats and providing appropriate leasing restrictions, stipulations, and mitigations to protect wildlife and allow flexible and suitable energy exploration and development.

Since 1986, portions of the Absaroka Front Management Area (AFMA) have been managed with the Absaroka Front Habitat Management Plan (HMP) by focusing on wildlife and their habitat and also by recognizing the area as a high potential oil and gas reserve. At the time the HMP was written, there were 20 known geologic structures in the HMP area and the entire HMP area, excluding Wilderness Areas, was under lease. There are currently 46 oil and gas wells producing in the HMP area. These wells provide significant economic benefits to the State and counties.

The HMP's success is evidenced by the very healthy populations of elk that exist in the AFMA today. There are three elk herds in the AFMA and all three herds have been over objectives for at least the last 10 years, varying from 20–80 % over objectives while being open to some level of oil and gas exploration and development.

The BLM presented an expanded AFMA for the Draft Bighorn Basin Resource Management Plan (RMP). This related, but entirely new area to the north of the present HMP included 402,682 acres (Figure 1) and the suggested management strategy was changed from open leasing in the current HMP to no surface occupancy (NSO), which would preclude oil and gas exploration and development in the proposed AFMA.

Given that the current management of wildlife protections and open leasing for energy development is working well and science-based mitigation measures are available to manage oil and gas activities to protect wildlife populations, we strongly believe operation under similar current management objectives is justified. Therefore, we promote our Alternative, D.2 (see Table 2, below). However, in the interest of working with the other CAs in this planning process, we do agree to work toward a negotiated alternative, and as such are willing to support Alternative D.3 (see Table 3, below). In giving our support to the negotiated alternative, the CAs would like to request we be part of the decisional team in future project level planning and decisions conducted in controlled surface use (CSU) areas.

1 INTRODUCTION

The purpose of this paper is to outline the local governments CAs analysis and proposal to address energy exploration and development within the AFMA. The CAs have considered the following three alternatives described in Table 1, Table 2, and Table 3:

Table 1 D.1: The WGFD Alternative as Presented on February 23, 2010

Surface Management	No Leasing	NSO	CSU	TLS	Open Leasing	Acreage Totals
Bureau of Indian Affairs	100	0	0	0	0	100
Bureau of Land Management	85,059	22,530	23,306	0	0	130,895
Bureau of Reclamation	0	0	208	0	0	209
Private Split Estate	59,620	42,858	17,496	0	0	119,973
Private Non Split Estate	32,993	34,415	27,291	0	0	94,699
State	18,239	18,881	19,242	0	0	56,362
Other	429	0	16	0	0	445
Totals	**196,440**	**118,684**	**87,558**	0	0	**402,682**

Table 2 D.2: The LGCA Alternative as Presented on February 23, 2010

Surface Management	No Leasing	NSO	CSU	TLS	Open Leasing	Acreage Totals
Bureau of Indian Affairs	0	0	100	0	0	100
Bureau of Land Management	0	45,444	85,451	0	0	130,895
Bureau of Reclamation	0	0	209	0	0	209
Private Split Estate	0	35,791	84,180	0	0	119,972
Private Non Split Estate	0	17,631	77,068	0	0	94,699
State	0	9,648	46,715	0	0	56,362
Other	0	0	445	0	0	445
Totals	**0**	**108,514**	**294,166**	**0**	**0**	**402,681**

Table 3 D.3: The LGCA/WGFD/State Negotiated Alternative as Presented on March 12, 2010

Surface Management	No Leasing	NSO	CSU	TLS	Open Leasing	Acreage Totals
Bureau of Indian Affairs	0	0	6	93	0	100
Bureau of Land Management	40,438	9,419	60,876	20,168	0	130,901
Bureau of Reclamation	0	0	209	0	0	209
Private Split Estate	25,257	8,097	70,108	16,512	0	119,973
Private	12,455	4,069	61,331	16,844	0	94,700
State	9,393	2,424	19,311	25,234	0	56,362
Other	0	0	20	425	0	445
Totals	**87,543**	**24,009**	**211,861**	**79,277**	**0**	**402,690**

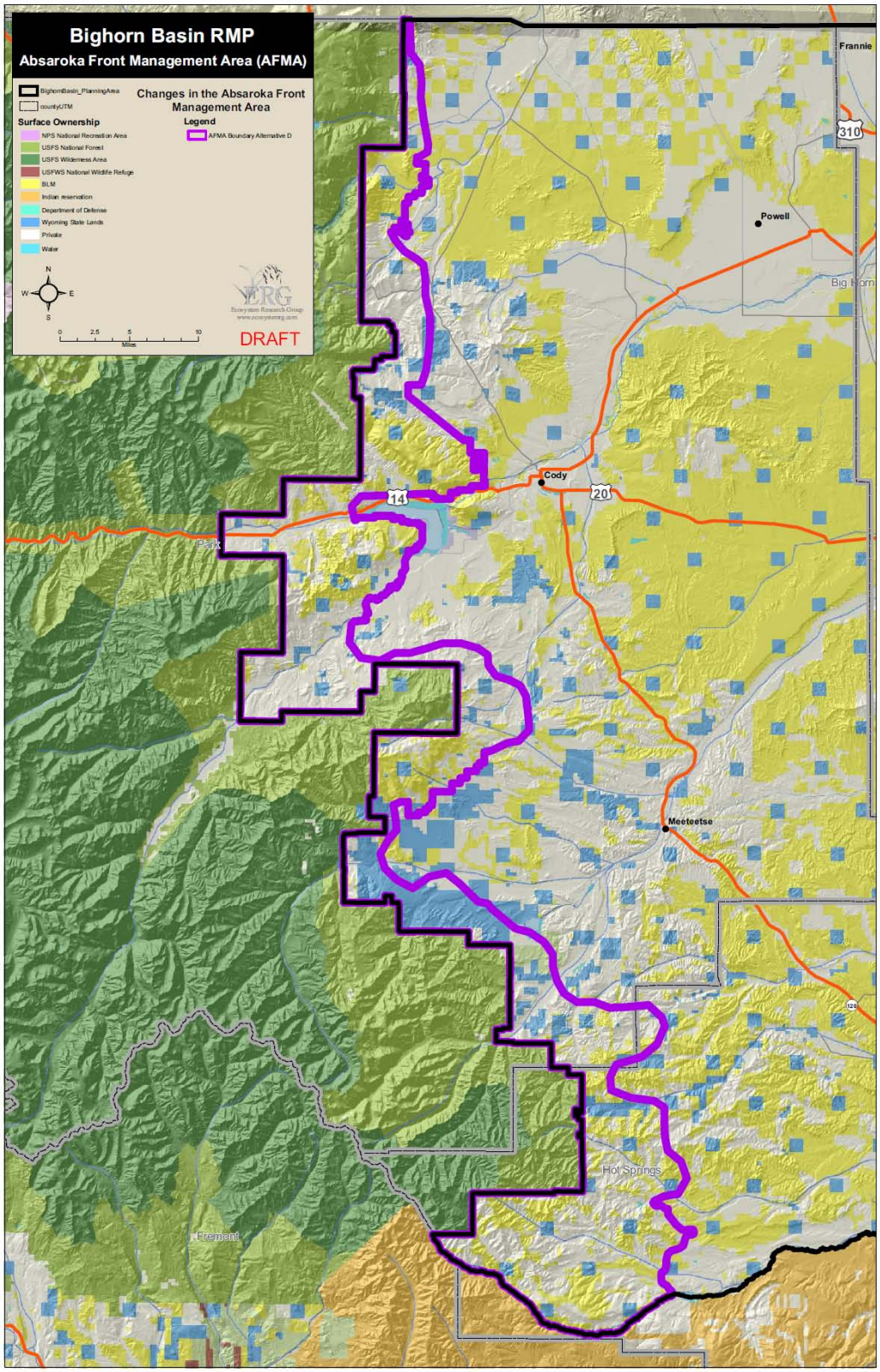

Figure 1 Absaroka Front Management Area

The current HMP was approved in 1986 and is a valid plan today. The plan was, and still is, forward looking; while focusing on wildlife and their habitat it also states (USDI 1986) ,

> HMP area is presently considered a high potential oil and gas reserve. Twenty known geologic structures (KGS) occur in the HMP area. The entire HMP area excluding Wilderness Area is currently under lease.

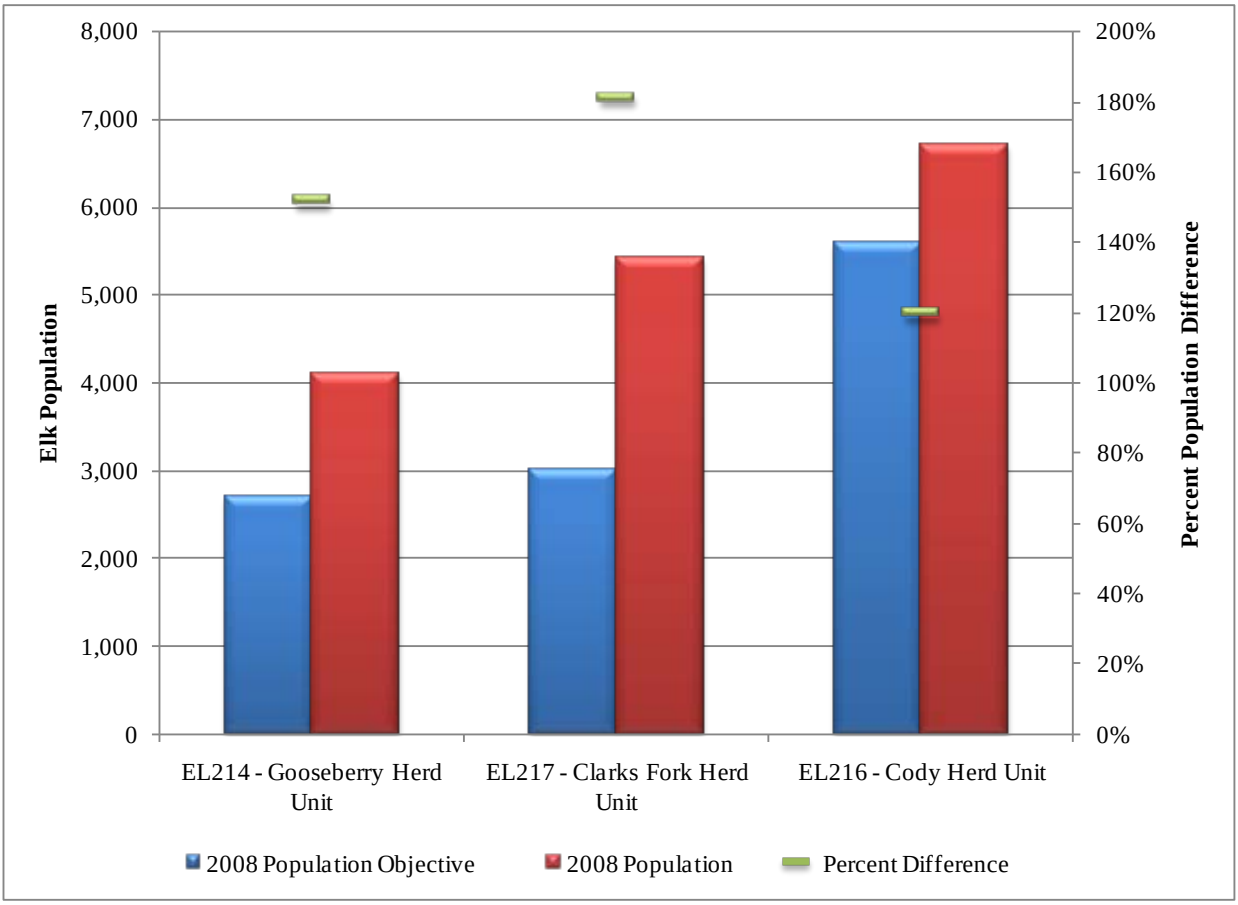

Figure 2 Elk Herd Populations

The proof of the plan's success is evidenced by the very healthy populations of elk. Figure 2 shows the current elk population data for the three elk herds in the AFMA.

All three herds have been over objectives for at least the last 10 years and vary from 20–80% over objectives, while being open to some level of oil and gas exploration and development. Given the win-win current management of wildlife protections and open leasing for energy development, we strongly believe our analysis and approach justifies continued operations under current management objectives. In addition, we do not believe there is a need to add the AFMA to the north as proposed by the WGFD and the BLM.

All of the Mineral Resource Goals and Objectives described in the Preliminary Alternative D Review Draft (02/17/10) and discussed in the February 2010 Cooperating Agency meetings support and maintain the notion of responsible exploration and development of mineral resources in the Planning Area. Indeed, the Mineral Resources Goal MR: 1 states,

> Provide Opportunities for mineral extraction and energy exploration and development to meet national and local needs, while avoiding or mitigating impacts on other resources.

This goal is clarified and expanded in Objective MR: 1.2 which states: "Encourage sound, balanced exploration and development of mineral resources in the Planning Area."

The current HMP recognizes the "high potential" for oil and gas and our research corroborates this. According to the 1995 USGS (Fox and Dolton 1995), the Sub-Absaroka is a "demonstrated" oil play located along the western side of the basin beneath Eocene-age volcanic rocks. That assessment stated the potential for significant new field discoveries (greater than 1 million barrels) was considered to be "good" in the Absaroka Front area. Oil was predicted to be trapped in Laramide-age anticlines and domes, similar to producing structures successfully developed elsewhere in the Bighorn Basin. Exploration of the Sub-Absaroka play has been limited to date because of the difficulty of exploring beneath the volcanic rocks that overlie the play. With recent advances in exploration technology (for example 3-D seismic), it should be possible to look beneath the volcanic cover at the underlying structures and evaluate what could be significant hydrocarbon reserves (Fidelity 2010). Loss of leasing opportunities, closure to exploration or NSO restrictions would effectively end future exploration of this possible significant shale gas and oil resource play.

The HMP's stated goal was to "to improve, expand, and meet WGFD strategic plan and threatened or endangered species national recovery plan goals." We feel that those goals have been met or exceeded with current management and therefore do not believe any changes to the management objectives are warranted.

The proposed AFMA is filled with significant assets and values. The socioeconomic benefits provided by the proposed AFMA include oil and gas production, ranching and agriculture, hunting and fishing, and motorized and non-motorized recreation. While all these assets and values are important, oil and gas production provides the greatest economic benefit. When areas are open to oil and gas development, companies have incentives to develop new technologies that help them to produce oil and gas more efficiently and sustainably.

The Federal Land Policy and Management Act (FLPMA 1976) Declaration of Policy states,

> Goals and objectives be established by law as guidelines for public land use planning, and that management be on the basis of *multiple use and sustained yield* (emphasis CAs) unless otherwise specified.

We feel that management direction is appropriate with a strategy of "multiple use in a mixed land ownership pattern" and we strongly suggest that a similar land strategy be applied in the Bighorn Basin Absaroka Front area.

As Gary Strong, Geologist for the Wyoming Oil and Gas Conservation Commission, said,

> My point is if an area isn't closed by an NSO or some other restriction, but instead, meaningful, and workable restrictions can be set, both technology and economics can come forward and get exploration and development done with income generated and jobs saved or added.

Appendix A contains a selection of oil and gas industry letters which contain additional comments regarding the Bighorn Basin RFD.

2 ANALYSIS APPROACH

An analysis of the socioeconomic benefits to continuing current HMP objectives into the newly proposed AFMA, i.e. area open to gas and oil exploration and development, was conducted. The geologic potential and important wildlife habitats in the AFMA area were also analyzed.

2.1 SOCIOECONOMIC

The proposed AFMA is filled with significant assets and values including socioeconomic assets, recreational value, historic and cultural value, and wildlife habitat. The socioeconomic benefits provided by the proposed AFMA include oil and gas production, ranching and agriculture, hunting and fishing, and motorized and non-motorized recreation. Oil and gas production provides the greatest economic benefit, as described in the following paragraphs. However, ranching and recreational activities such as hunting and fishing and motorized and non-motorized recreation also contribute economically to the area. The cultural value of this area includes not only the recreational assets and opportunities for wildlife viewing, but also job opportunities from the tourism industry and oil and gas production which prevents out-migration of the area's youth.

The following socioeconomic analysis covers the AFMA area proposed by the WGFD. The multiple uses of the area, including recreation and oil and gas development, are discussed, as well as lands owned privately and by the state and federal government and the economic contributions of these lands. The importance of oil and gas development is described by its job and income contributions as well as the possibility for increased technological innovations when more areas are open to oil and gas development.

2.1.1 Land Ownership

Ninety-eight percent of the proposed AFMA consists of private, state, and BLM lands within the counties of Park and Hot Springs. The majority of this area, 214,670 surface acres, is privately owned and the

revenue received from rent and royalty payments is supplemental to other income. This supplemental income allows many ranchers to maintain large tracts of land. Without this supplemental income, these lands would potentially have to be split and sold as smaller ranchettes. The division of ranches into ranchettes is detrimental to crucial wildlife habitat as it splits large, unaltered land parcels into smaller areas. The local residents receive and provide economic benefits. The economic benefits they receive include resource extraction, grazing, hiking, fishing, hunting, and OHV use. The economic benefits they provide include wildlife habitat and a maintained level of range condition compatible with other uses of grazing allotments.

The 56,361 acres of state lands in the proposed AFMA provide crucial funding to the state education system and other public institutions. The state owns 3.5 million surface acres and 3.9 million mineral acres statewide. In 2009, $197,900,000 in revenue was generated by these lands. Over 80% of the funds generated are designated for public schools. These lands were created by the U.S. Congress when Wyoming became a state. The Board of Land Commissioners is given the task

> To manage trust assets for two key purposes consistent with traditional trust principles; 1) long-term growth in value, and 2) optimum, sustainable revenue production.

If only one high-potential area in the AFMA is developed, it can generate a large amount of income (Wyoming Office of State Lands and Investments 2009).

The federal government owns 121,682 surface acres and 241,653 mineral acres in the proposed AFMA which are managed by the BLM. Oil and gas provide substantial income to the federal government and to the State in the form of rents, royalties, and bonuses. The BLM is required to manage these lands under the principle of multiple-use for the current generation and resource sustainability for future generations.

2.1.2 Recreation

One of the many uses of the proposed AFMA is its great recreational value. In the proposed AFMA, there are currently four trailheads, Hogan Luce Campground, and Clarks Fork Fishing Access that provide recreational opportunities for hiking, camping, sight-seeing, fishing, boating, and many other activities. This area is also known as prime hunting ground. Hunter success is high in all three hunting districts included in the proposed AFMA (214, 216, and 217). In 2009, the hunter success rates were 54%, 46%, and 41%, respectively (Wyoming Game and Fish Department 2009a).

2.1.3 Specialization of the proposed AFMA Counties

The proposed AFMA area borders two counties within the Big Horn Basin-Park County and Hot Springs County. Specialization is one way to determine how economically vulnerable a community is to disruptions. A county's specialization index compares the local sector breakout to that of the nation. A county that is structurally identical to the United States would have a score of 0 (very diverse); the largest

observed score in the United States is 3,441 (very specialized). Park County's economy is somewhat specialized with a score of 146 with most of their workforce concentrated in three sectors (Headwaters Economics 2010b). Hot Springs economy is highly specialized with a score of 321 and its workforce concentrated in only two sectors (Headwaters Economics 2010a). These counties are similar in that they both rely on agriculture, forestry, fishing, and hunting—the western rural lifestyle. The national norm for employment share in this sector is 1.5%. In Park County, 7.3% of employment is in this sector; in Hot Springs County, 8% of employment is in this sector. The other sectors in which each of the counties' workforces is concentrated are very different and are described in the following paragraphs.

The workforce in Park County is also concentrated in mining, accommodations, and food service. Four percent of the workforce is in mining; 8.22% is in accommodations and food service. The national norm for each of these sectors is 0.4% and 6.1%, respectively. Park County receives large number of tourists due to their location to Yellowstone National Park. However, the income generated by this sector is much smaller than that generated by oil and gas.

In Hot Springs County, 19% of the workforce is employed in the healthcare and social services sector; the national norm is 11%. This reflects the aging population of Hot Springs County. This county has not been as successful in oil and gas as others. The communities within this county are becoming retirement rather than resource-based economies. In retirement economies, it is difficult for the social services to keep pace without the income generated by industry.

The primary concerns and challenges of the residents of these areas are similar to those of the rest of the state. A 2007 poll conducted for the University of Wyoming found that the two primary concerns of voters were availability of water for agricultural purposes (57%) and loss of family farms and ranches (47%). Also, a 2007 Community Assessment Summary by the Wyoming Rural Development Council found that the "outmigration of youths due to lack of jobs and opportunities in their hometowns and overall lack of good paying jobs in rural communities" are two of the problems or challenges facing Wyoming (Hulme et al. 2008). The oil and gas industry helps to alleviate these concerns by providing employment opportunities.

2.1.4 Analysis of Oil and Gas Production

Oil and gas production in the Bighorn Basin provides incentives for producers to upgrade to new technologies, increasing their efficiency and sustainability, and contribute economically to the nation, state, and local economies. These benefits are described in the following sections.

2.1.5 Technological Innovation

Technology and regulation impact oil and gas companies' decisions. When areas are open to oil and gas development, companies have incentives to develop new technologies that help them to produce oil and

gas more efficiently and sustainably. Without the possibility for expanded production, companies may not find it economically feasible to expand research and development. The WGFD (Wyoming Game and Fish Department 2009b) states,

> "Energy development technologies are constantly evolving, as is knowledge of wildlife impacts, and monitoring and mitigation techniques. In light of this, efforts to identify and incorporate additional literature, monitoring procedures and more effective mitigation will continue".

Without knowing what future technology will bring, increased regulation will discourage oil and gas companies from pursing exploration leases in the Bighorn Basin. According to one industry professional, "The primary concern from…industry is whether or not we will be able to actually take what we have learned and apply it to the Big Horn Basin" (Koval pers. comm.). They will likely pursue exploration in other areas with less regulation which will decrease their costs. This would result in large lost opportunity costs to the communities. Keeping as many areas open as possible provides incentives for oil and gas companies to continue to research technologies in both production and mitigation, to minimize impacts. This will also help to ensure continued multiple-use of the federal lands and the open space culture of the area.

2.1.6 The Relative Economic Contribution of Oil and Gas

Wyoming's oil and gas industry is the largest contributor to the economic health at all levels, from individual employment to State revenues. It allows the state to retain its outdoor cultural heritage with ranching, recreational opportunities, and vast open spaces. It helps to provide energy security to the entire country.

Oil and gas contributes to the economy in two ways—through production and the payment of royalties and taxes. Production of oil and gas has direct impacts (jobs, employment income, and value added within the oil and gas industry), indirect impacts (jobs, employment income, and value added within industries that support oil and gas production), and induced impacts (jobs, employment income, and value added within all other industries due to household spending earned either directly or indirectly from oil and gas). These three impacts together measure the total operational impact.

2.1.7 Economic Benefits to the State

In 2007, the total operational impact of oil and gas on employment was 71,063 jobs, which were 18.85% of total jobs in the state. This means that one in five jobs in Wyoming can be attributed to the oil and gas industry. The total operational impact on labor income was $4,060,000,000 which was 24.3% of the state total. This is higher than the percentage of jobs which means that the jobs related to oil and gas are higher paying than jobs in other industries and one-fourth of total income is generated by oil and gas production. The total operation impact on value added was $8,432,000,000 which was 29.4% of the state total. Wyoming ranks first in the United States in percentage of jobs related to oil and gas and second (behind

Oklahoma) in percentage of income and value added related to oil and gas. Table 4, below, shows how the total impacts are calculated (American Petroleum Institute 2009).

Table 4 Operational Impact of Oil and Gas in Wyoming, 2007

	Direct Impact	Indirect Impact	Induced Impact	Total Contribution	Total Contribution as a % of State Total	Rank in US
Employment (jobs)	32,029	16,929	22,105	71,063	18.8%	1
Income	$2,590,000,000	$734,000,000	$736,000,000	$4,060,000,000	24.3%	2
Value Added	$5,762,000,000	$1,349,000,000	$1,321,000,000	$8,432,000,000	29.4%	2

Taxes and royalties are included in the calculations above of operational impacts; however, it is important to also see the tax benefits to the state. Oil and gas companies are the largest contributors at every level of government in Wyoming. They pay more local property and state taxes than others. They also provide rent and royalty revenue. Table 5 shows the total estimated ad valorem and severance tax collectible by the State of Wyoming in 2008 from oil and gas, as well as other information on ad valorem and severance tax.

Table 5 Ad Valorem and Severance Tax in 2008 (Wyoming Department of Revenue 2010)

	Taxable Value	Estimated Ad Valorem Tax Levied	Estimated Severance Tax Collectible
Natural Gas	$12,003,450,988	$745,347,794	$720,207,059
Oil - Crude	$3,521,323,842	$229,618,739	$130,633,403
Oil - Stripper	$567,945,543	$37,188,574	$22,717,822
Total Oil and Gas	$16,092,720,373	$1,012,155,107	$873,558,284
Total Minerals including Oil and Gas	$20,396,881,862	$1,270,103,644	$1,154,816,806
% Oil and Gas of total	79%	80%	76%
Total Assessed Valuation	$29,219,533,181	$1,851,444,265	NA
% Oil and Gas	55%	55%	NA

Mineral royalty and rent revenues on federal lands are reported to and collected by the U.S. Department of Interior Minerals Management Service. Disbursements are then sent back to the State. In fiscal year 2009, total federal onshore reported royalty revenues for the state of Wyoming totaled $1,861,472,498. Of that total, $722,303,925 was attributed to oil and gas[1] (Minerals Management Service 2010). That same year the federal government distributed a total of $957,232,075 in royalty revenues to the state of Wyoming, $398,725,757 of which was attributed to oil and gas (Minerals Management Service 2010).

[1] Categories included are condensate, drip or scrubber condensate, fuel gas, gas plant products, inlet scrubber, oil, other liquid hydrocarbons, and processed and unprocessed gas.

The state of Wyoming disbursed $29,564,975 of their total disbursement to Big Horn, Hot Springs, Park and Washakie Counties (Schaeffer pers. comm.).

In fiscal year 2009, mineral leasing and royalty compliance generated $185,728,544 in revenues on State Trust Lands (Wyoming Office of State Lands and Investments 2009). The disbursements of these funds are done according to Legislative directives. State Trust Land revenues were allocated as follows: 88.83% to the Permanent Land Fund, 6.33% to the Permanent Lands Income Fund, 0.80% to the General Fund, and 4.04%to the School Capital Construction Fund (Wyoming Office of State Lands and Investments 2009).

2.1.8 Economic Benefits to the Local Economies

The proposed AFMA has significant energy resources. The Absaroka Front HMP says,

> The HMP [Habitat Management Plan] area has 18 known oil and gas fields and contributes significantly to oil and gas production in Wyoming. The HMP area is presently considered a high potential oil and gas reserve.

Local counties and communities benefit specifically from taxes and royalties specific to the energy industry which include Federal Mineral Royalties (FMR) and severance taxes. Table 6 lists the FMR disbursements received by Hot Springs and Park County and for all four counties of the Bighorn Basin (Schaeffer pers. comm.).[2] Table 7 lists severance tax disbursements to counties within the Bighorn Basin. Small amounts of State severance taxes are also distributed to towns, which are not included in these figures.

Table 6 Disbursements of FMR by Area (Schaeffer pers. comm.)

Fiscal Year	Hot Springs County	Park County	Bighorn Basin
2004	$3,327,735	$9,220,666	$16,595,401
2005	$4,470,292	$12,243,560	$23,021,856
2006	$6,025,658	$19,098,545	$34,729,283
2007	$7,249,080	$15,814,298	$30,054,483
2008	$11,510,917	$24,614,706	$46,821,524
2009	$7,614,451	$15,301,272	$29,564,975

Table 7 Disbursements of Severance Tax by Area (Wyoming State Treasurer's Office 2009)

Fiscal Year	Hot Springs County	Park County	Bighorn Basin
2004	$133,476	$289,455	$769,461
2005	$106,791	$303,648	$726,057
2006	$115,818	$312,518	$765,602
2007	$117,265	$317,072	$787,378
2008	$108,850	$306,868	$749,163
2009	$94,806	$291,446	$688,580

[2] The four counties are Big Horn County, Hot Springs County, Park County, and Washakie County

In addition to the tax and royalty income received by counties, the energy industry referenced above by the HMP is a large employment contributor in many rural areas. Using job and income estimates from *The Forest Plan Amendment for grizzly bear habitat conservation for the greater Yellowstone area National Forests: Final Environmental Impact Statement* (USDA 2006), Table 8 shows jobs and labor income estimates contributed per well. Using the multipliers from these data as a conservative estimate and the multipliers generated for the oil and gas industry in the state of Wyoming from the Wyoming Oil and Gas Economic Contribution Study (Wyoming Heritage Foundation 2008) as a more realistic estimate for the region—as they generated multipliers specifically for the proposed AFMA— we have calculated the total employment and total labor income from one well in 2007 in top rows of Table 10.

Oil and gas development also provides State and county tax contributions. According to Fischer (Marathon Oil 2010), one successful oil well would generate from approximately $1,172,500 to $2,931,250 in annual state and county taxes, depending on production. The state and county taxes potentially generated in the proposed AFMA based on these estimates are also provided in Table 10.

Table 8 Jobs and Income for One Well (2001 dollars) from USFS

	Direct	Indirect	Induced	Total
Jobs per Drilled Well (number)	6	3	3	12
Labor Income per Drilled Well (2001 dollars)	$232,800	$92,700	$65,300	$390,800

The Draft Reasonably Foreseeable Development scenario for oil and gas, Bighorn Basin Planning Area, Wyoming (RFD) (USDI 2009) supplies potential oil and gas well estimates for the Bighorn Basin which includes the proposed AFMA. In the proposed AFMA, three classifications of development—medium, low, and very low—are designated according to their total number of wells predicted by township from the RFD. The number of townships in the proposed AFMA by development potential is provided using GIS analysis. The total well potential in the proposed AFMA uses the high number of the range of wells projected in the RFD times the number of townships by classification, as shown in Table 9. The high number is used to estimate the development potential because we feel the range of wells projected in the RFD is low. These estimates and the 46 currently active wells total 165 potential wells in the proposed AFMA.

Table 9 Oil and Gas Development Classifications (USDI 2009)

Potential	Wells	Townships (#)	Total Well Potential
Medium	20 to 100	0.2	20
Low	2 to < 20	4.5	86
Very low	< 2	12.8	13

Using the jobs and income estimated by well from Table 8 and the 165 estimated wells in the proposed AFMA, Table 10 shows total estimated jobs and labor income contributed in the proposed AFMA.

Table 10 Jobs, Income, and Taxes from Wells within the Proposed AFMA (2007 dollars)

		Direct	Total using USFS Multiplier	Total using WHF Multiplier
Jobs, Income, and Taxes for One Well	Jobs per drilled well (number)	6	12	21.9
	Labor income per drilled well	$272,553	$457,533	$700,461
	Annual state and county taxes	$2,051,875[3]	NA	NA
Jobs, Income, and Taxes of Existing 64 Wells within Proposed AFMA	Jobs (number)	384	768	1401.6
	Labor income	$17,443,392	$29,282,120	$44,829,517
	Annual state and county taxes	$131,320,000	NA	NA
Additional Jobs, Income, and Taxes of 119 Potential Wells within Proposed AFMA	Jobs (number)	714	1428	2606.1
	Labor income	$32,433,807	$54,446,442	$83,354,884
	Annual state and county taxes	$244,173,125	NA	NA
Total jobs, Income, and Taxes of 165 Wells of Proposed AFMA	Jobs (number)	990	1980	3613.5
	Labor income	$44,971,245	$75,492,966	$115,576,100
	Annual state and county taxes	$338,559,375	NA	NA

If the proposed AFMA are closed to oil and gas exploration and production (NSO), the additional income and employment shown in Table 10 would be lost.

2.2 GEOLOGY

We believe a review of the regional geology provides opportunities for discovering new oil and gas reserves along the western boundary of the Bighorn Basin. It has been established that Phosphoria formation oil in Bighorn Basin reservoirs migrated from the Idaho-Wyoming thrust belt and eventually charged the large traps that ring the basin (Stone 1967). While moving through the western and central basins area, some of these hydrocarbons were certainly diverted into intervening structural and stratigraphic traps. These traps have not yet become the target of explorationists because there have always been cheaper, shallower targets to drill. Those opportunities are diminishing and the time is ripe for resurgence of activity in the Bighorn Basin (Herrod 2010a). It has come to our attention that the Bighorn Basin Reasonable Foreseeable Development (RFD) may have understated the potential for new discoveries (i.e. low to no potential in the AFMA areas).

One of the understated areas is the Mowry Fractured Shale as defined by the US Geological Society (USGS 2008). Interest in the Mowry Fractured Shale play in the Bighorn Basin has increased due to the recent boom in production from the Bakken Shale in North Dakota and Montana. Success in the Bakken came from analysis of geologic data on a decades-old producing area, identification of untapped

[3] $2,051,875 is the average of Fischer's estimates.

resources, and application of the new drilling and completion technology (horizontal wells and fracture stimulation) necessary to exploit the resource (Energy Administration Office 2006).

2.2.1 Mowry Fractured Shale Play

The Mowry Fractured Shale shares many of the characteristics of the Bakken Shale and other successful fractured shale reservoirs in the United States. These characteristics include a significant thickness of source-rock quality shale (upwards of 700 feet in the Bighorn Basin), adequate maturation, the capacity to maintain open fractures, and susceptibility to fracture stimulation—see (Herrod 2010b, 2010c) for a thorough discussion of the Mowry Fractured Shale play in the Bighorn Basin. Only limited production has been reported from the Mowry Shale in the Bighorn Basin (primarily because it has never been specifically targeted) but it is known to produce from several fields in the Powder River Basin (Herrod 2010b).

Recent drilling has successfully targeted the Mowry Shale in the Bighorn Basin (Figure 3). In March 2008, a horizontal well (Ainsworth 13-35) was drilled in the Manderson field (a field with known Mowry Shale production). The well was completed in Ocht Louie sandstone at the base of the Mowry Shale. In the northwest corner of the basin, near the Absaroka Range Front, two wells (Crosby 25-2 and Crosby 25-3 in the Terry Field) were completed in the Mowry Shale in 2007. Cumulative production from Crosby 25-2 from June 2007 to November 2009 was 14,766 barrels (Bbls) oil and 291,841 thousand cubic feet (Mcf) gas. Cumulative production from Crosby 25-3 from May 2007 to November 2009 was 13,217 Bbls oil and 582,982 Mcf gas. These successful Mowry Shale completions will likely lead to additional development and drilling of Mowry Shale targets in the basin.

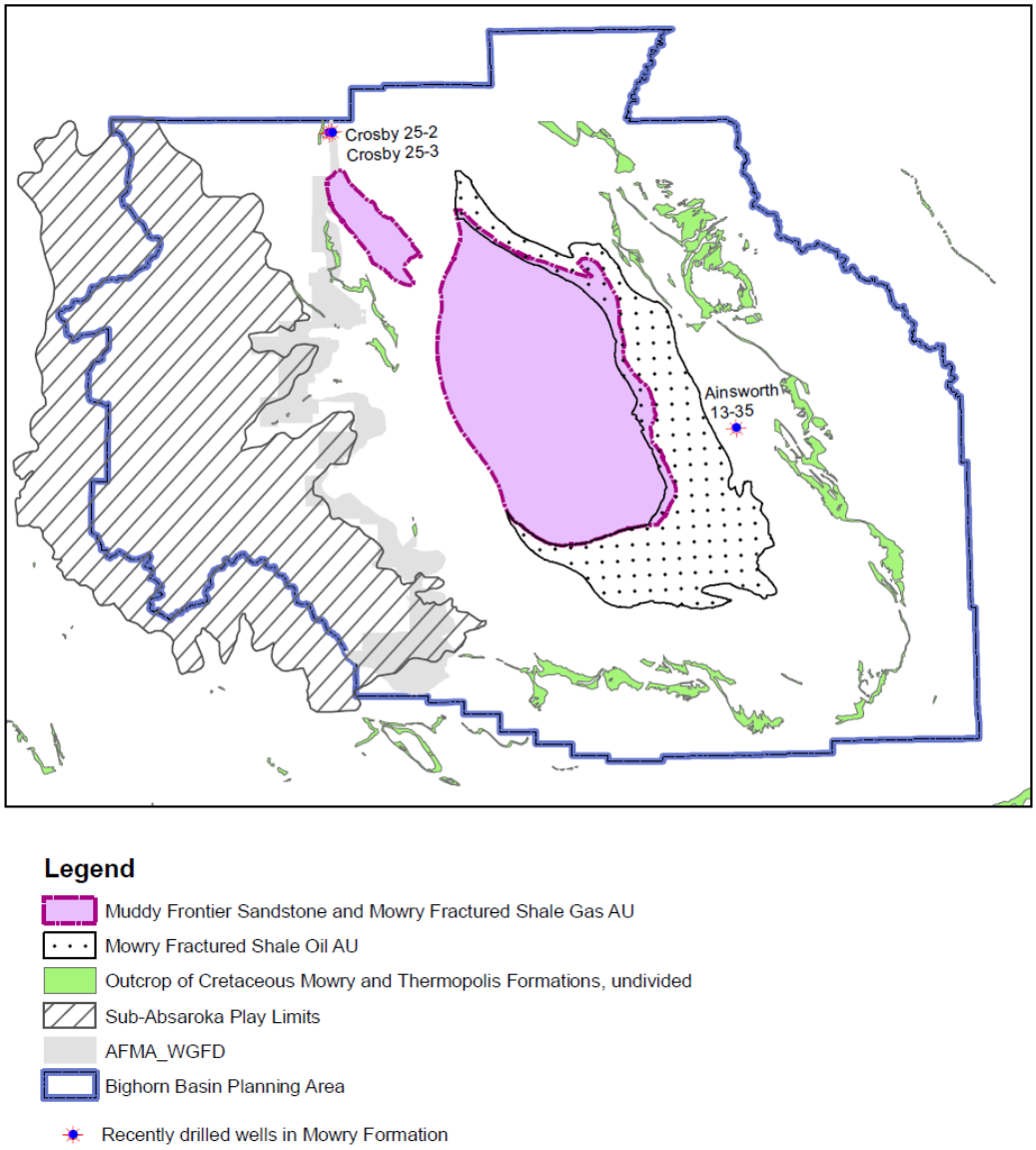

Figure 3 Sub-Absaroka Play

The USGS evaluated the Mowry Fractured Shale play in their recent assessment of undiscovered oil and gas resources of the Bighorn Basin (USGS 2008). The Mowry Fractured Shale was included in the Cretaceous-Tertiary Composite Total Petroleum System Muddy-Frontier Sandstone and Mowry Fractured Shale Continuous Gas assessment unit (AU) and was also evaluated separately as the Mowry Fractured Shale Oil AU. The extents of the two assessment units are shown in Figure 3. Estimated undiscovered continuous oil and gas reserves were five (5) million barrels of oil in the Mowry Fractured Shale AU and 248 billion cubic feet of gas in the Muddy-Frontier-Mowry AU. It is interesting to note that the Crosby 25-2, Crosby 25-3, and the Ainsworth 13-35 wells discussed above were drilled outside both AU boundaries, therefore indicating Mowry production throughout the basin cannot be overlooked.

2.2.2 Sub-Absaroka Play

The Sub-Absaroka play was evaluated by the USGS in their 1995 national assessment of oil and gas resources (Fox and Dolton 1995), but it was not included in their more recent 2008 assessment of undiscovered oil and gas potential for the Bighorn Basin. It was also not included in the 2009 draft BLM's Bighorn Basin RFD analysis. According to the 1995 USGS assessment, the Sub-Absaroka is a "demonstrated" oil play located along the western side of the basin (Figure 3) beneath Eocene-age volcanic rocks. That study stated that the potential for significant new field discoveries (greater than 1 million Bbls) was considered to be "good". Oil was predicted to be trapped in Laramide-age anticlines and domes, similar to producing structures successfully developed elsewhere in the basin. In the 2009 RFD, this area is considered to have low or no potential.

Exploration of the Sub-Absaroka play has been limited because of the difficulty of exploring beneath the volcanic rocks, especially the challenge of predicting the depth range of the drilling objectives due to the rugged topography of the Absaroka Mountains. However, industry has recognized structures beneath the volcanic rock and six small fields (Aspen Creek, Baird Peak, Dickie, Prospect Creek, Prospect Creek South and Skelton Dome) have been developed in this play. Production has been from the Permian Phosphoria and the Triassic Curtis (Crow Mountain) Formations.

With recent advances in exploration technology (for example 3-D seismic) and with access to public lands for exploration, it should be possible to look beneath the volcanic cover at the underlying structures and evaluate what could be significant hydrocarbon reserves (Fidelity 2010). Loss of leasing opportunities, closure to exploration, or NSO restrictions would effectively end future exploration of this possible significant shale gas and oil resource play.

2.3 WILDLIFE

Wildlife values are high across the AFMA. The research on the effects of energy extraction upon elk, mule deer, and greater sage-grouse (Sawyer et al. 2007a, Sawyer et al. 2007b, Holloran 2005) indicates that while adverse effects upon those species can be severe if not appropriately mitigated, the effects can generally be mitigated by a combination of measures designed to minimize and reclaim the "footprint" of physical disturbance (well pads and roads), reduce the risk of invasive weeds, and avoid human disturbance within critical use periods.

The alternative recommended by WGFD, Alternative D.1 in this analysis, withdraws leasing from much of the AFMA and allocates the remainder to a mix of NSO and CSU. While the alternative takes a "no risk" approach to protecting wildlife, the alternative goes beyond what the science (Sawyer et al. 2007a, 2007b; Holloran 2005) says is needed to protect wildlife from energy extraction activities.

The CA's Alternative: D.2 discussed here applies recommended mitigation measures and is consistent with WGFD seasonal ranges and seasonal recommended closure dates. This approach allows wildlife to be managed under a "low/no risk" approach while allowing substantially more energy extraction opportunities consistent with a broader community economic base.

Wildlife resources within the Greater Yellowstone Ecosystem (GYE) are considered "world class" in terms of the diversity of species, population density, and, within Yellowstone National Park, viewability (www.greateryellowstone.org/). The AFMA is an important part of the GYE in that it provides a unique mix of ungulate winter range, spring/fall grizzly bear seasonal range, and convergence between prairie species (e.g. greater sage-grouse) and Rocky Mountain front species (e.g. moose) (WGFD 2010). Because of the wide-ranging nature of many species using the AFMA (e.g. elk, grizzly bears), adverse impacts to wildlife occupying the AFMA have the potential to affect wildlife across a much wider area within the GYE.

Species to be assessed in this analysis include

- Elk
- Mule deer
- Bighorn sheep
- Moose
- Grizzly bears
- Greater sage-grouse

2.3.1 Past Direction

The 1986 Absaroka Front HMP, which was a partnership effort between WGFD, BLM, and the Shoshone National Forest, established direction for wildlife protection amidst various identified threats including continued timber harvest, energy development, and continued livestock grazing. Included was direction to

- Develop guidelines for oil/gas and forestry practice where human activities … affect habitat use by priority species.
- Institute road density criteria based on miles per section and cover value guidelines to limit proliferation of roads in elk habitats.
- (Close) elk and bighorn sheep crucial winter and spring ranges and appropriate buffer areas … Dec.1– May 1.
- Restrict access within elk and bighorn sheep parturition areas (May 1–June 30).
- Allow (the creation of) new energy (extraction) and logging roads during active period authorized under seasonal restrictions of the specific action.

Although the document was a very thorough assessment of the situation, some management emphases have changed. Timber harvest has shifted from a "commodities production" emphasis to more of a "restoration" emphasis. Nationally, increasing demand for energy has increased the emphasis on energy extraction. Wildlife populations have also changed. Increased grizzly bear populations in the GYE, accompanied by reduced mortality have resulted in federal de-listing of the GYE population in 2007 followed by re-listing in 2009, and increased grizzly bear occurrence in areas adjacent to the GYE. Increasing concerns over the viability of greater sage-grouse (GSG) have resulted in a U.S. Fish and Wildlife Service determination that the species is "warranted but precluded" from federal listing. The State has identified "core" and "non-core" GSG populations state-wide. A substantial amount of GSG research (Braun et al. 2002; Doherty et al. 2008; Holloran et al. 2004; Naugle et al. 2006; Walker et al. 2007) has identified measures for protecting the species within areas likely to receive energy leasing. Also, a substantial amount of research on energy related effects on mule deer (Sawyer et al. 2009, 2007b), pronghorn (Berger et al. 2006), and elk (Sawyer et al. 2007a) has become available since the 1986 HMP Plan.

2.3.2 Elk

Elk are highly valued by hunters as a game animal. Hunters spend substantial sums of money in pursuit of elk, and those expenditures also directly support outfitters, guides, resort owners, restaurants, and motels. Elk are also highly valued by the general public for the wildlife viewing opportunities. Although not as readily viewed as deer or antelope, elk can be viewed across the AFMA depending upon the season.

Elk are strongly dependent upon low-to-mid elevation winter ranges within which they avoid deep snows and find forage (Lyon 1979). Researchers have concluded that female elk and young bulls have a strong fidelity to a given home range, and generally return year after year to the same winter range (Marcum 1975). Elk trend and population data, therefore, are usually measured on an elk herd unit basis. Elk herd units are defined as the yearlong range that a given herd uses including the winter range to which those elk consistently return. There are three elk herd units in the AFMA including #214-Gooseberry Elk Herd Unit, #216-Cody Elk Herd Unit, and #217-Clarks Fork Elk Herd Unit. Elk populations for all three herd units have done well within the last decade and have exceed WGFD population objectives as summarized in the Table 11 (WGFD 2010). Figure 4 Elk herd population illustrates that response graphically.

Table 11 WGFD elk population data by herd unit

Elk Herd Unit	Mean population 1999-2008	WGFD population objective	Hunter success	Juveniles/100 cows
Gooseberry	4,320	2,700	49%	24
Cody	8,050	5,600	47%	22
Clarks Fork	5,331	3,000	42%	22

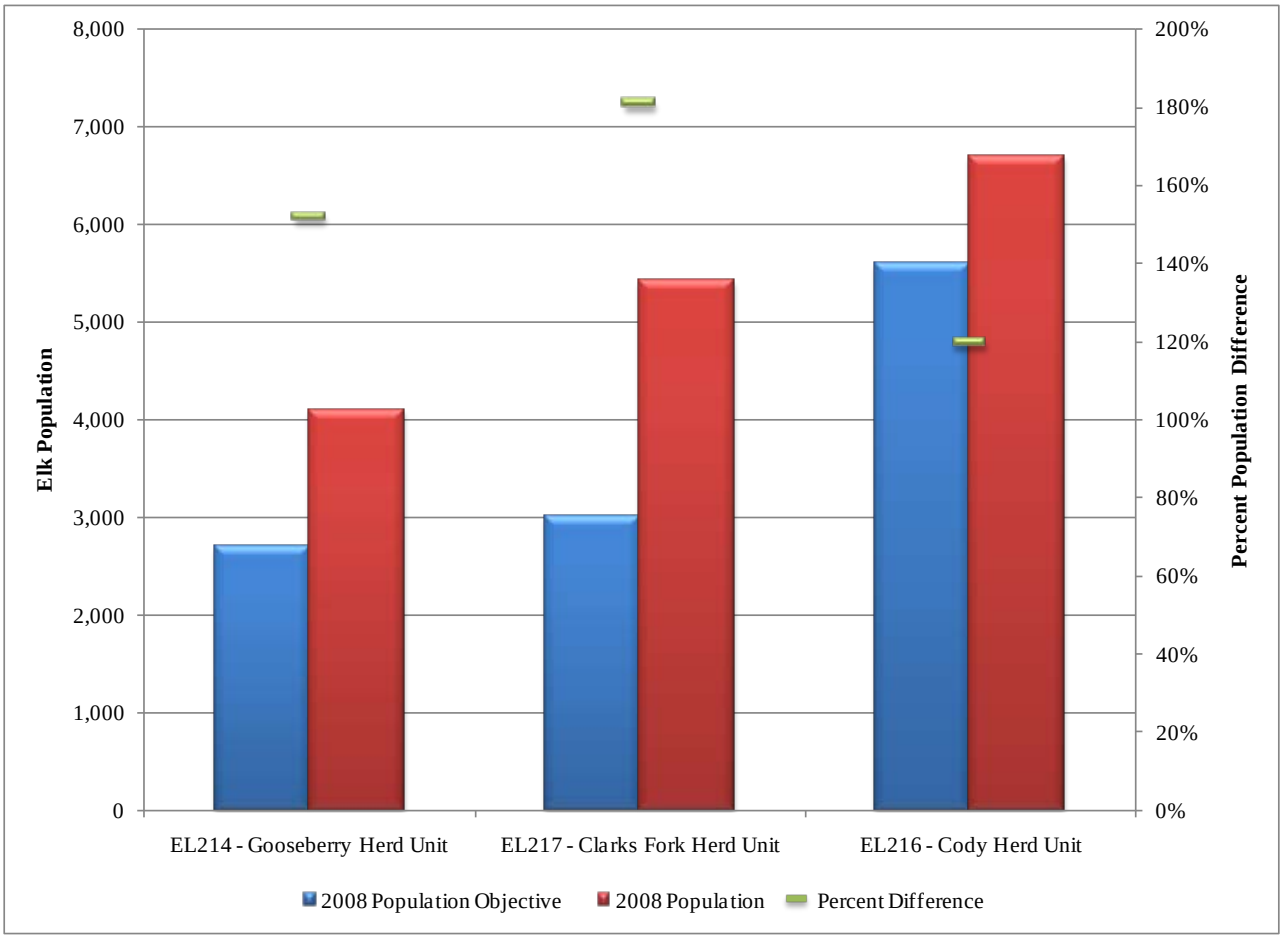

Figure 4 Elk herd population

Note that mean elk populations for the last decade have substantially exceeded WGFD population objectives. WGFD biologists (Altermatt pers. comm.) cautioned that good past performance does not necessarily mean that those herds are not without risk. Altermatt (pers. comm.) indicated that population trends over the last decade are down (even though populations still exceed objectives and the percentage of juveniles per 100 cows is substantially less than what biologists suggest is needed for stable populations (Coughenour et al. 1994)). Furthermore, increasing wolf populations suggest some potential for additional pressure on those elk populations.

A substantial portion of elk winter range is located within private ranches adjacent to the AFMA. The public often looks at high elk populations as "the more the better." Unfortunately, higher-than-desired elk populations, which have been the norm in the last decade, threaten the economic viability of those ranches. If those ranches become non-viable and are subdivided, there will be substantial adverse impacts to the wildlife that use those ranches.

Access to productive winter range is assumed to a major limiting factor for elk (Toweill and Thomas 2002). Acres of WGFD-designated by herd unit are disclosed in Table 12. The location of those winter ranges is disclosed in Figure 5.

Table 12 Distribution of Crucial Elk Winter Range within the AFMA

Elk Herd Unit	AFMA acres in the herd unit	Crucial winter range acres within the AFMA portion of the herd unit	Percent crucial winter within the AFMA portion of the herd unit
Gooseberry	175,877	106,128	60.3%
Cody	132,358	105,771	79.9%
Clark Fork	94,421	47,539	50.3%

Note from Table 12 that crucial winter range makes up a high percentage of all three herd units within the AFMA. Note too, from Figure 5 that most crucial winter range for all three herd units is within the AFMA.

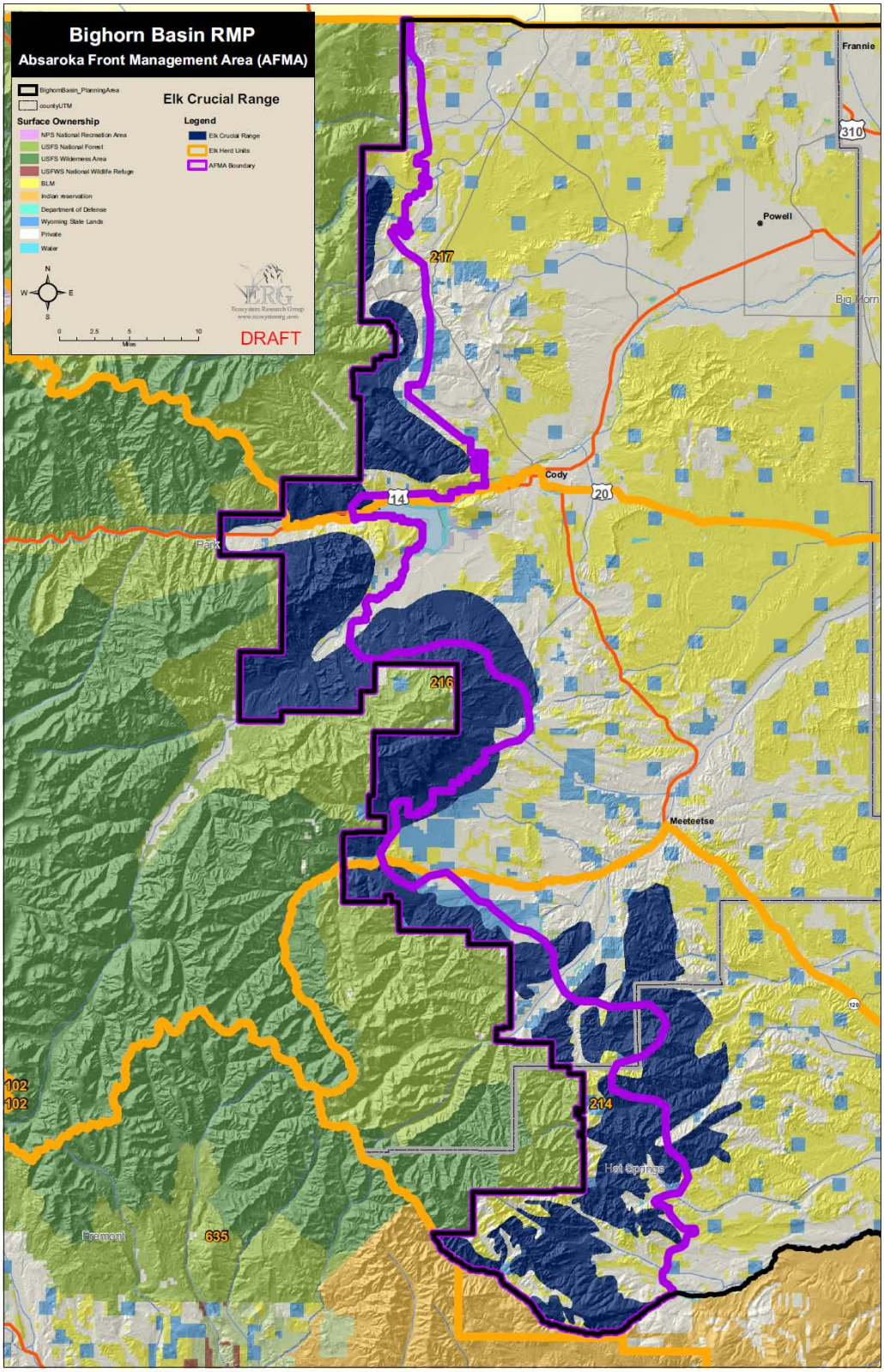

Figure 5 Elk crucial range

Threats to crucial elk winter range include

- Physical loss of productive, forage-producing lands due to access roads, drill pads, or other on-site structures.
- Physical loss of forage productivity due to invasive, exotic weeds introduced by the vectors created by roads and unwashed vehicles and/or from sites made more vulnerable to invasion by disturbance.
- Human disturbance during the winter use period that either displaces elk to less desirable portions of the winter range or forces elk to use that winter range under more stressful conditions or for shorter timeframes.

In the west, physical losses of winter range are most commonly associated with residential subdivisions where portions of entire winter ranges can become unusable to wintering elk (Toweill and Thomas 2002). Also, analyses of concentrated deep gas energy fields (ERG 2007) have demonstrated that the combined "footprint" of access roads, drilling pads, compressor stations, and pipelines can remove a substantial percentage of available wintering habitat. Effects are usually measured as the percentage of the landscape removed. Energy extraction activities are usually considered temporary and disturbed lands usually receive some reclamation. Reclamation efforts on droughty, eastside grassland/sagebrush cover types can be problematic and monitoring indicates that results are often less effective and timely than anticipated (USDI 2006). Impacts on lost winter range, therefore, usually include some temporal evaluation of how long energy extraction activities will last, and how effective reclamation of those disturbed lands will be.

Droughty, eastside grassland/sagebrush cover types are inherently vulnerable to invasion from exotic weeds including such species as cheatgrass or leafy spurge (USFS 2006). Physical disturbance from energy extraction activities can make those sites substantially more vulnerable to invasion from weeds.

Human-disturbance to wintering elk is inherently harmful for a number of reasons. When elk flee from human activities, they burn additional calories that cannot be readily replaced during the winter (Toweill and Thomas 2002). Repeated disturbances may displace elk onto less productive portions of the winter range. Repeated or continual disturbance ultimately reduces the percentage of animals surviving the winter "pinch period" and or further reduces the vigor of surviving animals that could be reflected in reduced calf production, reduced calf survival, or increased predation (Sauer and Boyce 1983).

Avoiding physical disturbance of winter ranges can take many forms. State wildlife agency-owned wildlife management personnel have often closed or obliterated roads and re-vegetated historically over-grazed or dry-land-farmed areas as a means of increasing carrying capacity. Wildlife agencies report that sites lost to past management activities from physical disturbance have often been restored with a subsequent increase in carrying capacity (DNRC, MDFWP 2001). Energy extraction activities have the same potential for site disturbance from pads, access roads, and compressor stations that other recreation or grazing activities do, albeit at a potentially greater scale. Energy extraction mitigation options generally include

1. Limiting physical disturbance to a given percentage of the landscape

2. Requiring that energy extraction be done either incrementally, when those limits are approached, or with improved technology (e.g. directional drilling) to limit the "footprint" of that activity

3. Requiring that reclamation of physically disturbed sites be done at a pace that equals new disturbance activity.

Avoiding weed invasions generally requires a number of aggressive actions to be successful. Those actions include

1. Rapid re-establishment of desired vegetation
2. Timely weed surveys
3. Aggressive weed control where needed
4. Periodic monitoring
5. Prompt re-treatment where warranted.

State Wildlife Management Agencies across the West have consistently managed winter ranges within wildlife management areas to minimize human disturbance upon wintering ungulates. Those restrictions can include road restrictions, area vehicle closures, or total seasonal closure to all recreational use. Wildlife agencies generally find that wintering elk thrive under those mitigation measures (DNRC, MDFWP 2001).

Wyoming has had situations where high density energy extraction has clearly adversely impacted wildlife populations (Lyon and Anderson 2003, Holloran 2005, Sawyer 2007a). The Pinedale Anticline field southwest of Pinedale has had documented declines in wintering mule deer, and probable declines in wintering pronghorns and nesting greater sage-grouse (ERG 2007). The density of wells, however, was very high and mitigation measures including limiting the footprint of disturbance, aggressively reclaiming disturbed sites, aggressively treating invasive weeds, and minimizing winter disturbance were inconsistently applied. Clearly, using the Pinedale Anticline as an example, it makes sense to consider the full range of mitigation options needed when making decisions about leasing public lands.

Based upon demonstrated success for avoiding adverse effects on wintering elk within crucial winter range, there are no major adverse energy extraction-related effects that can't be mitigated with a combination of CSU and, where sites are difficult or impossible to reclaim to pre-disturbance productivity, NSO. To be successful, however, the mitigations measures including seasons of allowable activity, allowable exceptions, maximum footprint of physical disturbance, and reclamation activity including invasive weed control need to be clearly identified in leasing stipulations.

The AFMA provides a highly scenic landscape in which hunters actively pursue elk during the hunting season. Note from the previous Table 11 WGFD elk population data by herd unit that hunting success is remarkably high in all three herd units. Quality hunter opportunities are not necessarily linked to hunter success. Christensen and Lyon (1993) described hunting opportunities as being "good" when hunting seasons were long, season restrictions were minimal, and hunters could pursue elk under a variety of situations including some very challenging situations, and periodically encounter elk throughout the

season. Hillis et al. (1991) defined security as nonlinear patches of hiding cover ≥250 acres in size >0.5 miles from an open road. They concluded that hunting opportunities would generally be good when the percentage of security was represented on ≥30% of the herd unit, including portions of the winter range in which elk might be present during the hunting season as a result of early fall snowfall. Edge and Marcum (1991) concluded that rugged topography was more likely to provide security than flatter ground, presumably because hunters were less willing to traverse difficult ground.

The Absaroka Front currently provides excellent elk hunting opportunities and contributes to the economic health of adjacent communities.

Elk hunting opportunities declined across the west during the 1960s and 1970s as a result of increased road access and increased hunters. Improved access and increase in hunters resulted in increased elk harvest rates to the extent that in some areas (e.g. northeastern Oregon) all legal bulls were harvested in the first day of the hunting season so that the experiences of hunters who remained in the field for the remaining of the season were seriously compromised (e.g. no legal animals remained that could be observed) (Christensen et al. 1993). In general, Wyoming hasn't suffered the extreme loss of hunting opportunities that other states like Oregon or Colorado have, although WGFD biologists have generally recommended retaining adequate security across landscapes, and advocated hunting season road closures (Hurley pers. comm.).

Energy extraction activities can compromise hunting season security by adding roads that can reduce security, or by creating a high level of noise and human disturbance during the hunting season that makes existing security areas unusable to elk. Mitigation needed includes

- Requiring new roads to be removed from the landscape following energy extraction activities
- Precluding energy extraction activity during the hunting season.

Generally leasing with CSU would fully mitigate impacts on security. If, however, security areas overlap with crucial winter range, the combined seasonal restrictions (e.g. fall through late spring) might not leave a sufficiently reasonable operating season for energy extraction. In that situation, special security areas, not to exceed 30% of the AFMA (Hillis et al. 1991), should be designated NSO.

2.3.3 Mule Deer

Mule deer are often assumed to be comparable to elk in terms of habitat selection, threats and mitigation needs (Shoshone National Forest Plan). Although mule deer are abundant across the AFMA, unlike elk, their populations have not increased to the degree that elk have, and they are currently in decline (Altermatt pers. comm.).

Threats to mule deer from energy extraction are similar to elk and include

- Loss of productive habitat due to physical disturbance from well pads, roads, and other infrastructure
- Loss of productive habitat due to invasive weeds exacerbated by drilling-related disturbance
- Human disturbance from winter drilling activity that displaces deer from desired foraging areas.

Analyses of concentrated deep gas energy fields (ERG 2007) have demonstrated that the combined "footprint" of access roads, drilling pads, compressor stations, and pipelines can remove a substantial percentage of available wintering habitat. Like elk, effects on deer are usually measured as the percentage of the landscape removed. Energy extraction activities are usually considered temporary, and disturbed lands usually receive some reclamation. Like within elk ranges, reclamation efforts on droughty, eastside grassland/sagebrush cover types can be problematic.

Droughty, eastside grassland/sagebrush cover types are inherently vulnerable to invasion from exotic weeds including such species as cheatgrass or leafy spurge. Physical disturbance from energy extraction activities can make those sites substantially more vulnerable to invasion from weeds.

Human disturbance on mule deer from energy extraction was specifically studied in the Pinedale Anticline field (Sawyer et al. 2007b, 2009). They found that when winter drilling activity was extensive across the winter range, deer were confined to a much smaller portion of the winter range and access to available foraging was reduced. When that disturbance corresponded with extended, severe winter weather conditions, deer mortality was high and comparably higher than other wintering deer herds that were not exposed to human disturbance. Sawyer et al.'s findings corroborate the importance of imposing seasonal restrictions on ungulate winter ranges.

Based upon demonstrated success for avoiding adverse affects on wintering elk within crucial winter range, there are no major adverse effects that cannot be mitigated with a combination of CSU or, where sites are difficult or impossible to reclaim to pre-disturbance productivity, NSO. To be successful, however, the mitigation measures including seasons of allowable activity, maximum footprint of physical disturbance, and reclamation activity including invasive weed control need to be clearly identified in leasing stipulations.

2.3.4 Bighorn Sheep

Bighorn sheep are a highly sought after trophy game animal, and are highly viewable, providing a valuable recreational experience for tourists. The western states bighorn sheep hunting permit auctions (one permit auctioned per state) managed by the Foundation for North American Wild Sheep generally brings in high bids of several hundred thousand dollars per permit, demonstrating a high demand for bighorn sheep.

Bighorn sheep are productive animals and tend to perform well, until periodic outbreaks of domestic sheep diseases (pinkeye, pasturella, etc) become epidemic. Sheep herds can crash precipitously when those epidemics occur, although they usually rebound rather rapidly (Enk et. al. 2001). Managers

generally preclude domestic sheep or goat grazing near bighorn populations to minimize epidemics. Bighorn sheep range, characterized by open grasslands on steep or rocky terrain, is present on only about 10% of the AFMA (Figure 5).

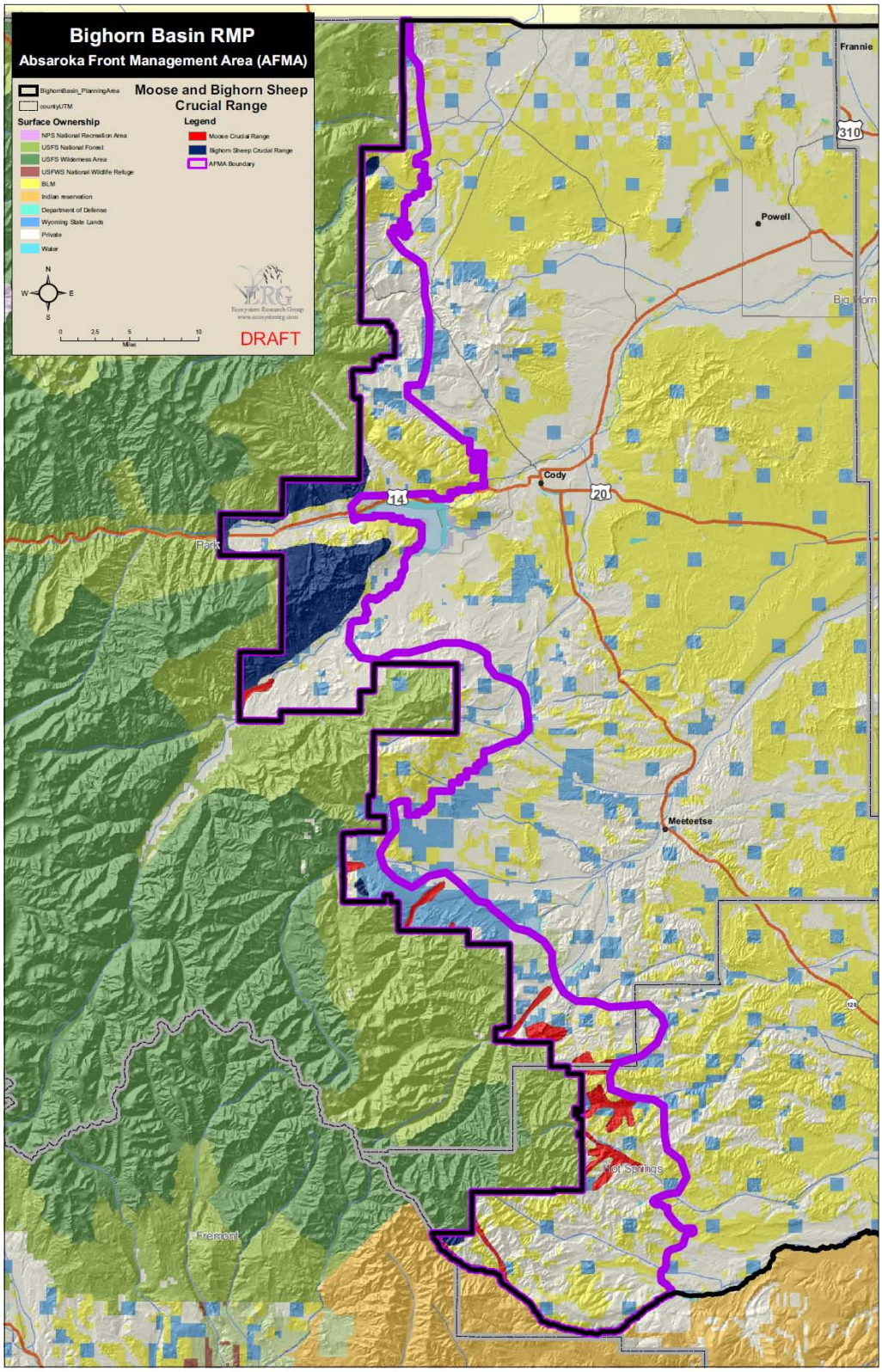

Figure 6 Moose and bighorn sheep crucial range

The majority of sheep habitat is within the Sheep Mountain area. Because this is within an ACEC, there will be no leasing. Other sheep habitat occurs within small, isolated pockets of steep, rocky ground, most of which are not economically suitable for pad or access road locations (e.g. lessees will generally choose to avoid such areas without any stipulation precluding site occupancy). Thus, physical disturbance of sheep habitat is not considered a major threat.

Bighorn sheep do not exhibit the same sensitivity to human disturbance that elk do (Papouchis et al. 2001). Bighorn sheep will routinely occupy habitat along freeways and other areas of high disturbance. Because of areas of de facto NSO (see previous paragraph) that comprise sheep habitat, it is unlikely that disturbance from energy extraction would have measurable effects upon sheep populations; therefore, no mitigation measures are necessary.

2.3.5 Moose

Like elk, moose move to low elevation winter ranges during the winter. Unlike elk, moose are more tied to mesic vegetation and are thus concentrated within a much smaller portion of the AFMA landscape than elk (WGFD 2010). Crucial moose range total 19,784 acres (4.9% of the AFMA). The location of that crucial range is disclosed in Figure 6.

Because of the more restricted range of moose, research upon the impacts of energy extraction has not focused on moose to the same degree as it has on mule deer, elk, pronghorn or greater sage-grouse. For analysis purposes, we have assumed that threats to moose are the same as for elk (e.g. loss of site productivity from physical disturbance, loss of site productivity from invasive weeds exacerbated by physical disturbance and human disturbance). When faced with human disturbance, moose, unlike elk, often do not seem to react by fleeing. As Cassier et al. (1992) found with heartbeat-monitored elk in Yellowstone National Park, however, stress from exposure to humans can occur even without the animals taking flight.

Mitigation measures needed to protect wintering moose are assumed to be the same as for elk (e.g. minimizing the "footprint" of physical disturbance, aggressively controlling invasive weeds, and restricting activity during critical use periods).

2.3.6 Grizzly Bears

Recovering grizzly bears within the GYE has been challenging and has included avoiding exposing bears to human foods to avoid habituation, minimizing livestock depredation, maintaining a mix of bear foods recognizing the downward decline of whitebark pine, and minimizing encounters with people (Gunther et al. 2004). Nonetheless, most researchers (Schwartz et al. 2006) conclude that grizzly bears have exceeded recovery goals and are relatively stable or increasing. One outcome of recovery is that bears increasingly inhabit the margins of prairie habitats along the periphera of the GYE. This pattern of use

increases the risk of livestock depredation and exposure to grizzly bears to people and human foods (Gunther et al. 2004).

Grizzly bears were de-listed in 2007 and re-listed after a legal challenge in 2009. WGFD has designated the southern end of the AFMA as seasonal grizzly bear range (Figure 7); note the extent of this area into the prairie.

Increased exposure of bears to human foods and resulting habituation, and increasing potential for confrontations with people are often cited as threats to grizzly bears (Gunther et al. 2004; Schwartz et al. 2006). Roads and associated human use of those roads are considered a threat to bears across the range (Mace and Manley 1993).

Disturbance associated with roads probably outweighs all other threats. CSUs have the potential to fully mitigate impacts upon grizzly bears; however, determinations regarding the level of energy extraction activity allowed, number of roads to be temporarily constructed, and season of use allowed for drilling need to be carefully crafted to fit the needs of locally-studied bear populations. In areas with an absence of reliable data, NSOs may be warranted.

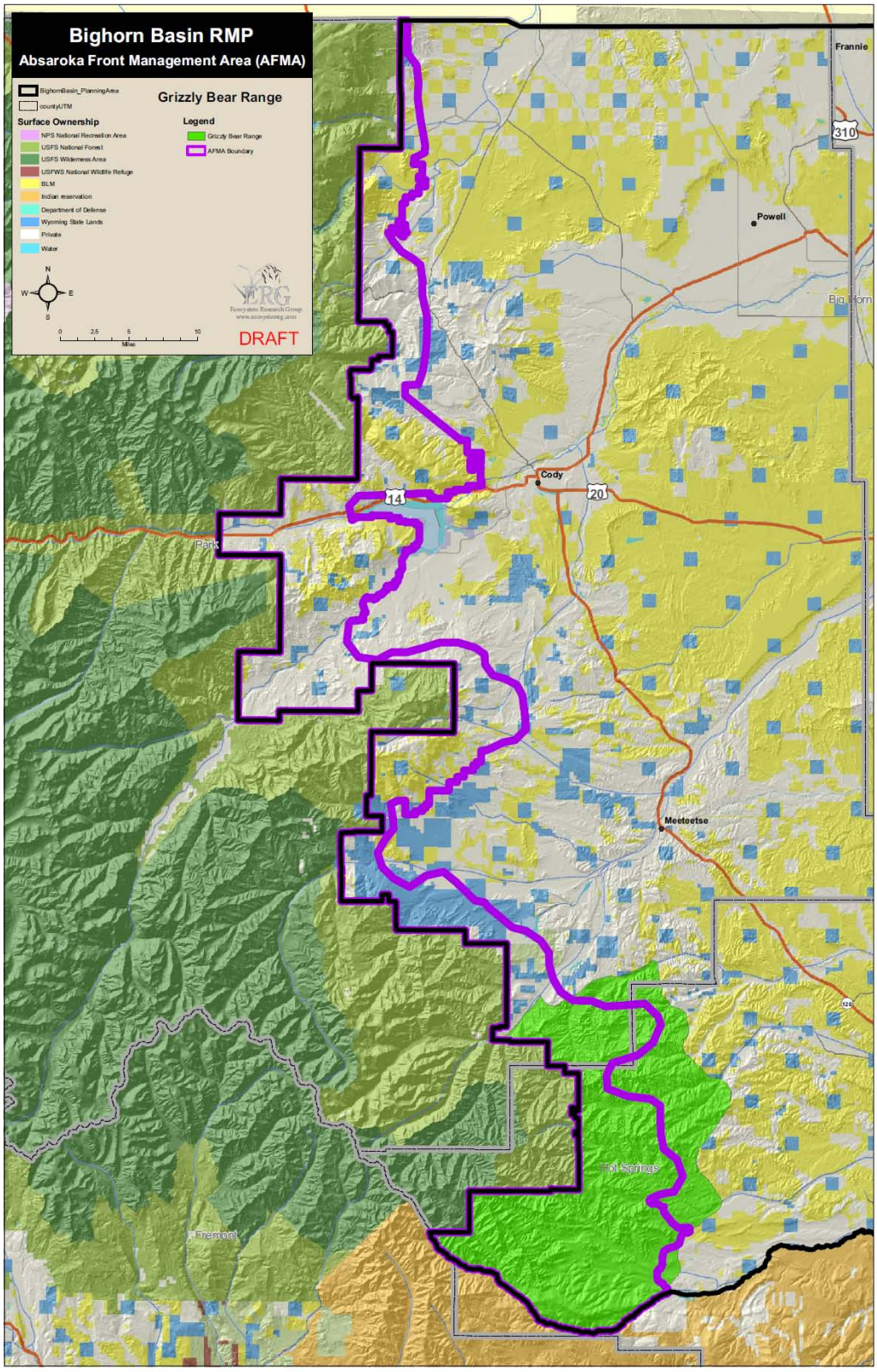

Figure 7 Grizzly Bear Range

2.3.7 Greater Sage-grouse

Greater sage-grouse are a popular game bird across the west. Although still abundant, they have suffered major population declines in the last several decades (Braun 1998). They are basically a prairie sagebrush/grassland species and overlap with the AFMA only along the toeslope.

The USFWS has recently designated greater sage-grouse as "warranted but precluded" from federal listing. Although the relative performance of greater sage-grouse varies substantially across Wyoming (and across the west), populations east of the AFMA have been relatively stable (Bighorn Basin Sage-grouse Local Working Group 2007). The effects of energy extraction on greater sage-grouse have been extensively studied (Lyon and Anderson 2003; Holloran 2005).

Within greater sage-grouse habitat, Wyoming has designated core habitat as areas having the greatest potential to sustain viable populations. Along the toeslope of the AFMA, there is both core and non-core greater sage-grouse habitat (Figure 8). The acreage in both categories is fairly minimal.

Active leks are inventoried and monitored statewide on BLM ground, and to varying degrees on other ownerships. Active lek locations within or adjacent to the AFMA are disclosed in Figure 8.

Current direction for greater sage-grouse within core habitat (USDI 2009) is to limit leases to NSO within 0.6 miles of active leks and to impose seasonal restrictions to avoid disturbance during the nesting seasons from 0.6 miles to 2.0 miles from leks. In non-core habitat, the NSO restriction is 0.25 miles from leks and seasonal timing constraints are applied within 2.0 miles of the lek.

Adult grouse have a strong fidelity to traditional lek locations (Lyon 2000; Holloran 2005; Holloran pers. comm.). Therefore, physical disturbance on or near leks carries a substantial risk of impacting local populations. Nesting females are disproportionately clustered near lek sites. Disturbance within 2.0 miles of leks during the nesting season can lead to nest failure (Holloran 2005).

The BLM direction for lek protection (NSO within 0.6 miles of leks, timing constraints from 0.6 to 2.0 miles) is a reasonably conservative strategy for protecting greater sage-grouse considering the relative stability of the local populations. One complication in the AFMA is that leks within core greater sage-grouse habitat overlap with crucial elk winter range. Thus, the combination of winter–spring timber restrictions to protect elk, and spring–early summer timing restrictions to protect greater sage-grouse leave little operation period for leases. Thus, the entire 2.0 mile zone from leks should be designated NSO within the AFMA.

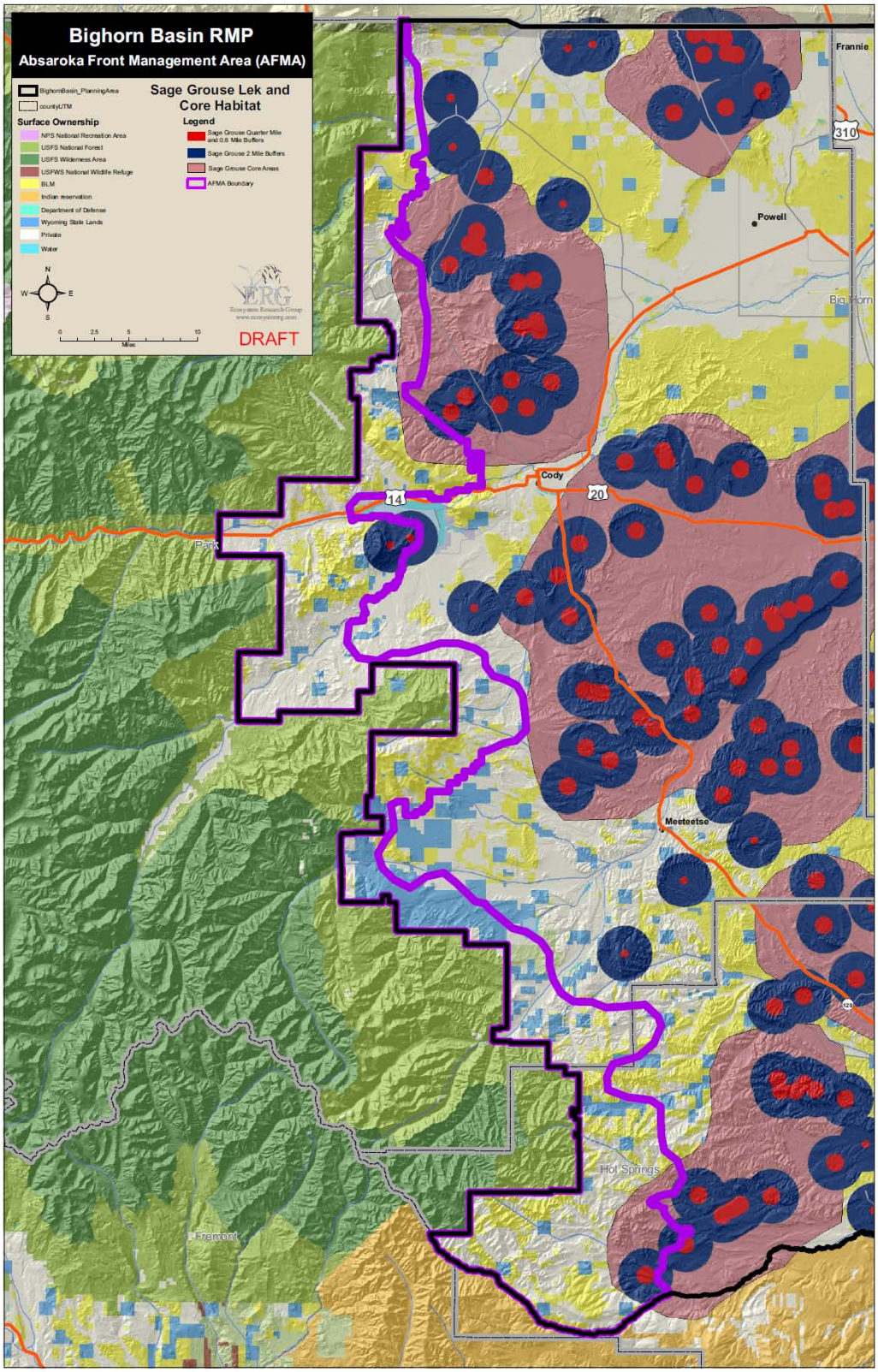

Figure 8 Sage Grouse Lek and Core Habitat

2.3.8 Alternatives

Alternative D.1 (Figure 9), the alternative recommended by WGFD and BLM, provides full protection to wildlife with virtually no risk to those wildlife populations. The restrictions, however, seem excessive to what is actually needed to protect wildlife based on the literature as previously discussed. Elk populations, and more recently grizzly bear and wolf populations, have thrived in the area with existing levels of protection. While it could be argued that energy extraction could be of an intensity to rival the Jonah or Pinedale Anticline fields, it is more likely that well head density would approximate the existing patterns across the Bighorn Basin which generally hasn't resulted in major declines in wildlife populations.

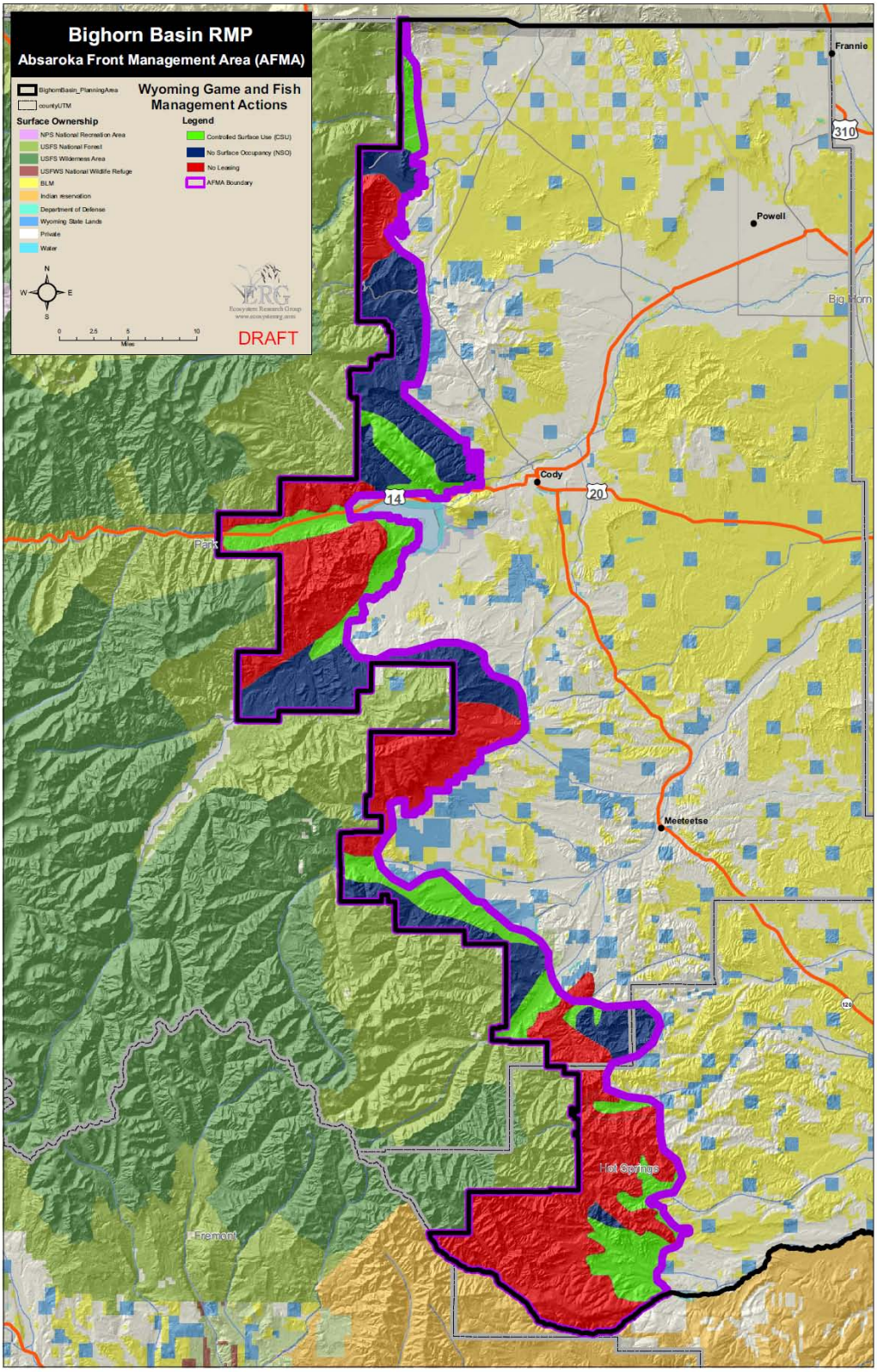

Figure 9 Alternative D.1

Alternative D.2 (Figure 10) takes the mitigation measures recommended in various publications and applies them where they overlap with key wildlife habitats. D.2 assumes wildlife populations are at some risk from energy extraction activities, but that the published mitigation measures will be sufficient to avoid any significant adverse effects. D.2 largely ignores the current level of over-performance that elk populations are exhibiting.

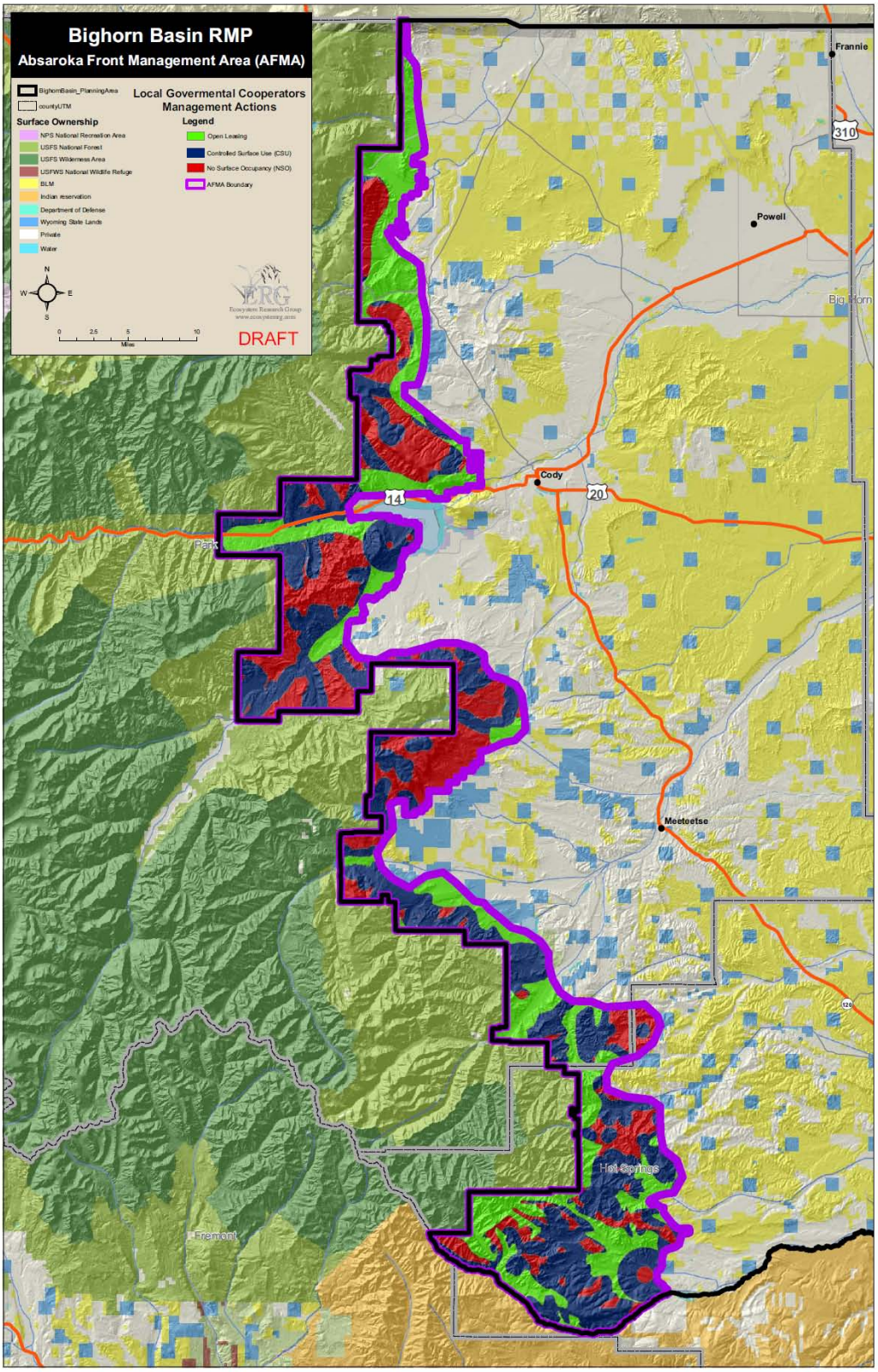

Figure 10 Alternative D.2

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APPENDIX A

INDUSTRY RESPONSE LETTERS

FIDELITY
Exploration & Production Company

March 4, 2010

United States Department of Interior
Bureau of Land Management
Caleb Hiner, Bighorn Basin RMP Project Leader
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Ecosystem Research Group
Gregory Kennett
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Commissioner Jill Shockley
Park County Courthouse
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Ladies and Gentlemen,

Fidelity Exploration & Production Company (Fidelity), as an interested and affected stakeholder in the current Bighorn Basin Resource Management Plan Revision respectfully submits additional comments on the BLM draft "Reasonable Foreseeable Development Scenario for Oil and Gas Bighorn Basin Planning Area, Wyoming" dated May 6, 2009. There are two complimenting components on which these comments are based. First, not only have those in industry prepared numerous assessments of the future potential of many different 'geologic plays' in the Bighorn Basin of Wyoming, but the USGS independently has also made their own assessment of future potential in the Bighorn Basin of Wyoming and Montana (USGS, 2008, Assessment of Undiscovered Oil and Gas Resources of the Bighorn Basin Province, Wyoming and Montana, 2008, USGS Factsheet 2008-3050, and *http//energy.cr.usgs.gov/oilgas/nogal*). Second, the activities undertaken by Fidelity in the Bighorn Basin over the past year have been focused on many of the same plays which have been recognized by workers of the USGS. While Fidelity does not portend to be the largest oil and gas player in the Bighorn Basin, our company has active exploration and development activity in the Basin and also plans to expand its' presence in this Basin in the future. As has been the case over the past five years, Fidelity will continue to work with the BLM moving forward to develop resources in an orderly and prudent fashion, while at the same time exercising care in terms of addressing environmental concerns.

Though Fidelity had moderate involvement in Garland field for many years, the company effectively entered the Bighorn Basin in March, 2006. As of March, 2006, the Bighorn Basin has become a core area for the company as demonstrated by the activity displayed by Fidelity over the past four years.

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Fidelity Drilling and Recompletion Activity:

- Fidelity currently operates 100 active wells in the Bighorn Basin.
- Approximately 30 new wells have been drilled by Fidelity in the Bighorn Basin since March, 2006.
- The downturn and uncertainty in commodity prices during 2009 prevented Fidelity from drilling new wells in the Bighorn Basin. However, recompletion work continued during 2009. Over 40 wells have been recompleted since March, 2006.
- Ten new locations are being staked for drilling in 2010.

Leasing activity:

- Fidelity had a long standing presence in Garland Field in the north central portion of the Bighorn Basin.
- Fidelity expanded its position in the Bighorn Basin in March, 2006, with the acquisition of
  13, 791 gross acres in and around the Silver Tip Field area, and made a commitment to expand in the Bighorn Basin.
- Since the Silver Tip acquisition, Fidelity has identified 10 prospect and geologic lead areas in the Bighorn Basin, and has acquired 70,483 gross acres under these projects during the last four years.

Seismic Activity:

- A 28 mi^2, 3-D proprietary survey was conducted over the Clark's Fork area during 2008. The survey resulted in a number of drillable prospects in the area.
- Fidelity has acquired and interpreted over 830 miles of existing 2-D seismic data over prospective areas in the Bighorn Basin.

GEOLOGIC DISCUSSION – OIL AND GAS POTENTIAL OF THE BIGHORN BASIN

As an introduction, it should be noted that much of the below discussion has been addressed by the BLM in the ***Reasonable Foreseeable Development Scenario For Oil and Gas Bighorn Basin Planning Area, Wyoming***, as documented in the Draft of May 6, 2009.

Role of the USGS

The work done by the USGS resulted in the publication titled "*Assessment of Undiscovered Oil and Gas Resources of the Bighorn Basin Province, Wyoming and Montana, 2008*". The results of this work were incorporated in to the assessment and planning done by the BLM for the Bighorn Basin. This summary of potential resources in the Bighorn Basin is part of the ongoing work by the USGS which is 'a work in progress'. As new data are incorporated in the USGS database and evaluated, forecasts/projections made by the USGS are revised. The BLM acknowledged this fact in the May 6, 2009 Draft.

Historically, if the body of work prepared by the USGS over the last 30 years is evaluated in places like the Green River Basin, Powder River Basin, Williston Basin, Piceance Basin, Uinta Basin, San Jaun basin, etc, the USGS has increased their reserve predictions multi fold for these basins as new geologic concepts, drilling techniques and completion technologies expanded the potential for industry to economically extract hydrocarbons from the rock column. It is also interesting to note that in many of the current oil and gas plays being developed today in the

Rocky Mountain Basins, it was the USGS which first brought attention to the potential that existed in things like shale plays (resource potential), coal plays, deep structural plays, etc. Over the past thirty years, industry has pursued many of these concepts and today has found a way to make them into an economic reality.

In 2008, the USGS estimated a mean of 989 BCF, 72 Million barrels of oil, and 14 million barrels of natural gas liquids are yet to be discovered in the Bighorn basin (please see attached Table 4 from the Draft of May 6, 2009). These numbers were the average submitted by the USGS at that point in time. Historically, Fidelity knows this estimate is low and will indeed be adjusted upward through time as we learn more about the Bighorn Basin and its potential.

History of the Bighorn Basin

From the perspective of industry, the Bighorn Basin is a 'lightly drilled' basin when compared to other basins in the Rocky Mountains. Comparison to the Green River Basin (29,300 wells drilled), Powder River Basin (71,800 wells drilled), Williston Basin (34,600 wells drilled), Piceance Basin (19,800 wells drilled), San Jaun Basin (45,300 wells drilled), D.J. Basin (70,500 wells drilled), and many portions of the Uinta Basin (16,800 wells drilled) demonstrates that the Bighorn Basin (13,000 wells drilled) simply does not have the number of well penetrations employed in other Rocky Mountain Basins. Fidelity believes it is one of the least mature basins being developed in the Rocky Mountains at the present time.

Part of the historic lack of drilling in the Bighorn Basin lies in the fact that all early drilling was located on structural features (anticlines) that were easily mapped either by surface geology or by seismic. The large federal lease blocks (Federal Units) drilled during the 1950's through the 1980's established production on large structures, but at the same time, adjacent undrilled leasehold was held in HBP status by this production. It was not until the downturn at the end of the 1980's that large areas of leasehold offsetting structures saw their leasehold terms finally expire, and once again these leases finally became available for leasing by independent operators in the basin. Not only has the Bighorn Basin been lightly drilled, but only recently has the opportunity existed for new concepts and plays to be explored because leases have once again been available for leasing.

Few Stratigraphic Plays have been Made to Date in the Bighorn Basin

Almost every basin in the Rocky Mountains was initially tested and developed based on identification of structural traps identified by geologists. Only when sufficient control from structural tests existed did geologists venture off of the existing structures and start exploring 'stratigraphic pinchouts' or 'stratigraphic traps' between the structures as defined by the existing well control. While some stratigraphic concepts have been tested on top of structures in the Bighorn Basin, very few stratigraphic concepts have been tested between structures at this point in time. Indeed, the only stratigraphic accumulation of significance in the Bighorn Basin for many years was Cottonwood Creek in the southeastern portion of the Basin.

Bighorn Basin Offers Significant Upside

In evaluating the reasonable foreseeable development of the Bighorn Basin, we need to remember that:

- Compared to other Rocky Mountain Basins, the Bighorn Basin has only been lightly drilled

- At the present time, only structures have been drilled. Existing stratigraphic plays have been found 'by accident' in association with structures that were drilled.
- The Bighorn Basin has great potential for development. All components are available to include source rocks, reservoir rocks, and traps.

The question which Fidelity, industry and the BLM can all ask is, "Where will the next five (or ten, or twenty) oil and gas accumulations be found?" While we cannot say for certain where the accumulations will be found, we all know they are found with the drill bit. This is why it is important for the BLM not to limit oil and gas exploration access by increasing No Surface Occupancy, areas of Critical Environmental Concern or other surface use limitations in the Bighorn Basin through the Management Plan Revision process. Fidelity respectfully reminds BLM that the National Environmental Policy Act process will take into consideration resource concerns when site-specific actions are proposed.

As acknowledged in the BLM Draft of May 6, 2009, thirty years ago when assessments were initially started for different geologic basins there were no stratopach bits or mud motors. Horizontal drilling was reserved for putting an electrical light switch on the wall in your house. Coal and shale production were only suggested by geologists who 'did not know how to make money'. Completion technology (early on) used walnut hulls as a propant, as opposed to a whole array of chemicals and high strength propants for fracture stimulation which today are specifically tailored for use on specific reservoirs.

From a geologic standpoint, thirty years ago we did not have the well control with associated electrical logs and drilling shows which now allow us to look at the potential differently. And of course, we look at these geologic concepts with an array of new drilling and completion technologies which can make these new plays work economically.

Primary Fidelity and Industry Concern

The primary concern from both Fidelity and industry is whether or not we will be able to actually take what we have learned and apply it to the Bighorn Basin. Fidelity believes that the current controlled surface use stipulations are protective of resource values while allowing a prudent method to conduct future exploration to meet the domestic energy demands. We cannot predict exactly where the new accumulations of Oil and Gas will be, but we know we need public lands access to test our exploration concepts with seismic and drilling operations.

Additional Observations Noted by Fidelity

Absaroka Volcanics

It was noted by Fidelity that the Absaroka Volcanic area bounding the west side of the Bighorn Basin was 'beyond the scope of this particular study'. At this point in time, much of this area is not committed to Wilderness Areas or Wilderness Study Areas. Five in-house references are attached to this letter, and one by *Brittenham, MD and Tadewald BH, 1985,* is referenced at this point. Industry has known for decades that there are structures located beneath the volcanic blanket which covers the area. Now with 3-D seismic we also know we should be able to look beneath the volcanic cover at the underlying structures which may offer significant hydrocarbon reserves.

Stratigraphic Traps will be Found

A statement was made on page 28 of the Draft Proposal of May 6, 2009, which reads "Subsurface stratigraphic mapping has been little used in the Planning Area because most fields in the Bighorn Basin are structurally trapped. Stratigraphic variations rarely contribute to trap limits within the basin. The major exception to this generality is the Cottonwood Creek Field, where the Phosphoria Formation trap is controlled by stratigraphy and has the largest areal extent of all fields within the Bighorn Basin." Much of industry now believes that regional stratigraphic traps in Paleozoic rocks are not uncommon in Rocky Mountain basins, and where found, they tend to be both large and prolific. In addition, the recent work done by Fidelity specifically in the Bighorn Basin strongly suggests that stratigraphic traps in Tertiary and Cretaceous rocks may be more prolific than previously thought.

Resource Plays, including both Coals and Shales

Figures 34, 35, 39 and 46 were prepared by the U.S. Geological Survey, 2009, and were incorporated in to the Draft Proposal of May 6, 2009, by the Reservoir Management Group. These four figures (attached) represent the following.

- Figure 34 – Cretaceous-Tertiary Composite total petroleum system, Muddy-Frontier Sandstone and Mowry Fractured Shale continuous gas assessment unit
- Figure 35 – Cretaceous-Tertiary Composite total petroleum system, Mowry Fractured Shale continuous oil assessment unit
- Figure 39 – Cretaceous-Tertiary total petroleum system, Fort Union Formation continuous coalbed gas assessment
- Figure 46 – Coalbed natural gas development potential within the Bighorn Basin Planning Area 2008 through 2027

Fidelity views these projections with much interest. Both coals and shales have received increasing attention for the past 15 years. Even when coals are not the specific target of the drill bit, it is known that gas from coals migrates through the petroleum system and typically charges reservoirs in adjacent formations. Shales are the "new frontier" of the industry at the present time. While industry realizes the gas is present in different shale units nationwide, the exciting component is currently the resources which industry is now focusing on shales in order to make these plays economically viable.

Fidelity appreciates the efforts of the Wyoming State Office Reservoir Management Group in preparing the *Reasonable Foreseeable Development Scenario for Oil and Gas Bighorn Basin Planning Area, Wyoming* draft of May 6, 2009. No report is ever perfect, but both the broad scope of the investigation and the objectivity demonstrated by the Reservoir Management Group are appreciated. The goal of Fidelity going forward is to work with the BLM to both protect and respect the environment, and at the same time work toward supplying the energy needs of our nation.

Respectfully submitted:

Dave Koval
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Fidelity Exploration & Production Company
Wyoming Professional Geologist
PG-854

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Figure 34.
Location of the Bighorn Basin Province, Cretaceous-Tertiary Composite total petroleum system, Muddy-Frontier Sandstone and Mowry Fractured Shale continuous gas assessment unit with respect to Bighorn Basin Planning Area boundary (U.S. Geological Survey, 2009).

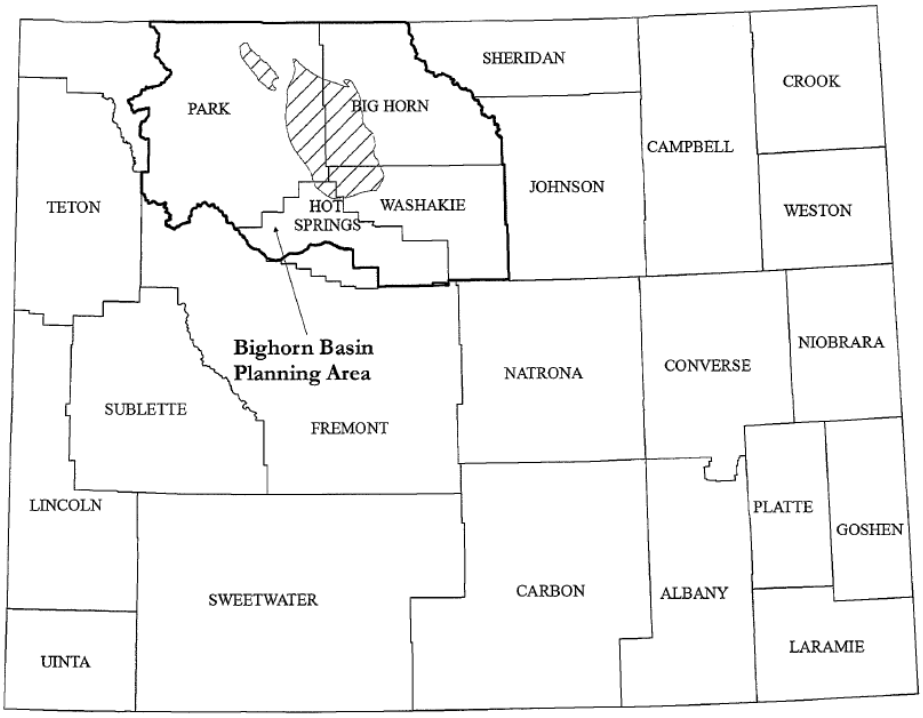


Figure 35.
Location of the Bighorn Basin Province, Cretaceous-Tertiary Composite total petroleum system, Mowry Fractured Shale continuous oil assessment unit with respect to Bighorn Basin Planning Area boundary (U.S. Geological Survey, 2009).

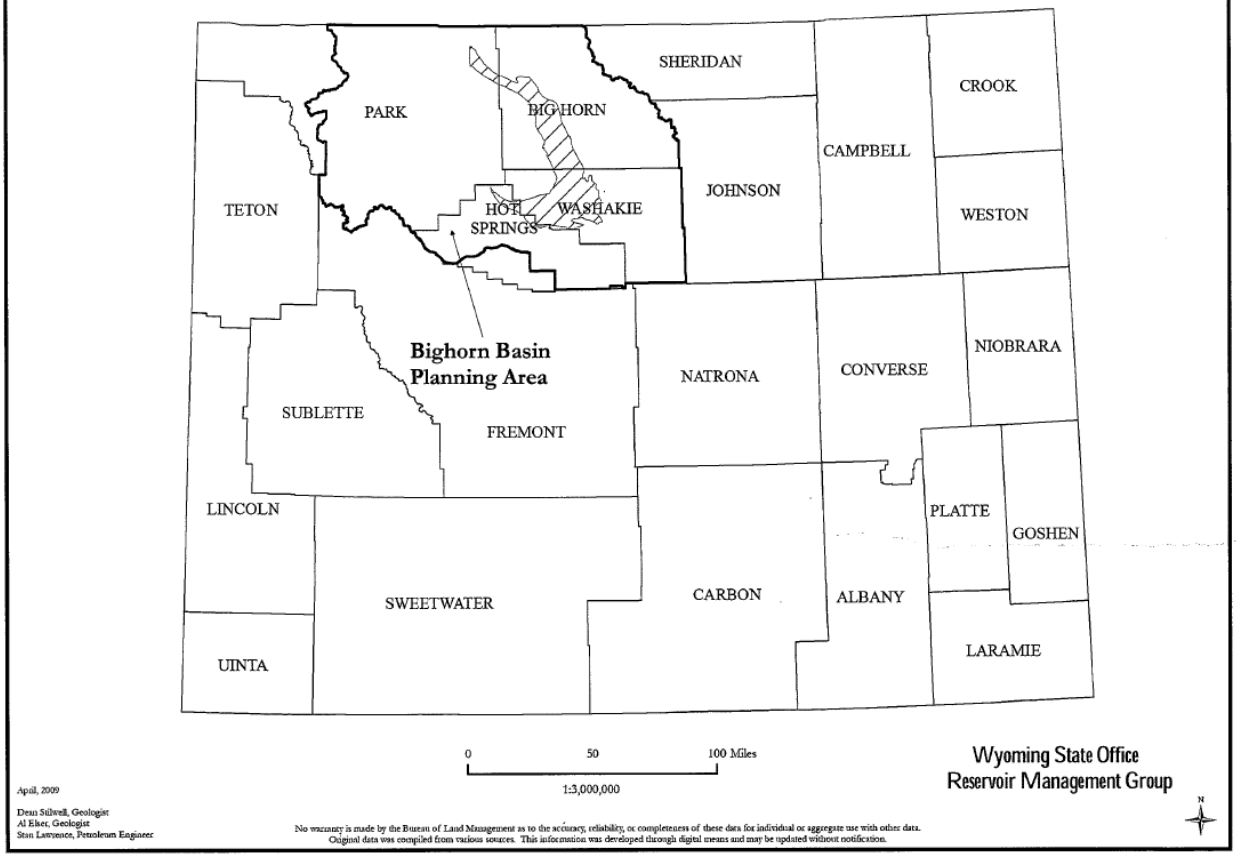
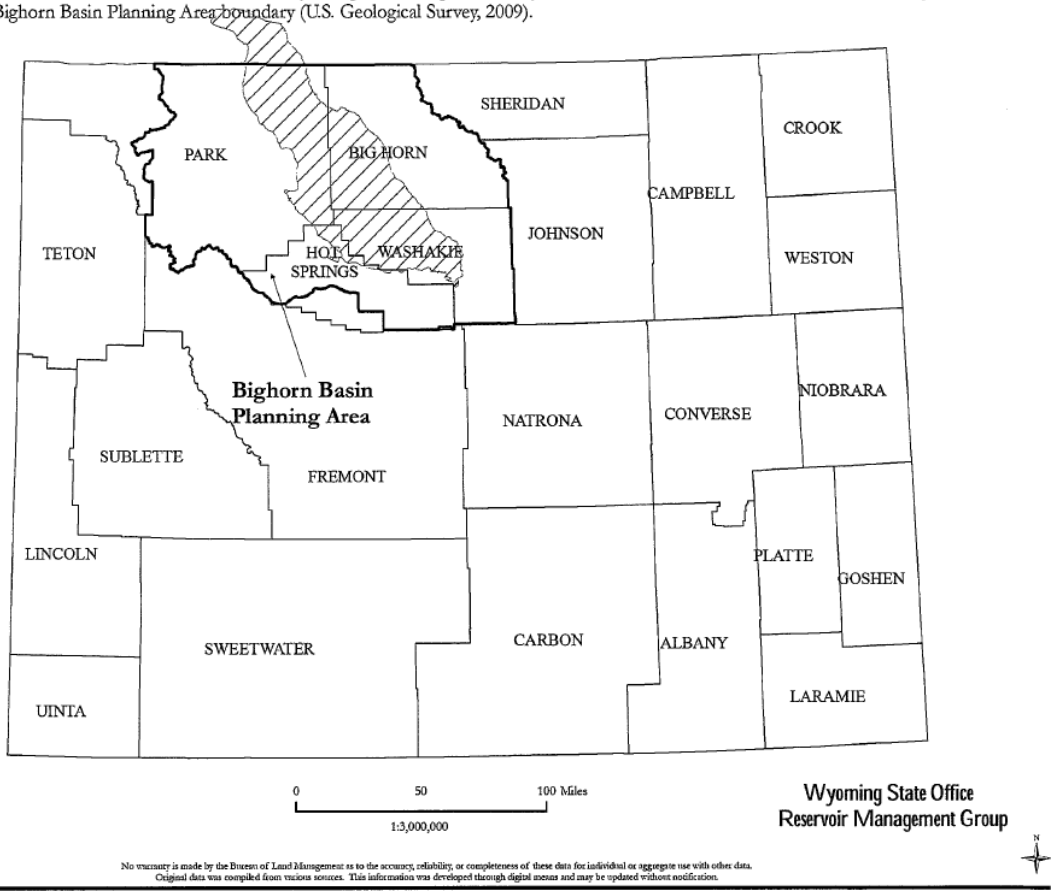


Figure 39.
Location of the Bighorn Basin Province, Cretaceous-Tertiary Composite total petroleum system, Fort Union Formation continuous coalbed gas assessment unit with respect to Bighorn Basin Planning Area boundary (U.S. Geological Survey, 2009).



HAND DELIVERED
2/25/2010

HERROD GEOSCIENCE CONSULTING, LLC
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Comments Regarding Current and Future Resource Management Plans in the Bighorn Basin, Wyoming

As interested and affected parties to the ongoing discussions relative to resource management in the Bighorn Basin, Herrod Geoscience Consulting, LLC, and Trudell Geophysical Consulting, LLC wish to make the following comments.

- Our professional experience and interest in the petroleum basins of the Rocky Mountains, including the Bighorn Basin, spans four decades each. We have developed that experience in exploration and development teams as employees of major oil companies, and more recently as consultants.
- We feel strongly that the central portion and western flanks of the Bighorn Basin are overlooked areas with considerable remaining exploration potential. The basis for this assessment is reviewed in some detail in the attached papers: "Big Horn Basin: Future Exploration Potential", "Fractured Mowry Shale Play, Big Horn Basin, Wyoming", and "Gas Production from Fractured Shales". The last two have been slightly abbreviated for reasons of confidentiality. We take particular exception to the position that shale resource plays have low potential in the basin, as does Ronald Surdam (Wyoming State Geologist) in an assessment of the Mowry Shale presented at the American Association of Petroleum Geologists (AAPG) Annual Convention in 2007.
- Additional evidence for this unexploited potential comes from an established source rock model for the basin. The source rocks for essentially all of the oil in the older, deeper rocks of the basin are within the Phosphoria formation located in western Wyoming (possibly including the western-most portion of the Bighorn Basin) and Idaho. The oil from the Phosphoria migrated from west to east across the Bighorn Basin and eventually charged the large traps that ring the basin like a necklace of pearls. This model was first proposed in an exhaustive technical paper by D. S. Stone in 1967 (attached) and has been accepted as fact by exploration professionals since its introduction. Simply put, in order to charge the traps on the eastern flank of the basin, this crude obviously passed through the western and central basin area where some of it was certainly diverted into intervening structural and stratigraphic traps. These traps have not yet become the target of explorationists because there have always been cheaper, shallower targets to drill. Those opportunities are diminishing and the time is ripe for resurgence of activity in the basin. There are entire townships in the central and western Bighorn Basin with only or few or no deep (or even shallow) wells. Any suggestion that large, relatively undrilled areas of the basin have only low potential for future hydrocarbon discoveries is flawed at best and fundamentally ill informed.
- The total exclusion of oil and gas operations by No Surface Occupancy (NSO) stipulations precludes the opportunity to search for these undiscovered resources. In order to

intelligently evaluate resource potential with geophysical tools such as seismic, magnetic, and gravity data, access is required. In the case of seismic data (the most definitive tool we have), this access must not be a "patch quilt" affair, but it must be continuous along the trace of the data line.

- The current Conditional Surface Use (CSU) approach has worked well for managing multiple-use public lands, demonstrating that hydrocarbon exploration and development and environmental, wildlife, and archeological protection are not mutually exclusive. Commitment and new drilling technology (pad drilling, long-reach horizontal wells, pre-planned reclamation, etc) have made this so.
- Any group citing adverse wildlife impacts should produce evidence proving long-term negative impacts to habitat and populations due to specific geophysical activities before requesting their exclusion from public lands.
- Any Resource Management Plan (RMP) must take into account new exploration models and improvements in exploration and drilling technology. Just a few years ago, successful exploration plays such as coalbed methane, shale resource plays, and basin-centered gas plays simply did not exit. The most successful exploration concepts have always been the ones that pedestrian geoscientists and engineers dismissed as bad ideas – until someone took the risk to prove otherwise. Were it not for the evolution of new play concepts, the world would have effectively exhausted its petroleum reserves decades ago. Successful new plays often reach a tipping point when enough knowledge (data) has been amassed followed by successful drilling. To exclude areas from future exploration because of what we do not yet know, or have not yet had the economic incentives to attempt, is short-sighted and irresponsible.

There are many medium- and long-term opportunities for discovering new reserves along the western boundary of the Bighorn Basin as well as in the poorly explored basin center. Since RMP is a 20-year document, asking oil and gas operators what their plans are for expenditures over the next 5 or even 10 years is the wrong question. Having been in the oil and gas profession for over 40 years, we can tell you that company plans and objectives change based on the overall strategy of the organization, economics, current exploration models and technology. The geologic potential does not change. The potential resources are there - merely waiting on economic incentives, new ideas, and new technology. When these factors are in alignment and coupled with a common sense environmental approach – industry will come.

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FRACTURED MOWRY SHALE LEASE PLAY
BIG HORN BASIN, WYOMING

The Mowry Shale has recently become an exploration target because of the general interest in fractured shale plays throughout the US, but in particular the Western US Rocky Mountain Region. In the Big Horn Basin, the Mowry Shale is considered to be a prime target because the qualities it possesses are common to existing successful fractured shale reservoirs. These include a significant thickness of source-rock quality shale, adequate maturation, the capacity to maintain open fractures, and its susceptibility to fracture stimulation. Nearly all of these must be in existence in order for the shale to be prospective within select "sweet spots" within a basinal setting. In addition, top seals must prevent vertical seepage, and bottom seals must prevent the influx of bottom water from deeply rooted fractures.

The Mowry is known to be a significant hydrocarbon source throughout the foreland basins of Wyoming. In general, its thickness is upwards of 700', it possesses high TOC's (1% - 4% reported in the Big Horn Basin), and importantly, it is extremely susceptible to fracturing because it is siliceous and brittle, particularly in its upper half. The Mowry is also known to contain interbedded thin sandstones, which can enhance matrix storage of trapped hydrocarbons.

In most cases, sweet spots are defined by identifying areas where high fracture intensity exists in conjunction with maturation that is at a level sufficient to deliver either oil or gas. For example, the Barnett in the Fort Worth Basin is played in areas specifically where it is in the gas generative window. The Bakken in the Williston Basin is presently being played along a trend in which high oil volumes (i.e., 700 – 1000 BOPD) are being produced from both naturally fractured and "fracturable" members.

We have identified a fairway in the Big Horn Basin in which all the criteria for making a successful fractured shale play exist. We have utilized proprietary aeromagnetics, seismic, and subsurface information, in combination with published maturation and geothermal gradient data to identify prospective fault trends. A recently acquired proprietary Hyperspectral Survey has also been employed to prioritize areas. In the 31 Townships within the Fractured Mowry Play, there have been less than 30 Mowry penetrations. Some of these wells have established production from the Frontier Sandstone and deeper intervals. Within this area, drilling depths range from less than 5000' on the shallow northeast portion of the area to ~ 12,000' throughout the majority of the rest of the area to the south and southwest where the play overlaps with a basin center gas cell in the central, deepest portion of the basin.

The play is dependent upon high fracture/fault intensity induced by a significant northeast oriented regional wrench fault system that influences pre-Larimide paleostructure, Paleozoic and Mesozoic depositional trends, and production. This trend corresponds to the "Tongue River Lineament", a northeast to southwest trending wrench system that can be traced from the basement in the Big Horn Mountains into the depths of the basin. Not coincidentally, this highly fractured trend is adjacent to

giant fields that have produced over 1 Billion Bbls of oil equivalent. It is also significant that this trend follows the highest geothermal gradient zone that exists in the basin, thereby causing higher than anticipated levels of maturation (potentially into the dry gas window), more overpressuring, and thus potentially higher production rates. Shales that both overlie (Cody Shale) and underlie (Skull Creek and Thermopolis Shales) the Mowry have source potential as well and may serve to add hydrocarbons to this fractured reservoir system. Included in this dominantly shale sections are the Frontier and Muddy Sandstones. Both of these have produced significant volumes of oil/gas throughout the basin and are exploration targets throughout the Mowry Shale fairway. The topseal for the entire fractured shale system is the Cody Shale; the bottom seal is the Jurassic Morrison Formation.

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BIG HORN BASIN: FUTURE EXPLORATION POTENTIAL

BASIN OVERVIEW

The Big Horn Basin of northwestern Wyoming and south-central Montana is both a structural and topographic basin. It is bordered on the east and northeast by the Big Horn and Pryor Mountains, on the south by the Owl Creek Mountains, on the west by the Absaroka Volcanic Plateau, on the northwest by the Beartooth Mountains, and subtly on the north by the E to W trending Nye-Bowler lineament, which separates it from the Crazy Mountain Basin. The basin encompasses an area of about 9500 mi^2 and includes portions of Park, Big Horn, Hot Springs, and Washakie Counties in Wyoming, and Carbon, Stillwater, and Sweetwater Counties in Montana.

The Big Horn Basin is typical of most Rocky Mountain intermontane basins in that it is a deep, asymmetrical structural depression containing thick sections of Upper Cretaceous and Tertiary strata (see Fig. 1). The steep flank of the basin is on the west where the west-dipping (east verging) Oregon Basin reverse or thrust fault forms a long, north-south structural terrace. The deepest part of the basin is located near its western margin where up to 27,000 feet of sedimentary rocks representing all ages except the Silurian are present. The central basin is covered by more than 14,000' of Tertiary sediments below which are roughly 9,800' of Mesozoic, and about 3,000' of Paleozoic rocks. The basin was formed by the Laramide Orogeny in latest Cretaceous to early Tertiary time. Therefore, while the non-volcanic mountain ranges consist of folded and faulted Paleozoic to uppermost Cretaceous rocks, the basin center is covered by essentially flat lying Eocene strata which overlap and cover most older units. The Mesaverde, Meeteetse, Lance, and Fort Union Formations outcrop in a 3 to 15 mile wide belt around the basin margins. The basin is unusual in that it is transected by at least three large wrench-fault systems that originate in, and segment, the basement rocks of the Big Horn Mountains. These wrench faults extend from NW to SE across the basin and set up complex fault trap plays as well as conventional four-way closures (see accompanying review of the Mowry Resource Play). These have yet to be explored.

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the thick Cretaceous shale packages, and the discontinuous nature of many of the Cretaceous sandstones.

ESTABLISHED PRODUCTION

Historically, hydrocarbon production has been from large, anticlinal traps that rim the basin. About 90% of the oil discovered in the basin is found in late Paleozoic reservoirs (the Tensleep and Phosphoria) associated with these large anticlines. More than 110 anticlines, many of which are productive, have been mapped around the basin margin. These were the first targets drilled, since they were often recognizable as surface structures, and located on the shallower basin flanks where the Precambrian is often less than 8,000' deep. In 1906, Garland Field in the northern part of the basin became the first major discovery. There have been eight such anticlines discovered that have produced in excess of 100 million barrels each. Together, these giants have produced over 1.8 billion barrels of oil and 800 BCF of natural gas. In total, the basin has produced roughly 2.7 billion barrels of oil and 1.8 TCF of natural gas. About 635 BCF (or 37%) of the natural gas is not associated with oil production. With the exception of Cottonwood Creek Field, a Phosphoria carbonate stratigraphic trap on the eastern flank of the basin (cumulative production of about 60 MMBO), virtually all of this production has come from basin-edge anticlinal traps.

Roughly 12,000 exploration and development wells have been drilled in the Big Horn Basin with the vast majority being concentrated on the basin margins. *Only about 100 wells have been drilled in the deep portion of the basin and there are large areas between the bowels of the basin and the shallower flanks that have only a few wells or no wells per township.*

COMPARISON WITH OTHER INTERMONTAIN ROCKY MOUNTAIN BASINS

For the reasons just discussed, the Big Horn Basin has long been viewed as oil-prone and dominated by Laramide structural traps that rim the basin margins. When viewed on the Oil and Gas Map of Wyoming, the lack of production anywhere in the basin other than on the flanks is striking and in contrast to other Wyoming basins. In comparison (and omitting coalbed methane), the Powder River Basin is dominated by various types of stratigraphic traps with a much greater proportion of sweet, green (Cretaceous sourced) hydrocarbons that are more uniformly distributed across the basin. The Wind River, Greater Green, and Uinta-Piceance Basins are characteristically gas-prone areas with a greater representation of stratigraphic and combination traps than the Big Horn. *In reality, the Big Horn Basin shares many geological characteristics with these neighboring basins regarding the thickness and maturity of Cretaceous source rocks and the abundance of Tertiary and Cretaceous sandstone reservoirs indicating that a number of stratigraphic or deeper structural plays remain to be made in the under-explored central and far-western margins of the basin.*

UNEXPLOITED POTENTIAL

Certainly, the Tertiary and Cretaceous sections in the Big Horn Basin have not benefited from the same exploration efforts accorded equivalent rocks in other Wyoming basins. In addition, there are a number of wrench systems in the basin as well as paleostructural trapping models that have not been addressed by previous exploration. The following is a brief summary of the unexploited, conventional Cretaceous and Tertiary plays to be made in the Big Horn Basin.

- Lower Cretaceous Stratigraphic/Structural Plays

  The targets here are sandstones locally known as the Greybull or Lakota within the basal Cretaceous Cloverly Formation, and the Muddy Sandstone. Production from all of these units has been established primarily as shallow recompletion targets within the basin margin structures previously described. Often, the production associated with closed structures exhibits a stratigraphic component of entrapment. These units are usually channelized. They were deposited in a variety of fluvial to estuarine settings and range widely in thickness from 10' to more than 50'. Due to their discontinuous nature, many off-structure stratigraphic trapping geometries are likely due to updip pinchouts and drape over structural noses. Such traps are more viable on the gently dipping eastern flank of the basin. Source rocks include the Mowry and Thermopolis Shales, which often entomb the reservoirs making for short migration distances and possible overpressuring. These source packages entered the hydrocarbon generation window during the Paleocene and in some areas have generated thermogenic gas. Charging by both green, sweet oil and by gas is possible. Examples of existing fields with Lower Cretaceous production include: Manderson, Slick Creek, Sand Creek, Fourteen Mile, Dobie Creek, Fritz, Lamb, Greybull, Garland, Whistle Creek, Elk Basin and others.

- Upper Cretaceous Stratigraphic/Structural Plays

  These targets include the Frontier, Mesaverde, Meeteetse, and Lance Formations. Again, production from all of these units has been established primarily as shallow recompletion targets within basin margin structures. The Frontier (locally termed the Peay, Torchlight, or Heart Mountain Sandstone) generally consists of stacked coarsening-upward marine sands. The thickness of individual sands can range from less that 10' to greater than 125'. Due to its complexity (owing in part to the presence of several significant unconformities within the section), the Frontier usually exhibits a strong stratigraphic trapping component even on large structures. This complexity enhances its prospectivity as a stratigraphic target. Depths range from less than 200' to about 13,000'. The underlying Mowry Shale and perhaps the overlying Cody Shale are the principal source rocks for Frontier oil and gas production.

  The Mesaverde, Meeteetse, and Lance Formations outcrop in a 3 to 15 mile wide belt around the basin margins and their outcrop patterns define some of the basin's larger surface structures (Fig. 1). The Mesaverde is a variable unit of interbedded sandstones, shales, and coals. It ranges in total thickness from about 900' in the north to around 1,400' in the south. Relative to the older sandstones just discussed, it is a relatively sand-rich system that was deposited across broad floodplains and delta plains in stream channels, coastal swamps, and lagoons as the Cretaceous sea regressed to the east. Many of the sand members are fairly thick and can range from less than 20' to over 320' in thickness. Some structural component of trapping (such as faulting) may be needed to enhance production. The Meeteetse was deposited across broad floodplains as meandering streams and as thin swamp and lake sediments and ranges in thickness from less than 600' in the south to over 1,000' feet to the north. Sands in the Meeteetse are thinner and more discontinuous than in the Mesaverde and contain more interbedded thin coals. Their stratigraphic trapping potential is therefore enhanced. Finally, the Lance Formation was deposited in a dominantly fluvial environment amid scattered small swamps and lakes with relatively fewer coals than the Mesaverde or Meeteetse. All three of these units can be indigenously sourced by gas from interbedded coals and carbonaceous shales, as well as from the underlying Cody Shale. The Mesaverde ranges from surface outcrops down to about 8,000' in depth. Examples of fields with Upper Cretaceous production include: Worland, Slick Creek, Fourteen Mile, Fritz, Dobie Creek, Lamb, Greybull, Byron, Garland, and others all with Frontier production; the Mesaverde

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produces at Silvertip (along with the Lance and Meeteetse), Golden Eagle, and at Dry Creek in Montana.

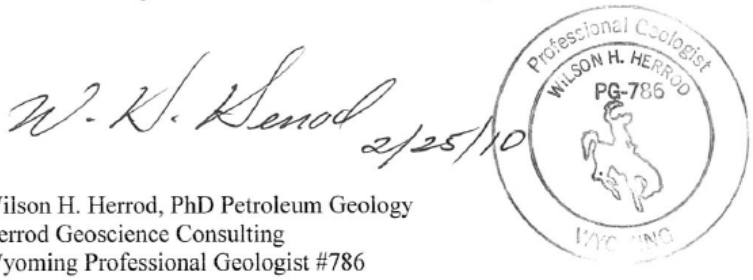
- Tertiary Stratigraphic/Structural Plays
  The Paleocene Fort Union Formation outcrops in many areas of the basin and locally may be completely stripped by erosion. However, it is a very thick unit and may reach a maximum thickness of more than 8,500' in the deepest part of the basin where it may achieve burial depths of 10,000'. It was mainly deposited it a fluvial environment with a lot of variation in the amount of sand in any one area. It is known for its thick surface and subsurface coal accumulations in the Grass Creek, Gebo, and Red Lodge/Bear Creek areas. These coals are a potential source of methane to charge shallow traps. There is scattered and poorly documented Fort Union production in the basin, an example being McCulloch Peak Field near Cody.

Additional exploration opportunities are to be found in resource plays, such as the Mowry Shale as outlined in an accompanying review, and in basin-centered gas accumulations in the virtually unexplored deepest portions of the basin. Last, but not least, are the untapped structural, wrench-fault targets also described in the Mowry Shale report.

SUMMARY

There are a number of reasons for the overlooked potential in the Cretaceous and Tertiary rocks of the central Big Horn Basin. These include:

- The historical focus on easily defined and cheaper to drill structural traps around the shallow basin margins;
- The low recent interest in natural gas which is often found in the younger rocks of the Big Horn Basin;
- Overbalanced mud systems, which were designed to control deeper Paleozoic targets, but which obscured shows in younger Cretaceous and Tertiary rocks;
- The subtle and ephemeral nature of natural gas shows in cuttings combined with the lack of a mud logger or geologist to monitor the shallow portion of a deeper test (particularly through shale sections such as the Mowry);
- The water sensitive nature of many clays associated with Cretaceous and Tertiary sandstones, which led to irreversible formation damage prior to testing;
- The overlooked potential of the deeper central basin with its transecting wrench faults; and
- The relatively new exploration model for shale resource plays was made viable by recent technological advances in horizontal drilling and fracture stimulation.



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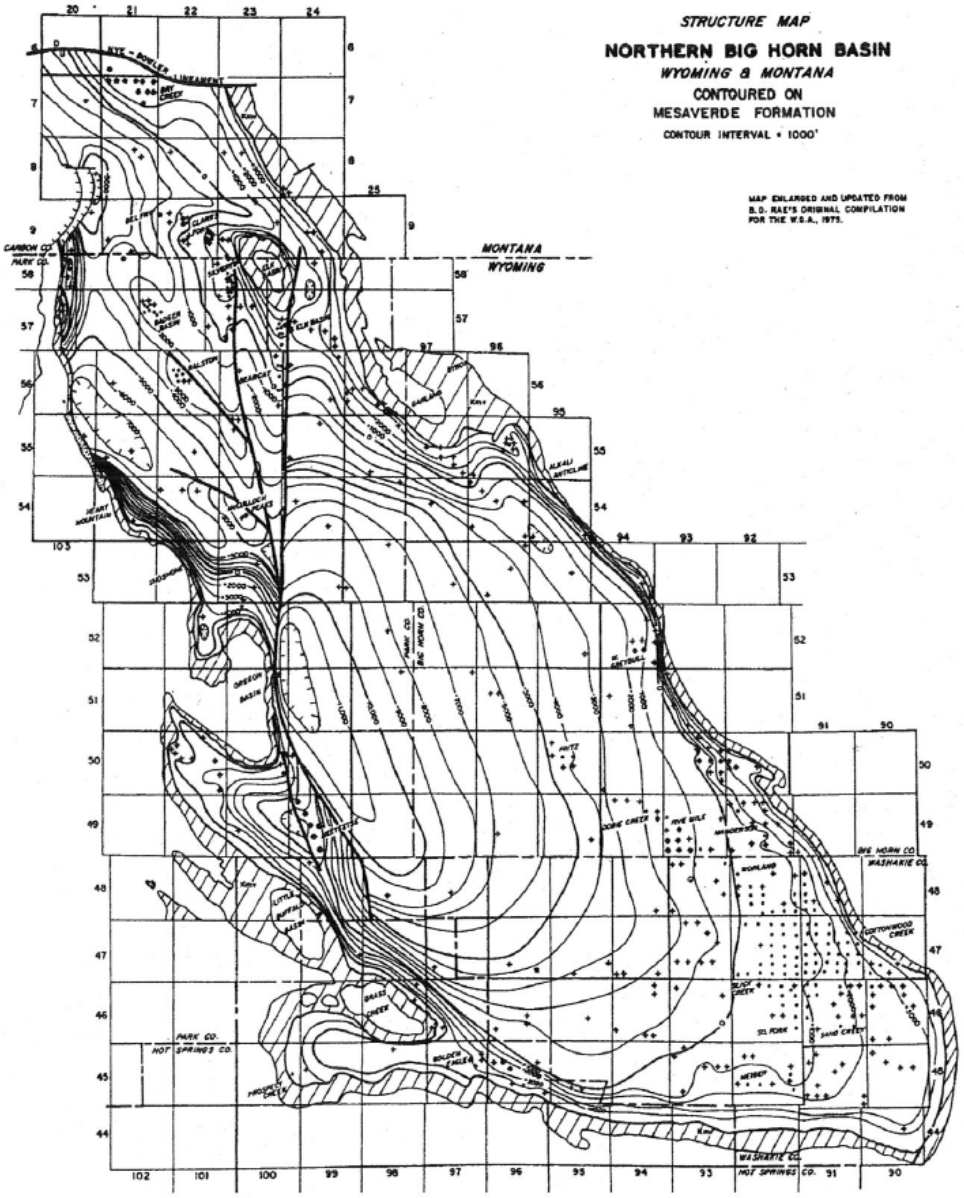

Figure 1: Big Horn Basin structure contour map atop the Upper Cretaceous Mesaverde Formation. Mesaverde outcrop is cross-hachured. Note basin asymmetry and field labels. Not all wells are shown. Figure modified from Talbot (1996).

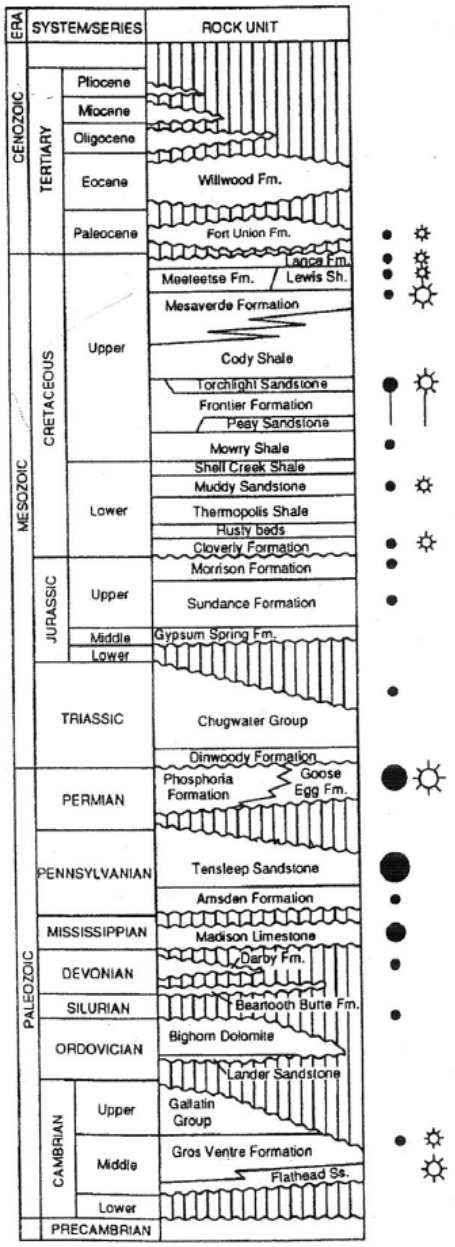

Figure 2: Stratigraphic column for the Big Horn Basin. Principal oil and gas producing intervals are indicated by blackened circles and gas symbols respectively; relative importance to established production is indicated by size. Major petroleum systems based upon source rock are: (1) the black, sour oil and gas from Permian Phosphoria source rocks which is typically trapped in the Tensleep Sandstone and in carbonates of the Phosphoria/Goose Egg system; and (2) the green, sweet oil and gas from thick Cretaceous shales such as the Thermopolis, Mowry and Cody which are reservoired in Cretaceous sandstones such as the Cloverly (Greybull), Muddy, Frontier, Mesaverde, Meeteetse, and Lance. The central Big Horn Basin is under explored for both green oil and gas from Cretaceous source rocks, and for black oil from Permian Phosphoria source rocks. Figure modified from Fox and Dolton (1996).

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GAS PRODUCTION FROM FRACTURED SHALES

Introduction

Gas production from shales is often cited as an unconventional resource. However, such production is nothing new and in many ways is quite ordinary. Devonian shales have been producing gas since the late 1820's in New York. Commercial production was established in the New Albany Shale in the Kentucky portion of the Illinois Basin in 1863. By 1926, the Devonian Shales of the eastern U.S. were the world's largest known resource for natural gas. As indicated in Figure 1, in the decade from 1989 to 1999, annual shale gas production increased by over 250% from about 149 BCF to 380 BCF. Prior to 1988, 90% of shale gas was produced from the Ohio Shale. The dramatic increase in overall shale gas production in the ensuing decade was due to the rapid exploitation of the Antrim Shale, which by 1996 accounted for 55% of the total annual gas shale production. In 1998, shale reservoirs supplied 1.6% (380 BCF) of total U.S. dry gas production, and held about 2.3% (3.9 TCF) of U.S. proved natural gas reserves.

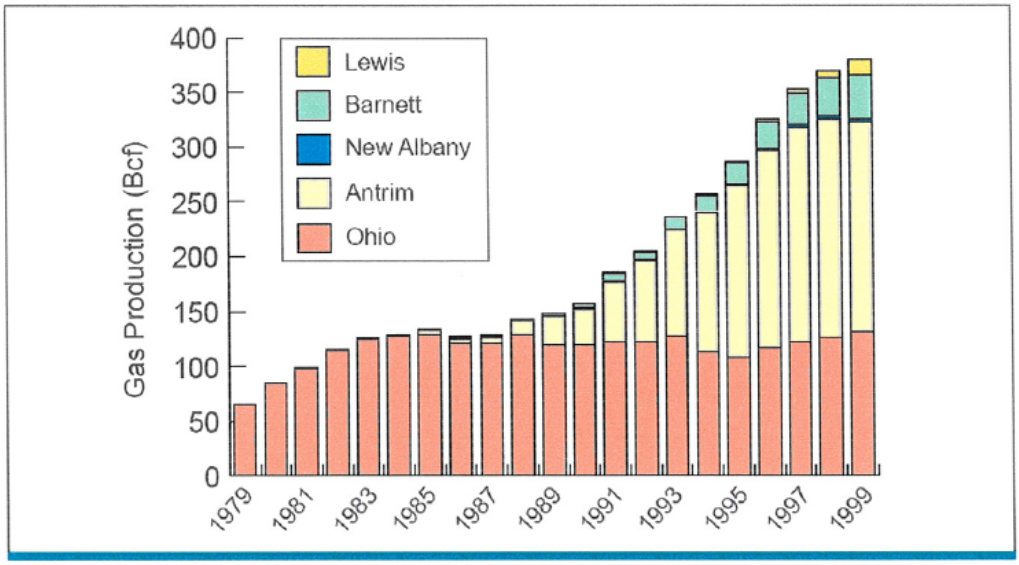

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Figure 1: Annual U.S. Shale Gas Production by Formation. Note the major contribution of the Devonian Antrim Shale of the Appalachian Region since the early 1990s. Recent contributions from the Mississippian Barnett Shale of the Fort Worth Basin and the Cretaceous Lewis Shale of the San Juan Basin accounted for about 55 BCF (14.5% of the total) by the end of 1999. (After GRI, 2000)

Characteristics of Shale Gas Plays

Shale gas plays are often described by USGS geologists as "continuous" accumulations in that hydrocarbon saturation is pervasive over a broad area. Basin centered gas accumulations are also continuous, and some, but not all, shale gas plays are also basin centered. Because of their wide distribution (often vertically as well as horizontally), shale gas plays usually present low rate, but long-lived reservoirs (up to 30 years or more), and in most cases, favorable finding and development costs. A typical production profile will exhibit an initial kick as fractures deplete followed by a long, slow decline as the matrix desorbs gas (see below). Production decline rates are usually less than 5% per year and reservoirs contain large in-place volumes (5 to 50 BCF per section). Due to the low matrix porosity and permeability of the host source/reservoir (porosity typically occurs as micropores and permeability is usually measured in micro-darcies) some stimulation is almost always needed for commercial production.

Shale gas systems differ from conventional hydrocarbon accumulations in many ways. Shale is a self-sourced reservoir - acting as both source and reservoir, and often as the seal. Secondary migration from a source to a reservoir via a conduit is not necessary since the source retains part (and possibly nearly all) of the generated hydrocarbons. This buildup of self-generated hydrocarbons in a potentially sealed (or partially sealed) system may result in over-pressuring. However, not all shale gas reservoirs are overpressured. Most are normally pressured to under-pressured since uplift and erosion can allow some of the generated hydrocarbons to leak, especially if the system contains some fine-grained sandstones and siltstones. Other differences between shale gas traps and conventional traps is that the former often do not occur above a base of water, and are not density stratified within the reservoir.

The potential for shale gas production from an interval depends on the generative capacity of the shales and adequate porosity and permeability for storage and movement. This porosity and permeability is usually a function of natural fractures (which are proportional to the brittleness of the shale) and the presence of clastic stringers of siltstone and sandstone. Storage of the generated hydrocarbons occurs in three modes, within natural fractures and matrix porosity, and as an adsorbed phase on the kerogen and clays that are the principal constituents of shale. Adsorption is the adhesion of a few molecules of gas to the internal surfaces of the shale (or coal) matrix. Since clays are renowned for their huge surface areas, up to 50% of the total

retained gas may be found as an adsorbed phase. Therefore, the volume and nature of the clays and kerogen in a shale will have a dramatic influence on both the storage capacity and degree of adsorption.

Gas is generated within source rocks by two processes: a thermogenic process involving the progressive heating of the source material with greater depths of burial; and by biogenic action due to bacterial modification of the source rock. This biological modification generates methane during either the early diagenetic history of the rock relatively near the surface, or due to the introduction of meteoric waters to deeply buried source rocks, or to those exhumed by erosion. Most, if not all, shale gas systems exhibit gas from both biogenic and thermogenic processes.

Overview of Historically Productive Plays

The conventional oil and gas industry in the U.S. began in the east with Drake's famous well in Pennsylvania in 1859 and then migrated west in the early 1900s. Similarly, shale gas exploitation began even earlier in the east. However, shale gas is just beginning to develop in the Rockies having first taken root in the Barnett Play in Texas.

Gas-in-place estimates for the five major plays illustrated in Figure 1 (above) and Table 1 (below) total 581 TCF with recoverable reserves of 31 to 76 TCF. These are very conservative estimates since GIP data for the relatively new Barnett Shale and recoverable gas for the Lewis Shale are not yet available.

Table 1: U.S. Gas-Bearing Shale Resources in Historically Productive Plays

Basin	State(s)	Major Shale-Bearing Formation or Group	Basin Area (mi^2)	Total Organic Carbon (TOC)%	Thermal Maturity (%R_o)	Shale Gas-In-Place Resource (Tcf)		Estimated Recoverable Shale Gas Resource (Tcf)		Estimated Total Undiscovered Shale Gas Resource (Tcf) *
Appalachian	OH, KY, NY, PA, WV, VA	Ohio Shale	160,000	0 - 4.5	0.4 - 1.3	225 - 248**	1980 & 1992 NPC Estimates	14.5 - 27.5	1980 & 1992 NPC Estimates	90.7
Michigan	MI, IN, OH	Antrim Shale	122,000	1 - 20	0.4 - 0.6	35 - 76	1980 & 1992 NPC Estimates	11 - 18.9	1992 NPC & 1995 USGS Estimates	40.6
Illinois	IL, IN, KY	New Albany Shale	53,000	1 - 25	0.4 - 1.0	86 - 160	1980 & 1992 NPC Estimates	1.9 - 19.2	1992 NPC & 1995 USGS Estimates	NA
Fort Worth	TX	Barnett Shale	4,200 ***	4.5	1.0 - 1.3	NA		3.4 - 10.0	Schmoker, 1996 Kuuskraa, 1998	NA
San Juan	CO, NM	Lewis Shale	1,100 ***	0.45 - 2.5	1.6 - 1.88	98.9	1997 Burlington Resources Estimate	NA		NA

* 2000 GRI Baseline projection of U.S. Energy Supply and Demand to 2015 (GRI-00/0002.2)
** Black shales only.
*** Play area only.

Table 1: General data for the major productive shale gas plays in the U.S. Both gas in place and recoverable value are conservative due to incomplete data on the emerging plays in the Barnett and Lewis Shales. (After GRI, 2000).

The following are brief overviews of the five most significant existing shale gas plays in the U.S. Table 2 below summarizes basic reservoir properties and costs for these same plays.

Devonian Ohio Shale (Appalachian Basin)

The Devonian shales of the Appalachian Basin are a widespread and diverse unit consisting of alternating layers of organic rich (black) and organic lean (gray) shales, often interbedded or interlaminated with siltstones and fine-grained sandstones. The package is from 300' to 1,000' thick and currently exhibits the highest estimates for recoverable reserves (14.5 to 27.5 TCF) of the established plays. Per well recoveries vary widely from less than 100 MMCF to over 1 BCF. The average well produces 250 to 350 MMCF over a 30-year life. Over 90% of commercial producers require some form of stimulation and no single technique has proven universally successful.

Devonian Antrim Shale (Michigan Basin)

This was the most active U.S. shale gas play during the 1990s. Breakthroughs in both geological characterization of the targets, and engineering advances in stimulation and production efficiencies were responsible for the expansion along with increasingly attractive product prices. Typically 160' thick, the Devonian Antrim is geologically similar to the Ohio Shales. Estimates for recoverable reserves range from 11 to 18.9 TCF. Water removal via artificial lift is an important part of the production process. The average well produces about 116 MCFPD with 30 BWPD.

Devonian New Albany Shale (Illinois Basin)

The Devonian New Albany shale is an organic rich, brown-black to gray-black unit that is present throughout the Illinois Basin averaging 180' in thickness. It has not enjoyed the same rate, nor scale of development of the other Devonian Shales just discussed. Recoverable reserve estimates for the play range from 1.9 to 19.2 TCF. In the Indiana portion of the basin, the New Albany requires water lifting like the Antrim, whereas in western Kentucky, the production is more akin to the Ohio Shale. Due to this heterogeneity, average per well rates are not meaningful. In part due to a lack of geological understanding and engineering expertise, this play is currently the least significant of the five mentioned above.

Mississippian Barnett Shale (Fort Worth Basin)

Relative to the other units discussed here, the Barnett is a relatively uniform, organic rich shale. It averages 200' to 300' in thickness. Major production was established in the Newark East Field (Wise and Denton Counties, Texas) where it grew from less than 1 BCF from 25 wells in 1985, to 40.6 BCF from over 500 wells in 2000.

Newark East (Barnett) is now the largest gas field in Texas with an estimated GIP of more than 120 BCF per sq. mi. and booked reserves in excess of 2.5 TCF. Current production is over 700 MMCFD. Recent improvements in stimulation techniques involving water (as opposed to cross-linked gels) and smaller proppant loads have dramatically reduced costs and improved recoveries. However, the current recovery factor is about 8% to 15% leaving tremendous room for improvement.

Upper Cretaceous Lewis Shale (San Juan Basin)

The Lewis Shale play is a basin-centered trap that encompasses a large 1,110 sq. mi. area. The Lewis ranges from 500' to 1,900' in thickness. Unlike the other plays reviewed here, the Lewis is being developed as a secondary target, or as a recompletion target, rather than as a primary objective. This reflects the large number of wells that have penetrated the Lewis on the way to deeper objectives such as the Pictured Cliffs Formation. The Lewis is a well-stratified unit consisting of shale, siltstone, and minor sandstone, which for completion purposes, acts as a sandy siltstone rather than as a true shale. As such, it is intermediate between tight gas sands and gas bearing shales. Optimum stimulation methods are still being refined inasmuch as the Lewis is under-pressured (0.22 psi/ft) and water-based stimulation fluids and frac-fluid retention in the formation reduces relative permeability to gas. An average well will produce 100 to 130 MCFD with an EUR of 300 to 500 MMCF.

Comparison of the Mowry Fractured Shale Play to Established Plays

The Cretaceous Mowry Shale within the Big Horn Basin of Wyoming exhibits many characteristics associated with the established shale gas reservoirs catalogued in Tables 1 and 2. The Mowry and its equivalents are known to be a significant source rocks throughout the foreland basins of Wyoming for sandstone reservoirs such as the Muddy, Frontier, and Dakota. Mowry equivalents such as the Aspen Shale sourced the Jurassic Nugget Sandstone in the western Overthrust Belt. The organic rich Mowry contains a mixture of Type II and Type III organic matter and is therefore both an oil and gas-prone source. In the Big Horn Basin, the relative percentage of Type III organics is higher suggesting greater potential for natural gas production and retention (see below) than in other intermountain basins. The Mowry is known to be thermally mature in the deeper parts of the Big Horn Basin, where it is in excess of 700' thick. TOC values are in the 1% to 4% range. Since the Mowry is known to have generated thermogenic hydrocarbons, thereby reducing the measurable TOC, these values are conservative overall.

Although some hydrocarbons have migrated out of the Mowry, there is geochemical evidence from the Big Horn Basin that much of the gas, or in some cases oil, remain trapped within micropores or as adsorbed phase within the shale matrix. All major northern Rocky Mountain basins, except the Big Horn, exhibit a TOC anomaly – that

is they exhibit anomalously low TOC values coincident with the deeper portions of the Laramide structural basins that formed subsequent to Mowry deposition. Tmax values in excess of 435°C for these anomalous areas supports the idea that thermal maturation and hydrocarbon expulsion account for the low TOC values. The lack of such low TOC anomalies in the Big Horn Basin, suggests that the hydrocarbons that were generated have been retained by the Mowry to a greater degree than in other basins. This was reinforced by Ronald Surdam (Wyoming State Geologist) in his review of Mowry production potential at the 2007 AAPG Conference. The Mowry is known to contain abundant smectite and illite clays that form a highly adsorptive/retentive matrix.

Hydrocarbon retention also adversely affects vitrinite reflectance (Ro) readings by coating and impregnating vitrinite particles. Geochemists have specifically noted this effect on Mowry samples analyzed from the Big Horn Basin where reflectance measurements were masked and forced into a low and artificially small range (Ro 0.65 to 0.75). In fact, all samples collected within or below the oil window (R0 = 0.5 to 0.6) exhibit the "ubiquitous presence of hydrocarbons, both as impregnation and coatings on vitrinite particles, and the presence of extractable hydrocarbons in every sample examined" (Hagen and Surdam, 1984, RMAG). Based on relatively clean Ro values, the top of the liquid hydrocarbon window is at about 2,000' depth in the Big Horn Basin and the bottom (or top of the gas window) is at 11,000' to 12,000'. The top of the gas window will be shallower in areas of greater concentrations of Type III organics.

The Mowry is typically hard, dark gray, siliceous shale containing abundant fish scales and interbedded bentonites. The siliceous and bentonitic aspects of the Mowry are a consequence of the volcanic activity prevalent in the Cretaceous during its deposition and the abundant radiolarian siliceous microfossils found within it. Its siliceous nature makes it unusually susceptible to natural fracturing thereby enhancing its productive potential. Thin, discontinuous, silty sandstone stringers such as the informally named Kimball and Ocht Louie further enhance the Mowry's permeability in some areas of the basin.

At least six fields are known to produce from the Mowry in the Powder River Basin. Breen Field in the eastern Powder is one example. Breen was discovered in 1966 by Shell Oil as a Pennsylvanian Minnelusa producer. Additional production was established in 1971 from the Mowry/Muddy interval at depths just below 8,990'. Initial rates were 173 BOPD and 38 MCFD flowing with no stimulation. The interval cum'd over 336 MBO and 90 MMCFG. Similarly, the Big Hand Field discovered in 1969 has cum'd 386 MBO from the Mowry and a silty Muddy Sandstone interval with fractured Mowry considered as the main contributor. Another example is Krejci Field where commercial quantities were produced in the 1950s and '60s without the benefit of modern stimulation techniques. Cumulative volumes are uncertain since

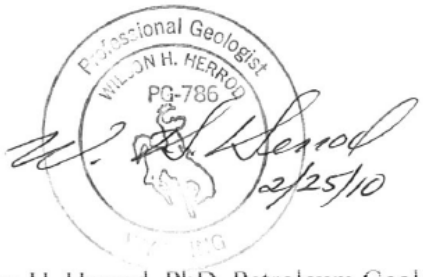
pre-1978 production was not tabulated. Post 1978 volumes total 74 MBO and 780 MCF. In addition, the Dillinger Ranch East area has had a number of Mowry producers. The ARCO Bishop Fee #1 has produced 128 MBO, 119 MMCFG, and 8635 BW from the Mowry. Other Mowry producers in the area have been water free. The Stone & Wolf Bishop 10-5H sidetrack has produced 29,401 BO, 47 MMCF and no water since May 2000. The S&W Bishop #19-8 has cum'd 4,187 BO and 4,916 MCF with no water since April 2003. The S&W State #16-47 has produced 7,220 BO, 2,916 MCF and no water since November 2000.

The Mowry has never been specifically targeted within the Big Horn Basin. Early (pre-1940) objectives in the basin were the Frontier Sandstones above the Mowry. The next wave of exploration in the 1940s and 50s began to focus on the deeper Paleozoic targets such as the Pennsylvanian Tensleep and Permian Phosphoria formations. The Mowry was rarely mudlogged and always considered as purely a source rock. Gas production was typically flared and volumes not recorded or reported. As engineering techniques matured, natural gas was usually reinjected for pressure maintenance. Any Mowry production associated with Muddy Sandstone production was commingled and not segregated. Some Mowry shows and production has been separately reported from Manderson Field where about 6,400 BO have been reported from at least eight wells.

The unique aspects of the Mowry in the Big Horn Basin discussed above such as:

- The presence of Type III (gas-prone) and Type II (oil-prone) source material,
- The abundance of hydrocarbon retentive clays,
- The TOC anomalies and the high extraction volumes of free hydrocarbons in source rock samples,
- And the siliceous, brittle nature of the rock

indicate that there is significant shale gas as well as oil potential there. This is an overlooked basin, which could easily be the next western locale for a shale resource play.



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Property	Barnett	Ohio	Antrim	New Albany	Lewis
Depth, ft	6,500-8,500	2,000-5,000	600-2,200	500-2,000	3,000-6,000
Gross Thickness, ft	200-300	300-1,000	160	180	500-1,900
Net Thickness, ft	50-100	30-100	70-120	50-100	200-300
Bottomhole Temp °F	200	100	75	80-105	130-170
TOC, %	4.5	0.0-4.7	1-20	1-25	0.45-2.5
$\%R_o$	1.0-1.3	0.4-1.3	0.4-0.6	0.4-1.0	1.60-1.88
Total Porosity, %	4-5	4.7	9	10-14	3.0-5.5
Gas Filled Porosity, %	2.5	2.0	4	5	1-3.5
Water Filled Porosity %	1.9	2.5-3.0	4	4-8	1-2
K_h md-ft	0.01-2	0.15-50	1-5,000	NA	6-400
Gas Content, scf/ton	300-350	60-100	40-100	40-80	15-45
Adsorbed Gas, %	20	50	70	40-60	60-85
Reservoir Pressure, psi	3,000-4,000	500-2,000	400	300-600	1,000-1,500
Pressure Gradient, psi/ft	0.43-0.44	0.15-0.40	0.35	0.43	0.20-0.25
Well Costs, $1,000	450-600	200-300	180-250	125-150	250-300
Completion Costs, $1,000	100-150	25-50	25-50	25	100-300
Water Production, Bwpd	0	0	5-500	5-500	0
Gas Production, Mcf/ton	100-1,000	30-500	40-500	10-50	100-200
Well Spacing, Acres	80-160	40-160	40-160	80	80-320
Recovery Factors, %	8-15	10-20	20-60	10-20	5-15
Gas-In-Place, Bcf/Section	30-40	5-10	6-15	7-10	8-50
Reserves, MMcf	500-1,500	150-600	200-1,200	150-600	600-2,000
Historic Production Area Basis for Data	Wise Co., Texas	Pike Co., Kentucky	Otsego Co., Missouri	Harrison Co., Indiana	San Juan & Rio Arriba Co., New Mexico

Table 2: Characteristics of significant shale gas plays. (After GRI, 2004)

Headwaters Economics. 2010a. *A socioeconomic profile: Hot Springs County, Wyoming*. Bozeman, Montana: www.headwaterseconomics.org. (accessed .

———. 2010b. *A socioeconomic profile: Park County, Wyoming*. Bozeman, Montana: www.headwaterseconomics.org. (accessed .