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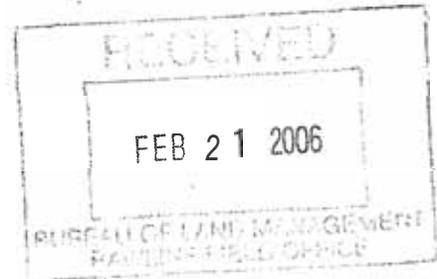


*Working to Protect Native Species and Their Habitats*

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February 17, 2006

David Simons  
Rawlins BLM  
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**Comments on the Atlantic Rim CBM Project Draft EIS**

Dear Mr. Simons:

The following are the comments of Biodiversity Conservation Alliance, The Wilderness Society, Center for Native Ecosystems, Californians for Western Wilderness, Sagebrush Sea Campaign, Southern Rockies Ecosystem Project, Western Watersheds Project, Wyoming Outdoor Council, Wyoming Wilderness Association, Friends of the Red Desert, High Country Citizens' Alliance, the Upper Green River Valley Coalition, Sierra Club, Rocky Mountain Recreation Initiative, and Natural Resources Defense Council on the Atlantic Rim Coalbed Methane Project Draft EIS.

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Overall, the Draft EIS suffers from a crippling flaw: The BLM has not planned the project, laying out the location of where the wells, pipelines, roads, and powerlines will be sited. Without planning the locations of these facilities, their direct impacts cannot be measured. We have noted numerous other shortcomings in the Draft EIS analysis, which should be remedied before a final decision is made.

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We believe that there is potential to develop an alternative that allows all of the gas and CBM to be developed, while providing some level of protection for other multiple-use resources in the Atlantic Rim Project Area (ARPA). However, the current action alternatives each fail to provide adequate protection for wildlife, fisheries, recreation, vegetation, scenic resources, and special landscapes like ACECs and the Wild Cow Creek citizens' proposed wilderness. Because each current alternative would turn the ARPA into a single-use industrial zone and would destroy sensitive and critically important resources such as sage grouse lek concentration areas, important big game seasonal ranges, and wilderness resources, the only Alternative that the BLM should implement at this point is Alternative A, the No Action Alternative. In the meantime, we recommend that the BLM go back to the drawing board and prepare at least one action alternative that provides responsible management of coalbed methane and natural gas drilling, sound stewardship of the land and its wildlife, and a mix of development and protection that allows for multiple use of these lands. If the Atlantic Rim project is to move forward, the BLM must approve it under a plan of action that meets these criteria.

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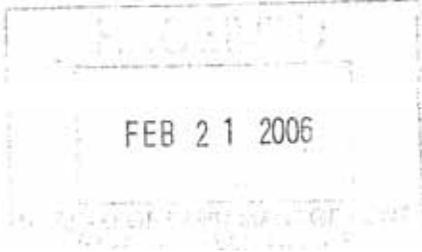
**THE ATLANTIC RIM CBM PROJECT MAY NOT LEGALLY BE APPROVED PRIOR TO THE ISSUANCE OF THE NEW RAWLINS RMP**

Despite being misleadingly named a "Natural Gas Field Development Project", the Atlantic Rim project is primarily a coalbed methane project. BLM notes that 1,800 of the wells would tap "coalbed natural gas" in the Mesa Verde formation, versus 200 wells tapping "conventional natural gas" found in other formations. DEIS at S-2. BLM explicitly describes "coalbed natural gas" (the new euphemism for CBM) as a "nonconventional source." DEIS at 1-5. Thus, BLM itself admits that coalbed methane drilling and production is distinct from conventional gas drilling and production.

Coalbed methane development has unique impacts that are distinctly different from conventional oil and gas development. Coalbed methane development entails that active dewatering of coal seams in order to reduce head pressure, which allows the coalbed methane to desorb from the coal and begin migrating to the wellbore for production. CBM production can produce millions of gallons of wastewater per day (in contrast to conventional gas production, which produces very little, and this can generally be accommodated in the reserve pit). In the case of the Atlantic Rim CBM project, this wastewater is highly salty and constitutes a disposal problem requiring an additional infrastructure of injection wells, water transmission pipelines, and additional pumping facilities. This additional infrastructure creates additional surface impacts on the land, as well as additional pump impacts to air quality, above and beyond the impacts of conventional oil and gas development.

Coalbed methane production is associated with lowering of water tables, wells and springs drying up, and increases in methane gas seeps, which kills vegetation and is a hazard to humans and wildlife (BLM, n.d.). Corning (2001) provided a useful overview of the problems associated with coalbed methane wastewater disposal: Major components of coalbed methane wastewater include salts, carbonates, and sulfates of Sodium, Calcium, Magnesium, and Potassium. Important toxins that may be present can include Selenium, Arsenic, and Cyanide. Total dissolved solids (TDS), Sodium Adsorption Ratio (SAR), and Conductivity may all be used as indices of the impurities suspended in solution in coalbed methane wastewater. Clearwater et al. (2002) found that the discharge of coalbed methane wastewater tended to increase sodium and bicarbonate ( $\text{HCO}_3^-$ ) concentrations in the Powder River while decreasing chloride and sulfate ( $\text{SO}_4^{2-}$ ) concentrations as well as water hardness. Thus, coalbed methane production entails a suite of major impacts to soils and waters over and above the impacts of habitat fragmentation and degradation due to the heightened activity, noise, and surface damage caused by the construction and operation of conventional oil and gas fields.

Corning (2001) noted that surface disposal of coalbed methane wastewater onto soils causes major problems for both plants and the soils themselves: Salt accumulations in soils immobilizes soil water, reducing water availability to plants and inducing drought stress and death. Water conductivity levels higher than 1920  $\mu\text{mhos/cm}$  is likely to present severe water availability problems in agricultural crops. When high levels of sodium are deposited on soils, soil structure is also disrupted as clays become deflocculated (achieving finer particle size and fewer interstices), reducing soil porosity and permeability to water infiltration; this problem becomes "severe" when water SARs rise above 16 (Corning 2001). Highly sodic soils (with high pH


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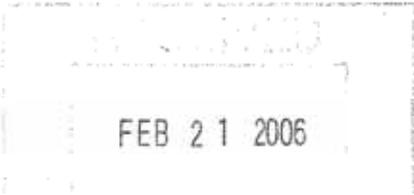
readings) immobilize mineral nutrients needed by plants, further stressing plants. Ion toxicity in plants occurs at a water SAR higher than 9. Balba (1995) noted that high-pH, nonsaline sodic soils are less permeable to water, while saline soils contribute to plant water stress by causing transpiration to increase, cause ion toxicity due to an increase in salts in plant tissue, and have a reduced nutrient availability and thus soil fertility.

Woodward et al. (1985) examined the toxicity to fish for wastewaters high in Potassium, Lithium, Magnesium, Molybdenum, Sodium, SO<sub>4</sub>, and NO<sub>3</sub>. Toxic levels were reached at conductivity of 2,750 umhos/cm and TDS of 2610 mg/l. By comparison, Cleanwater et al. (2002) found that conductivity of produced water in the Powder River Basin ranged from 470-5300 umhos/cm and TDS ranged from 270-2390 mg/l. Produced water in the Rawlins Field office may have significantly higher concentrations of dissolved solids. For fathead minnows in the Woodward et al. study, MgSO<sub>4</sub> was the most toxic salt, followed by NaCl, NaNO<sub>3</sub>, and Na<sub>2</sub>SO<sub>4</sub>. Suter and Tsao (1996) reported threshold values for metals concentrations to prevent toxicity to aquatic life. These are summarized in the table below (all values micrograms per liter). Because CBM wastewater discharge is most commonly a constant and continuous input into aquatic systems, the chronic threshold levels are the most appropriate benchmark. For the Powder River Basin, Cleanwater et al. (2002) reported that coalbed methane wastewater discharge could cause exceedences of these thresholds if large volumes of produced water were released. Trace mineral concentrations must never be allowed to rise above these levels.

Chemical	OSWER NAWQC/FCV	OSWER Tier II	Region IV Acute Screening	Region 4 Chronic Screen.
Aluminum			750	87
Antimony			1300 (2s)	160 (2s)
Arsenic III	190		360	190
Arsenic V		8.1		
Barium		3.9		
Beryllium		5.1	16 (6s)	053 (1s)
Boron			--	750
Cadmium	1.0 h		1.79 h	0.66 h
Chromium III	180 h		984.32 h	117.32 h
Chromium VI	10		16	11
Cobalt		3.0		
Copper	11 h		9.22 h	6.54 h
Iron	1000		--	1000
Lead	2.5 h		33.78	1.32
Manganese		80		
Mercury			2.40	0.0123
Molybdenum		240		
Nickel	160 h		789.00 h	87.71 h.
Selenium	5.0		20.0	5.0
Silver			1.23 h	0.012 (1s)
Thallium			140.0 (3s)	4.00 (2s)
Vanadium		19		
Zinc	100 h		65.04 h	58.91 h.

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According to Corning (2001), discharge of coalbed methane wastewater into stream channels will lead to radical flow increases, with attendant acceleration of erosion and channel widening and straightening, or "channelization." These outcomes increase the likelihood of future flash flooding. The increase in sodium concentration leads to clay deflocculation in banks and streambeds, accelerating physical erosion (Ibid.).

One method of surface disposal for coalbed methane wastewater is to discharge it into unlined reservoirs, either along drainage channels or away from them. Such reservoirs are designed to leak the wastewater gradually into the soil, where it joins groundwater in its down-gradient flow to the nearest surface stream. In earthen dams with high clay content, "piping" of water through the clay of the dam is a likely outcome of storage of highly saline waters, resulting in leakage of stored water into the channel below and ultimately failure of the dam.

In addition, aquifers in different geologic strata are not watertight units, and often there is significant water leakage between aquifers (Phillips et al. 1989, Walvoord et al. 1999). Thus, coalbed methane development may not only dewater the target seam of coal, but may also result in the contamination of neighboring aquifers above or below with natural gas or other pollutants.

It is important to note that the current Great Divide Resource Management Plan did not envision coalbed methane development, and its NEPA process does not support coalbed methane development on a programmatic scale. All projects approved by BLM must be consistent with their Resource Management Plan in accordance with FLPMA. Because the Rawlins Field Office does not currently possess an RMP that explicitly planned for and had NEPA analysis of the unique impacts of CBM development, the Atlantic Rim Project is not legally eligible for final approval until this deficiency is remedied. It is important to note that the Rawlins RMP Draft EIS also was deficient in analyzing for the specific and unique impacts of CBM development, and if the agency ever wishes to approve CBM projects in the Rawlins Field Office legally, it would be wise to correct this oversight.

#### **THE ATLANTIC RIM EIS FAILS TO CONSIDER A RANGE OF REASONABLE ACTION ALTERNATIVES**

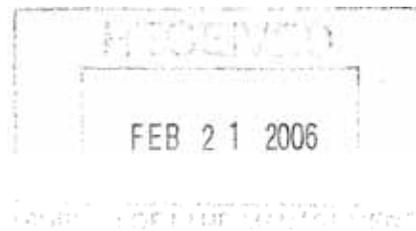
The range of alternatives is "the heart of the environmental impact statement." 40 C.F.R. § 1502.14. NEPA requires BLM to "rigorously explore and objectively evaluate" a range of alternatives to proposed federal actions. See 40 C.F.R. §§ 1502.14(a) and 1508.25(c). Formulation of alternatives during the NEPA disclosure and study process is at the heart of Congress' choice of NEPA as the procedural method that guides federal agencies' management of the public lands. See *Natural Resources Defense Council v. Hodel*, 865 F.2d 288,299 (D.C. Cir. 1988) (citing *Kleppe v. Sierra Club*, 427 U.S. 390,410 (1976)). In fact, NEPA requirements state that "no action concerning the proposal should be taken which would: (1) Have an adverse environmental impact; or (2) Limit the choice of reasonable alternatives." 40 C.F.R. § 1506.1(a). *Catron County v. U.S Fish and Wildlife Service*, 75 F.2d 1429 (10th Cir. 1996)(partial NEPA compliance is not enough.) NEPA regulations also require agencies to address appropriate alternatives in Environmental Assessments. 40 C.F.R. § 1508.9, with specific reference to section 102(2)E of NEPA. In addition, the law requires consideration of a range of mitigation

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measures. See *Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1122-1123 (9<sup>th</sup> Cir. 2002) (and cases cited therein) (stating that agencies must develop and analyze environmentally protective alternatives in order to comply with NEPA).

Section 102(2)(C) of NEPA requires an agency to present alternatives to the proposed action, and Section 102(2)(E) requires the agency to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(C) and (E) (1994); see 40 C.F.R. § 1501.2(c); *Biodiversity Associates*, IBLA 2001-166 at 6; *Wyoming Outdoor Council*, 151 IBLA 260, 272 (1999); *Howard B. Keck, Jr.*, 124 IBLA 44, 53 (1982); *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228-29 (9<sup>th</sup> Cir. 1988), cert. Denied, 489 U.S. 1066 (1989).

The fact is that this basic, fundamental requirement that is the touchstone of every NEPA document has not gone unnoticed on the federal judiciary in sending back environmental studies that fail to meet this requirement. See *e.g.*, *Calvert Cliffs Coordinating Comm., Inc. v. United States Atomic Energy Comm'n*, 449 F.2d 1109, 1114 (D.C. Cir. 1971) (detailed EIS required to ensure that each agency decision maker has before him and takes into account all possible approaches to a particular project . . . which would alter the environmental impact and the cost-benefit balance); *Natural Resource Defense Council v. Callaway*, 524 F.2d 79, 93 (2d Cir. 1975); ("The duty to consider reasonable alternatives is independent from and of wider scope than the duty to file an environmental statement."); *Simmons v. United States Army Corps of Engineers*, 120 F.3d 664, 660 (7<sup>th</sup> Cir. 1997) ("The highly restricted range of alternatives evaluated and considered violates the very purpose of NEPA's alternative analysis requirement: to foster informed decision making and full public involvement."); *Alaska Wilderness Recreation & Tourism v. Morrison*, 67 F.3d 723, 729 (9<sup>th</sup> Cir. 1995) ("The existence of a viable but unexamined alternative renders an environmental impact statement inadequate."); *Dubois v. US Dept. of Agric.*, 102 F.3d 1273, 1288 (1st Cir. 1996) (EIS invalid because agency did not consider alternative of using artificial water storage units instead of a natural pond as a source of snowmaking for a ski resort); *Libby Rod & Gun Club v. Poteat*, 457 F. Supp. 1177, 1187-88 (D. Mont. 1978), rev'd in part on other grounds, 594 F.2d 742 (9<sup>th</sup> Cir. 1979) (Army Corps violated NEPA in an EIS for a hydroelectric dam by only cursorily addressing the alternatives of meeting the Northwest's energy needs through other sources or conservation.); *Northwest Env't'l Defense Center v. Bonneville Power Admin.*, 117 F.3d 1520, 1538 (9<sup>th</sup> Cir. 1997) ("An agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action.")

The failure to look at the full range of reasonable alternatives is related to BLM's duty in any environmental analysis to develop, study, analyze and adopt mitigation measures to protect other resources. The ability to adopt post-leasing mitigation measures – see 43 C.F.R. § 3101.1-2 – is quite broad, as all reasonable measures not inconsistent with a given lease may be imposed by BLM. This is particularly true given that BLM, pursuant to FLPMA, must manage public lands in a manner that does not cause either "undue" or "unnecessary" degradation. 43 U.S.C. § 1732(b). Put simply, the failure of BLM to study and adopt these types of mitigation measures – especially when feasible and economic – means that the agency is proposing to allow this project to go forward with unnecessary impacts to public lands, in violation of FLPMA.

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The Tenth Circuit examined NEPA's alternatives requirement and agreed with other courts that "have interpreted NEPA to preclude agencies from defining the objectives of their actions in terms so unreasonably narrow that they can be accomplished by only one alternative (i.e. the applicant's proposed project)." *Colorado Environmental Coalition v. Dombeck*, 185 F.3d 1162, 1165 (10<sup>th</sup> Cir. 1999), at 1174 (citing *Simmons v. United States Corps of Eng'rs*, 120 F.3d 664, 669 (7<sup>th</sup> Cir. 1997)). At the same time, an agency may not completely ignore an applicant's objectives. See *Id.* at 1174-75. Taken together, these directives "instruct agencies to take responsibility for defining the objectives of an action and then provide legitimate consideration to alternatives that fall between the obvious extremes." *Id.* at 1175. See *All Indian Pueblo Council v. United States*, 975 F.2d 1437, 1444 (10<sup>th</sup> Cir. 1992) (a thorough discussion of alternatives is "imperative"). Accordingly:

Agency compliance vel non with the requirement to consider alternatives is evaluated under the "rule of reason," meaning that "the concept of alternatives must be bounded by some notion of feasibility," and that agencies are required to deal with circumstances "as they exist and are likely to exist," but are not required to consider alternatives that are "remote and speculative." *Natural Resources Defense Council, Inc. v. Hodel*, 865 F.2d 288, 294-095 (D.C. Cir. 1988) (internal citations omitted). However, in examining alternatives to the proposed action, an agency's consideration of environmental concerns must be more than a *pro forma* ritual. Considering environmental costs means seriously considering alternative actions to avoid them. *Calvert Cliffs' Coordinating Comm., Inc. v. U.S. Atomic Energy Comm.*, 449 F.2d 1109, 1128 (D.C. Cir. 1971).

Southern Utah Wilderness Alliance, 237 F.Supp.2d 48, 51; see also *Mineral Policy Center v. Norton*, 292 F.Supp.2d 30, 51 (D. D.C. 2003) (agency "not entitled to deference" where agency operates under erroneous assumption).

In particular, federal agencies must explore alternatives to proposed actions that will avoid or minimize adverse effects on the environment, 40 C.F.R. § 1500.2(3), alternative kinds of mitigation measures, 40 C.F.R. § 1508.25(c)(3), alternatives that would help address unresolved conflicts over the use of available resources (e.g. roadless areas and/or potential wilderness), 40 C.F.R. § 1501.2(c), and other reasonable courses of action, 40 C.F.R. § 1508.25(c)(2). The requirement to consider such less damaging alternatives helps agencies meet NEPA's primary purpose of promoting "efforts which will prevent or eliminate damage to the environment and biosphere..." 42 U.S.C. § 4321. These requirements are affirmed in BLM policy: "BLM officials may not so narrow the scope of a planning/NEPA document as to exclude a reasonable range of alternatives to the proposed action..." USDI Instruction Memorandum No. 2001-075.

The IBLA has established that the elimination of reasonable alternatives without sufficient analysis does not satisfy NEPA, and noted that, "While we could speculate about the BLM's rationale for dismissing...alternatives, we should not be required to fill in the blanks for BLM. The record should speak for itself." *Biodiversity Associates, IBLA 2001-166, Slip Op.* at 7 (2001). Such objective evaluation is gravely compromised when agency officials bind themselves to a particular outcome or foreclose certain alternatives at the outset. Importantly, BLM's decision to approve a high-impact project in sensitive and undeveloped lands when

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671-4-2 | lower-impact alternatives and mitigation measures were readily available has resulted in a project that wreaks unnecessary impacts on the public lands.

671-4-3 | In the context of a situation – such as here – where the goals of the project are in significant part responsive to the project applicant's needs (i.e., Anadarko's), it is important to note that BLM's obligation to consider such needs "does not limit the scope of the agency's analysis to what the applicant says it needs." Southern Utah Wilderness Alliance, 237 F.Supp.2d 48, 52. In other words, while BLM can account for the Operator's desire to minimize costs, this is merely a singular, rather than dispositive and exclusive factor in assessing the feasibility and reasonableness of a given alternative; feasibility and reasonableness must also be understood in light of the BLM's statutory obligations towards non-mineral resources.

671-4-4 | Moreover, simply because BLM asserts that impacts are "insignificant" does not obviate the agency's duty to assess alternatives. Id. at 53-54 (stating "[t]here is no de *minimis* exception to [42 U.S.C. § 4332(E), NEPA's alternatives requirement]"); Sierra Club v. Watkins, 808 F.Supp. 852,870-871 (D.D.C. 1991) (EA must consider less harmful alternatives even if impacts of proposed action insignificant); see also Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1229 (9<sup>th</sup> Cir. 1988) (agency's duty to consider alternatives "is both independent of, and broader than," its duty to complete an environmental analysis). Considering a reasonable range of alternatives is critical to ensure that all interested parties – BLM, Warren E & P, and the public – have an informed basis to question initial predispositions and "to rethink the wisdom of the action." Natural Resources Defense Council, 865 F.2d 288,296; See also Citizens Against Burlington, 938 F.2d 190, 196 ("the rule of reason does not give agencies license to fulfill their own prophecies, whatever the parochial impulses that drive them). This cannot be done if the agency fixates on a limited factors – economic and practical considerations – to the exclusion of other costs (i.e., impacts to non-mineral resources).

671-4-5 | The Atlantic Rim EIS does not consider a range of reasonable alternatives. According to BLM, each alternative assumes the drilling of 2,000 wells, and "All three alternatives assume the same ultimate extent of development." DEIS at 2-6. This is unacceptable; BLM should be examining a range of possible development scenarios that involve less than 2,000 wells, as such alternatives would entail reduced environmental impacts and greater protection for other multiple uses within the project area.

671-4-7 | The BLM should strongly consider developing at most 25% of the project area at any one time, putting leases in the rest of the project area under suspension in the interim. This action would preserve the ability to drill and produce for the Operators, at no cost to them, and would allow BLM to manage the pace of development in the ARPA at a level acceptable to the public and consistent with maintaining wildlife populations. Such large-scale lease suspensions would not constitute a "takings" situation from a legal standpoint, and there is precedent from the Jack Morrow Hills Coordinated Activity Plan, under which leases were suspended for 578,000 acres for a period of 8 years (and counting).

671-5 | **Well Spacing Alternatives Should be Considered**

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The proposed well spacing is 80 acres (8 wells per square mile), with a possible reduction to 160-acre spacing (4 wells per square mile) depending on geology and the proclivities of the operators. DEIS at S-3. This well spacing is too dense to support most multiple uses within the Atlantic Rim project area. It is important to note that the Seminole Road CBM project (at 1,240 wells) is proposed for a surface spacing of 160 acres. See Seminole Road Draft EIS. And while this assumes 2 wells per wellpad, it does not include any directional drilling, as each of the two wells on a pad will be vertical pad completed into different coal-bearing strata. The BLM should evaluate in detail an alternative that requires a maximum of 160-acre well spacing on the surface, and an alternative that requires a maximum of 640-acre spacing on the surface. The analysis of these alternatives should include study of the comparative dewatering profiles for each spacing, how long it would take to dewater the aquifer sufficiently to produce the gas, and how long it would take to produce the gas once the hydraulic head pressure is released. The BLM should look to examples for CBM projects elsewhere in the West for its data, rather than relying on the opinions of "experts," particularly those who might have a vested financial interest in the outcome of the project.

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Several commentators at the Atlantic Rim public hearings referred to an analysis by the BLM's Reservoir Management Group on the feasibility of the project under various well spacings. This report was omitted from the Draft EIS. See DEIS at xi. If BLM is to consider the findings of this document in formulating the Atlantic Rim project decision, this document must be disclosed to the public by appending it to the EIS. If this is not done, then the agency will be unable to rely on any analysis, regardless of its validity (or lack thereof), to support its decision on this project.

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**A Directional Drilling Alternative Should Be Considered**

Directional drilling (both horizontal/multilateral and S-turn) holds sufficient promise for application in the Atlantic Rim CBM project that it should be considered in detail as an alternative to higher-impact vertical drilling layouts. Directional drilling allows for full development of the resource with fewer roads, wellpads, and pipelines that disrupt wildlife, public use, and other multiple-use values on the surface. A survey of the petroleum engineering literature concerning the state of directional drilling and its environmental advantages is contained within the report *Drilling Smarter: Using directional drilling to reduce oil and gas impacts in the Intermountain West*. Attachment 1.

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There are two types of directional drilling which could be employed in the Atlantic Rim project, and which would constitute reasonable alternatives. The first type is Z-Pinnate directional drilling (a horizontal multilateral approach), as practiced by CDX gas for coalbed methane resources in southwestern Colorado and now in south-central Wyoming. CDX Gas is currently drilling Z-Pinnate directional for coalbed methane just west of Baggs at their Smith Rancho wells. As of January, these wells were averaging 600 barrels of water per day, and gas is increasing to 150 mcf/day. There has been no problem with borehole collapse; both open-hole laterals and main lateral liners. Drainage area is estimated at 640 acres. While drilling these wells, CDX hit some faults, which cause some difficulties and additional expense. But CDX was able to resolve these issues, and the company expects these wells to be profitable and successful over the long term. CDX plans additional Z-Pinnate directional wells for CBM in the Sugarloaf

area just across the Colorado line from their Smith Rancho operation. Telephone conversation with Doug Wight, Vice President, CDX Gas, January 31, 2006.

According to CDX Gas, their Z-Pinnate Directional Drilling system can be used to drain an area of up to 1,280 acres of coalbed methane from a single pad (Wight 2004). These wells have produced 90% of the coalbed methane in place over a 3-year time horizon, versus only 10-40% of the CBM for vertical well layouts over the course of decades (Ibid.). This technology is effective at depths greater than 800 feet; this fits well with the depth of the target formations in this project. Several "pinnates" can be drilled to take advantage of disjunct coalbed methane deposits at different depths. Id. In the San Juan Basin of Colorado, use of this technology cost \$1,635,006 for each 1,280-acre layout, versus over \$2 million to drain the same area with vertical wells (Id.). This technology should have been considered as an alternative to a conventional well layout, with its tangle of roads, pipelines, and wellpads. See also Attachments 2 and 3. We recommend that BLM speak directly with CDX Gas about the possibilities of producing the Atlantic Rim CBM using Z-Pinnate directional drilling, thus reducing the surface spacing to one wellpad per square mile or less, with major savings in impacts to wildlife, lands and waterways.

In addition, the Draft EIS presents no evidence that the particular coal deposits in the ARPA are not conducive to horizontal drilling. Indeed, BLM states,

The lateral continuity of these coal units is considered sufficient such that they act as a regional aquifer system. Although individual coal seams may split and merge, there is sufficient hydrologic communication, on a regional scale, to allow movement of groundwater.

DEIS at 4-33. If the coal-bearing strata are sufficiently fractured and/or porous to permit groundwater to flow freely throughout the stratum, then once the hydraulic head pressure has been removed from the coal seams, the coalbed methane (a gas) will likewise flow freely through the stratum. Thus, horizontal drilling would be expected to be just as feasible (indeed, perhaps more efficient) as a means of producing CBM in the Atlantic Rim project as the vertical drilling alternatives advanced in the EIS.

The second reasonable alternative would be to use S-turn directional wells and well clustering to tap CBM resources in the ARPA. Because these wells return to the vertical before entering the target strata, they are functionally identical to the vertical drilling in the Proposed Action from a gas and water production standpoint. BP is currently drilling 8 wells from a single pad in the Wamsutter Field, achieving 80-acre downhole spacing (identical to the Proposed Action) with only one wellpad per square mile on the surface. On the Pinedale Anticline, Shell is drilling up to 32 wells per pad, achieving downhole spacing of 20 acres but with only one wellpad per square mile on the surface. In the Jonah Field, EnCana has drilled more than 140 S-turn directional wells in a tight-gas unconventional play. See Attachment 4, but see also Attachment 5. It is apparent that the CBM resources in the ARPA are sufficiently deep to support this type of drilling.

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The BLM states that a directional drilling alternative was considered but eliminated from detailed consideration for the Atlantic Rim project, beyond the vacuous statement that such an alternative "would not be reasonable." DEIS at 2-8. In its EIS, the BLM offers no rationale whatsoever for why directional drilling might be considered infeasible. *Id.* The BLM references a memorandum from its Reservoir Management Group to support this conclusion, although this memo was not included in the EIS. In order for the BLM to legally rely on the information in this memorandum to support its decision to trim the range of reasonable alternatives pursuant to NEPA, it must be presented for public scrutiny in the EIS document itself. No information withheld from an EIS or EA is admissible as analysis upon which the BLM may base a decision.

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It is important to note that the BLM's Reservoir Management Group has historically been unsuccessful in predicting where directional drilling can (and cannot) be implemented for fluid minerals resources. For example, for the Yates Duck Creek drilling project, the Reservoir Management Group stated categorically that directional drilling was impossible for oil targets in that particular formation, due to the geological complexity of the area. Yates subsequently completed a directional well into the same formation a few miles away. The lousy guesswork of this department renders its conclusions essentially useless for analysis of directional drilling potential; one can hardly rely on this group as a source of "expert opinion."

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**A True Phased Development Alternative Should be Considered**

BLM's "Alternative B" would allow development of the project area to occur in three phases, each lasting 6-7 years. DEIS at S-3. Once drilling and interim reclamation were complete for the 925 wells in the central part of the project area, drilling and construction operations would begin in the northern third, and once interim reclamation was complete in the north, activities would begin in the southern third. This type of phased development is really not phased development at all; it is in fact phased drilling, which accomplished very little to mitigate impacts to wildlife species and recreational users displaced by drilling and production activities.

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Studies have shown that the impacts of gas fields at the production stage are virtually as great as the impacts of drilling and construction (see Powell 2003, Sawyer et al. 2005, and Holloran 2005), and that development of the intensity envisioned for the Atlantic Rim project will essentially render developed areas void of sensitive wildlife for the duration of production-related activities.

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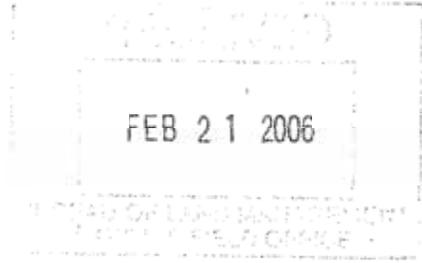
671-7-4

Instead, the BLM should consider a true phased development alternative, in which all drilling and production activities are completed and fully restored to a natural state, prior to moving on to other parts of the project area. In addition, allowing a maximum of 1/4 of the project area to be under development at any one time would be a much more practical pace of development than beginning with almost half of the project at the beginning. Existing leases could be suspended in areas where development was deferred until a later phase; doing this would remove any possibility of "takings" of lease rights during the course of deferral.

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**Reducing the Project to a Manageable Size Should be Considered as an Alternative**

BLM should also consider the alternative of paring down the project to a much smaller size. A smaller project, less than 100,000 acres in area, would be beneficial because it would



671-8 | industrialize only a minority of the wildlife habitat, recreational landscapes, and watersheds between Rawlins and Baggs, instead of virtually all of them. This alternative would provide a greater balance of uses, instead of elevating drilling and production to the single and dominant use of these lands. We would still like to see a more responsible density of surface impacts under such an alternative than we currently see under any of the three action alternatives published in the Draft EIS.

**There is No Alternative that Would Render Impacts to Sage Grouse and Other Wildlife Below the Threshold of "Significant"**

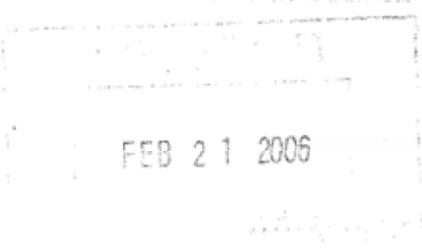
671-9-1 | According to BLM, all three action alternatives would result in significant impacts to sage grouse and Columbian sharp-tailed grouse. DEIS at S-5. As both of the birds are on the BLM Sensitive Species list, with an agency mandate to prevent a trend toward listing under the ESA, the agency should study and implement an alternative that reduces impacts to sage grouse and Columbian sharp-tailed grouse below the significance threshold. In addition, according to BLM's analysis (which represents a most rosy estimate), all three action alternatives would exceed the significance criteria with regard to impacts to soils, some vegetation criteria, elk, mule deer, and recreation. As there are mitigation measures and/or alternative wellfield management options (outlined below) that fully meet the Purpose and Need for this project and would reduce impacts to the aforementioned resources (as well as others which BLM has erroneously concluded would not incur significant impacts under the various alternatives), such alternatives must specifically be analyzed and considered by BLM because they represent alternatives that minimize the impacts of the project to the human environment.

**An Action Alternative that Protects the Wild Cow Creek Citizens' Proposed Wilderness Must Be Analyzed**

671-9-2 | The Wild Cow Creek citizens' proposed wilderness is a 33,500-acre roadless area that contains unique backcountry recreation opportunities, is a hotspot for wildlife and fish habitats, and represents one of the few areas in the ARPA with high scenic values where solitude can be found away from human intrusions. Not one of the proposed action alternatives provides adequate protection for this important area. Even Alternative C would allow road densities of 3 miles per square mile and wellpad construction in this area. DEIS at 2-5,6. BLM notes that all three alternatives would result in "displacement of wildlife and the loss of natural appearing landscapes" throughout the ARPA, rendering it "undesirable for hunting or wildlife viewing" and decreasing its value for camping. DEIS at S-6. These losses would be particularly egregious in the proposed wilderness unit. BLM should provide and analyze at least one action alternative that excludes the Wild Cow Creek citizens' proposed wilderness from the project. This would be eminently reasonable, as water drawdown modeling maps for the project indicate that most (if not all) of the CBM extraction will take place west of the unit.

**THE ATLANTIC RIM DRAFT EIS FAILS TO TAKE A "HARD LOOK" AT IMPACTS TO LANDS AND RESOURCES**

671-10-1 | NEPA's purpose is to maintain a national "look before you leap" policy in regard to all major federal actions. Congress' intent in establishing this objective was to avoid uninformed agency decisions that could have serious environmental consequences. Thus, NEPA's mandate is that all federal agencies analyze the likely effects of their actions, as well as address the potential



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alternatives. "Agencies are to perform this hard look before committing themselves irretrievably to a given course of action so that the action can be shaped to account for environmental values." NEPA § 102(2)(c) requires the agency to consider numerous factors [including] irreversible commitments of resources called for by the proposal." *Sierra Club v. Hodel*, 848 F.2d 1068 (10<sup>th</sup> Cir. 1988) (rev'd on other grounds)(emphasis added). NEPA provides procedural protections for resources at risk by requiring analysis of impacts before substantial decisions are made that set development in motion. See *Conservation Law Foundation v. Watt*, 560 F. Supp. 561, 581 (D. Mass. 1983), *aff'd* by *Massachusetts v. Watt*, 716 F. 2d 946 (1<sup>st</sup> Cir. 1983).

### **The EIS Fails to Provide an Adequate Description of the Proposed Action and Alternatives**

The Atlantic Rim Draft EIS was released prematurely, before the BLM had developed a plan for where and how the project would be implemented. The agency has no idea where most of the roads, wellpads, and pipelines would be sited. In addition, BLM concedes that "the actual number and location of deep natural gas wells is speculative at this point." DEIS at 4-49. The Wyoming Game and Fish Department has characterized the relative severity of oil and gas impacts as follows:

The severity of the impact to wildlife depends on the amount and intensity of the disturbance, the specific locations and arrangements of the disturbance, and the ecological importance of the habitats affected (WGFD 2005).

With this in mind, it is impossible for BLM to provide a meaningful analysis of impact severity without first determining where the wells and roads will be located, specifically, and what relationship they will have spatially with ecologically important habitats.

With the exception of the No Action Alternative, the BLM has failed to provide sufficient information about the proposed action and other action alternatives to support a reasonably thorough impacts analysis as required by NEPA. The BLM noted that the project will entail 1,000 miles of new roads, road construction, and pipelines. DEIS at 2-2. These three categories have substantially different impacts; how many miles of new roads will be required? How many miles of pipelines? How many miles of road upgrades or reconstruction, and are these upgrades of two-track jeep trails or upgrades of existing constructed and maintained gravel roads? In addition, compressor stations and gas processing facilities may be required. DEIS at 2-2. These facilities have major impacts above and beyond the impacts of individual well facilities. How many compressor stations will be required, and exactly where will the high-noise-pollution facilities occur in relation to sage grouse leks and other sensitive wildlife habitats? How many gas plants will be needed, and where will these be sited?

Dividing the project area by eight wells per square mile yields 3,420 well sites. DEIS at 4-22. There are 210 wells extant and an additional 200 wells that could be approved under the interim drilling program. Added to the 2,000 wells of the Atlantic Rim project, there would be a maximum of 2,410 wells drilled, covering roughly 2/3 of the planning area at maximum density. In other words, approximately 1,000 potential well locations would not be emplaced. *Id* This could leave a little less than 113 of the planning area undeveloped. BLM notes, "The construction disturbance would not be uniformly distributed across the project area, but rather, project facilities would be located where the efficiency and feasibility of extracting natural gas would be

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671-11-6 | 671-11-1 | the highest." DEIS at 4-38. Where will the full-field development occur under this project, and which lands will remain undeveloped? This information is an absolutely essential (and missing) prerequisite to a sound impacts analysis.

**Geological Hazards**

The BLM admits that many of the areas in the ARPA are prone to landslides, and that large-scale landslides have occurred within the AFWA in the past. DEIS at 3-9. BLM admits that some mass movement could be triggered by project activities. DEIS at 4-2. For each alternative, how many miles of road and how many wellpads would be constructed in geologically unstable areas? While the BLM notes that direct and indirect impacts associated with landslides and erosion would occur under the Proposed Action (DEIS at 4-4), the agency makes no effort to quantify the magnitude, level, or likelihood of impacts, or where they would most likely occur and what the environmental consequences would be. Identical deficiencies occur for the analyses of other alternatives. This is a clear violation of NEPA's "hard look" requirement. And because the agency has failed to map the locations of roads, pipelines, and wellpads for this project, it cannot examine how many wells or miles of roads or pipelines will fall on steep and/or unstable slopes. And without this information, it is impossible for BLM to analyze the level of impact for geological hazards. This deficiency must be corrected before the project can be approved.

**Coal Seam Fires**

BLM notes that, while clinker deposits indicate the advent of past coal seam fires, coal seam fires resulting from the Atlantic Rim project are unlikely because coal outcrops tend to already be degassed, reducing the opportunity for ignition. DEIS at 3-8,9. However, as the hydraulic head pressure is released by dewatering of the coal seams during the Atlantic Rim project, the coalbed methane will begin to migrate. CBM migrates in an uncontrolled fashion; it can make its way to the surface through overlying beds of rock, or through water well systems, emerging at the surface to kill vegetation and cause explosions in residences, as has happened in the San Juan Basin coalbed methane play. Similarly, coalbed methane vents to the surface at the North Antelope-Rochelle Mine face. Duane Zavadil, Bill Barrett Corporation, personal communication. It is equally possible for newly-liberated CBM to migrate along the coal seam to the outcrop, where it could ignite and cause a coal seam fire. BLM acknowledges this likelihood for the AFWA. DEIS at 4-47. A photograph of this phenomenon from the Powder River Basin was published in a July 2005 National Geographic article on oil and gas issues in the West. The BLM's impacts analysis is deficient inasmuch as it does not include a quantification or estimate of how much CBM will travel along coal seams to outcrops, and what the impacts of such venting might be.

**Soils**

The BLM has identified a suite of five impact significance criteria for soils. DEIS at 4-17. The BLM concludes that under the Proposed Action, "[m]any areas would exceed the impact significance criteria for soils," but fails to disclose which of the five criteria will be exceeded, where each criterion would be exceeded, for how many wellpads, or miles of road or pipeline, these criteria will be exceeded. See DEIS at 4-18. Essentially, although the BLM has made an acreage categorization of the ARPA by soil type, with some inferred risks (see Table 3-10), it has made no attempt to analyze the magnitude of impacts under any of the alternatives. In order to

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thoroughly study the magnitude and geographic distribution of impacts, BLM must map the specific locations of roads, pipelines, and wellpads under each alternative, provide the magnitude of impact projected by soil type and slope, and calculate the acreage of land where reclamation is expected to be unsuccessful, the tonnage of soil that is eroded in each watershed, the stream reaches where water resources criteria are not met, the acreage where vegetation significance criteria are surpassed, and the acreage where soil productivity is reduced beyond the ability of vegetation to recover to pre-disturbance levels. At one point, the EIS alludes to a figure of 36% of the sensitive soils in the ARPA would be disturbed, but it is unclear whether this figure is meant to apply to Alternative C or the Proposed Action. DEIS at 4-19. The Draft EIS currently provides essentially no information or analysis to support the conclusions that are reached for each alternative, and these conclusions are so vague that the public (and the decisionmakers) have no way to evaluate the magnitude of the ecological disaster that will result from the implementation of this project.

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*Biological Soil Crusts*

The Atlantic Rim DEIS fails to take the "hard look" at impacts to biological soil crusts required by NEPA. BLM asserts that "no biological soil crusts are mapped or known to occur within the ARPA." DEIS at S-4. This assertion is factually incorrect. Photographs of biological soil crusts from within the ARPA were submitted to the Rawlins BLM by Dr. Jack States, and his comments identified biological soil crusts within the ARPA. We incorporate Dr. States' comments into these comments by reference. Appendix I to Dr. States' comments, titled "Location of BSC inventory sites within the Great Divide Resource Area," maps biological soil crust inventory sites within the ARPA. In addition, photographs numbered EMM68-13, EMM68-14, and EMM68-7 attached as Appendix V to Dr. States' scoping comments, show biological soil crusts with precise GPS locations that place them within the ARPA. The fact that BLM asserts that there are no known biological soil crust occurrences within the ARPA indicates not only that BLM has failed to take a hard look at the resources on the ground, but that it has failed to even take a hard look at the information that the agency possesses in its own files.

Dr. States noted, "The highly degraded condition of soil crusts in the GDRA [Great Divide Resource Area] is indicative of the dire need for additional investigation, mapping, and assessment." Commentary on biological (*microphytic*) soil crusts in the Rawlins Resource Management Area at 3. In addition, Dr. States recommended, "*Conduct detailed surveys and mapping of critical resource areas,*" and "*Analyses of the environmental impacts on biological soil crusts should be required of all development projects including but not limited to rights-of-ways, coal, oil, gas, and seismic exploration permits, and permits to drill and test.*" Id at 5, emphasis in original.

Causes of crust disturbance noted by Dr. States include "Mineral Resource Industry activities (seismic exploration, oil & gas development, coalbed methane development)." Commentary on biological (*microphytic*) soil crusts in the Rawlins Resource Management Area at 3.

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In order to fulfill the baseline information requirements of NEPA, which provide the starting point for the legally required "hard look" at impacts to biological soil crusts, the BLM must undertake field sampling and surveying at representative points within the project area. The

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671-14-7 | agency must then provide maps of the areal distribution of soil crusts, along with their state, so that the agency can undertake a meaningful analysis of the impacts of the various alternatives on biological soil crusts.

671-14-8 | 671-14 | And because the BLM erroneously assumed that biological soil crusts were absent from the ARPA, it provided no impact analysis on the effects of the project on soil crusts. See DEIS at 4-16. This failure to take a "hard look" at soil crusts must be remedied through field surveys before the project may legally be allowed to go forward.

### Water Resources

671-15-1 | The BLM's requirement that almost all of the wastewater from this project be injected underground is a measure that must be retained and strengthened by requiring surface disposal at the Cow Creek Pod to be converted to underground injection. BLM correctly notes that surface disposal would increase salt loading and salinification of riparian habitats (resulting in deterioration of habitat function), and increase headcutting erosion and blowout of stream channels (with the resulting increase of sedimentation not noted by BLM). DEIS at 4-48. BLM notes that there might be some opportunity to enhance riparian function by artificially maintaining flows in dry years (*Id*), but this purported benefit is undercut by the fact, also noted by BLM, that salinity from wastewater would have major negative impacts on riparian vegetation. As a result, there would likely be no valuable riparian habitat left to enhance with increased water flows. Thus, under any circumstance, the requirement to inject wastewater for this project must be maintained, and is one of the few bright spots in an otherwise bleak NEPA document.

671-15-2 | 671-15 | One assumption for the impacts analysis for water resources is that "The degree of impact attributed to any one disturbance or series of disturbances is influenced by several factors including location within the watershed, time and degree of disturbance, existing vegetation, and precipitation." DEIS at 4-23. This assumption points out the need to define the precise location of roads, wells, and pipelines in order to measure impacts to water resources. The Draft EIS does not contain this critical information, which is a prerequisite to a sound "hard look" at impacts to water resources according to BLM's own assumptions. This problem of failing to know where impacts will occur geographically is particularly egregious with regard to sedimentation to specific waterways and impacts to springs and seeps. BLM demurs that "the locations of these new pad locations can not be determined definitively under any of the action alternatives...." DEIS at 4-23. This statement is arbitrary and capricious; in the Draft EIS for the Seminole Road CBM project (1,240 wells), the locations of roads and wellpads are presented in full. Seminole Road DEIS, Figure 4. So obviously, a project of this magnitude can (and should) be planned and laid out in advance, by alternative, allowing a full and legally sufficient impacts analysis to be done.

671-15-4 | 671-15-5 | If the BLM is to live up to the requirements of NEPA for the Atlantic Rim project, the well locations would be known ahead of time, allowing a legally sufficient analysis to be undertaken. In fact, the well site locations for the Double Eagle "Catalina Unit" are already known and mapped in the BLM's APD file, and APDs have been requested. See Attachment 6. It is

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671-15-5 | incumbent on the BLM to gather this data, plus proposed road alignments, compressor station  
671-15 | and gas plant locations, pipeline alignments.

### **Wildlife**

671-16-1 | Overall, BLM's impact analysis on wildlife species by alternative is shockingly sparse, devoid of  
any scientific analysis, modeling, or other predictive material, and in fact represents no analysis  
at all of the impacts to various wildlife species. See DEIS at 4-68. Due to the lack of a thorough  
analysis, BLM has reached the erroneous conclusion that impacts will not reach the level of  
significance under all three action alternatives for noxious weeds, small mammals, raptors, BLM  
Sensitive Species, and Threatened and Endangered fishes living downstream of the ARPA. See  
DEIS at 2-10. In addition, these insufficient analyses have led BLM to the erroneous conclusion  
that Alternative C would not result in significant impacts to vegetation, songbirds, pronghorn,  
and visual resources. *Id.* It is surprising that BLM would so baldly go where no data has gone  
before on a project so consequential for some of the most important wildlife habitats and public  
lands in the state. See *Rawlins to Baggs Geographic Area*, DEIS at 3-199.

#### Sagebrush Obligate Passerines

671-16-2 | Ingelfinger (2001) found significant declines in nesting songbirds that are BLM Sensitive  
Species within 100m of gas field roads, and also found that sage sparrows declined near  
pipelines. A legally sufficient impact analysis for the Atlantic Rim project would map the  
locations of wells, roads and pipelines, then buffer them by 100m to determine how much area  
would lose its habitat function for these species. But because the BLM has yet to plan the  
location of these impacts, the requisite "hard look" required by NEPA could not be undertaken.  
671-16-3 | How much of the landscape will be within 100m of a road or wellpad under each alternative?  
671-16 | This baseline information is a crucial underpinning if BLM is to make an informed choice.

#### Pronghorn

671-16-4 | The BLM notes that the project would likely result in the displacement of pronghorn from  
developed areas during the production phase. DEIS at 4-63. The agency also notes that these  
antelope are limited to crucial winter ranges east of Highway 789, which is a barrier to westward  
antelope movement. In light of the findings of Sawyer et al. (2005) and Powell (2003) for other  
ungulates, we have significant concerns that the pronghorn in the ARPA will not have access to  
suitable winter ranges once the project is in full swing. Because winter ranges are viewed as the  
limiting factor for antelope populations in this part of Wyoming, there is a strong chance that this  
project will result in major decreases in pronghorn populations, just as Sawyer et al. (2005)  
found major decreases in the mule deer population as a result of full-field development in the  
mule deer crucial winter ranges of the Pinedale Anticline. And yet the BLM has made no effort  
to model the population-level effects of this project on the antelope herd that inhabits the ARPA.  
671-16-5 | This is an egregious violation of NEPA's hard look requirements.  
671-16-6 |

#### Mule Deer

671-16-7 | For mule deer, it is clear that mitigation measures proposed for the ARPA will not prevent the  
wholesale abandonment of crucial winter ranges, because a study by Sawyer et al. (2005) has  
shown that complete abandonment of mule deer winter ranges has in fact occurred for oil and gas  
developments of the scale of the Atlantic Rim project while similar mitigation measures were

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applied, and the result was a 48% reduction of the impacted herd. And, in fact, the BLM predicts that these mitigation measures will result in displacement and die-offs of mule deer. DEIS at 4-64. Because the agency essentially concedes that its mitigation measures will not succeed, it has a responsibility to come up with stronger measures that will. In addition, the BLM is deferring to some future time the development and application measures for mule deer migration corridors. DEIS at 4-64. To satisfy NEPA, the project's implementation and analysis must be fully prepared and presented in the EIS. If more information on mule deer migrations is needed (and clearly this is so), then the implementation of this project can wait until the study is concluded, the BLM has sufficient information to design mitigation measures and fully evaluate alternatives, and a legally sufficient EIS can be presented to the public for review.

### Elk

Several studies have shown that elk abandon calving and winter ranges in response to oilfield development. In mountainous habitats, the construction of a small number of oil or gas wells has caused elk to abandon substantial portions of their traditional winter range (Johnson and Wollrab 1987, Van Dyke and Klein 1996). Drilling in the mountains of western Wyoming displaced elk from their traditional calving range (Johnson and Lockman 1979, Johnson and Wollrab 1987). Powell (2003) found that elk avoid lands within 1.5 kilometers of existing oilfield roads and well sites in summer and avoid lands within 0.6 mile of roads and wellpads in winter in sagebrush habitats of the Red Desert. Migration corridors may in some cases be equally important to large mammals and are susceptible to impacts from oil and gas development (Sawyer et al. 2005).

Thus, winter range areas should be withdrawn from the surface disturbances associated with oil and gas development, and leased only under "No Surface Occupancy" stipulations.

For elk, BLM notes that several elk migration routes traverse the project area, but their significance remains unknown. DEIS at 4-65. This lack of information betrays insufficient baseline data and analysis to support a decision on this project, or to properly evaluate alternatives. BLM openly admits that mitigation measures in the Proposed Action and Alternative B will have no mitigative value throughout the life of the project due to their absence of influence on production-phase impacts. DEIS at 4-65. BLM predicts displacement and impacts to reproductive rates and winter ranges to which the animals are displaced. And yet the BLM has made no effort to estimate the population-scale impacts of this project to elk, in violation of NEPA's hard look requirements. BLM's analysis of impacts under the various alternatives relies on estimates of surface disturbance acreage, which is not a sound index for impacts to elk. The real metric, based on the science (see, e.g., Powell 2003), is how many acres of elk CWR and migration corridors are within 0.6 mile of a road or wellpad, as this is the habitat that is likely to be avoided by elk during winter according to the best available science. In order to generate this data, BLM will need to plot the exact location of proposed wellsites and roads against elk CWR, Severe Winter Relief (SWR) range, and migration corridors.

### Sage Grouse and Columbian Sharp-tailed Grouse

For sage grouse, BLM describes the types of impacts that will likely be incurred, up to and including lowered productivity and long-term population declines. DEIS at 4-66. But the agency fails to under take an analysis of what extent these impacts will be under the various alternatives. Holloran (2005) found that oil and gas development of a similar intensity to the Atlantic Rim

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project caused leks to go extinct within several years of the onset of development, and also found that development on this scale is completely incompatible with maintaining sage grouse populations within developed areas. Which of the 88 leks will go extinct as a result of project activities? What is the estimated trajectory of the ARPA sage grouse population throughout the life of the project.? Holloran (2005) modeled demographic data and determined that sage grouse in the Pinedale Anticline/Jonah Fields would be extinct within 19 years. BLM could run the same model for the ARPA, and must if it is to adequately satisfy NEPA's hard look requirements. But the agency must first plan and plot the layout of wells, roads, compressor stations, and other facilities in order to conduct this level of analysis, because project-level impacts will depend on exactly where project impacts occur. In addition, there are only 200 acres of Severe Winter Relief (SWR) habitat in the ARPA. DEIS at 4-66. A highly specific layout of wells and roads, as in the Seminole Road project, would allow BLM to accurately assess impacts to this rare resource. This layout needs to be completed before the BLM can accurately assess impacts to grouse SWR habitat.

For Columbian sharp-tailed grouse, the six leks in the ARPA represent 27% of the leks in the Rawlins Field Office (DEIS at 4-66), and likely 27% of the leks in Wyoming as well (BLM should clarify this point in the FEIS). BLM has provided no analysis of environmental consequences for sharp-tailed grouse under this project. How many leks will be abandoned? Which ones? What will be the sharp-tailed grouse population trajectory throughout the life of the project? These questions must be answered for each alternative to achieve a legally satisfactory EIS.

#### Raptors

For raptors, BLM asserts that "most prey species would be expected to rebound to pre-disturbance levels following initial reclamation." DEIS at 4-67. This statement is completely unsupported by scientific evidence or expert opinion, and is thus arbitrary and capricious. In fact, BLM estimates that available forage will be reduced by either 15-30% or 20-35% (depending on which section of the DEIS one believes). Because these forage plants are the food base for rodents, lagomorphs, songbirds, and other raptor prey, the educated estimate would be that raptor prey base will decrease by 15-35% throughout the life of the project, and when the last traffic disappears and the dust finally settles (after 30-50 years), then and only then will the prey base rebound. The BLM's assumptions about the raptor prey base reveal a profoundly flawed analysis.

The BLM's "impact analysis" for raptors under the Proposed Action and Alternative B amount to one sentence: "With the application of avoidance and mitigation measures, impacts are not expected to exceed the significance criteria." No analysis, no supporting scientific evidence. Just one bald, unsupported, arbitrary and capricious assertion. Besides the lack of analysis to support its conclusions, the BLM's single sentence is itself dead wrong: this will be discussed further when the inadequacy of BLM's proposed mitigation measures for raptors is laid out in the following section. Indeed, the BLM biologist formerly responsible for monitoring raptors in the Rawlins Field Office concluded that "the existing, proposed, and potential levels of natural gas development would significantly impact nesting raptors" throughout the Flat Top Mountain area of the Great Divide, where the Desolation Flats natural gas project is currently proposed by BLM

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(Apple 2003). According to Postovit and Postovit (1989), oil and gas development results in habitat fragmentation and increased levels of human disturbance, impacting raptor species; nesting and foraging habitat loss can be substantial in the case of full-field development. It is important to note that raptor nesting concentration areas in the ARPA are at least as important as those at Flat Top Mountain, and the proposed wellfield development has a significantly more intense impact than that approved for the Desolation Flats project. In order to remedy these deficiencies, BLM must undertake a review of the raptor research literature (see Mitigation Measures *for Raptors* below), and design and implement mitigation measures that will actually reduce the impacts below the significance level.

BLM must also undertake a full and credible analysis of the impacts of this project on raptors, by individual species. What are the baseline populations for each raptor species within the ARPA, and what are the current fledging rates (an index of recruitment). The BLM should have ready access to these data, as they are typically gathered by the WGFD. The BLM should then develop estimates of what the effects will be of development activities on individual active raptor nests, which are well-known to BLM. This will require a spatial analysis of the proximity of roads and wellpads to each active raptor nest (which, in turn, requires the BLM to come up with a layout of the roads and wells for the project). The BLM should then present a projected population trajectory for each raptor species, based on the best available scientific information.

#### **THE DRAFT EIS FAILS TO ASSESS THE EFFECTIVENESS OF PROPOSED MITIGATION MEASURES**

Simply listing and not analyzing the effectiveness of these measures also results in violation of NEPA. See Northwest Indian Cemetery Protective Association v. Peterson, 764 F.2d 581, 588 (9th Cir. 1985), rev'd on other grounds, 485 U.S. 439 (1988) (where the court determined that NEPA requires agencies to "analyze the mitigation measures in detail [and] explain how effective the measure would be. ... A mere listing of mitigation measures is insufficient to qualify as the reasoned discussion required by NEPA."). In a case where the Corps of Engineers attempted to rely on untested mitigation measures, the Wyoming District Court ruled, "the Court holds that the Corps' reliance on mitigation measures that were unsupported by any evidence in the record cannot be given deference under NEPA. The Court remands to the Corps for further findings on cumulative impacts, impacts to ranchlands, and the efficacy of mitigation measures." Wyoming Outdoor Council v. US. Army Corps of Engineers, 351 F.Supp.2d 1232, 1238. (D. Wyoming 2005).

Second, the mitigation measures relied upon must "'constitute an adequate buffer' ...so as to 'render such impacts so minor as to not warrant an EIS.'" Greater Yellowstone Coalition, 359 F.3d at 1276 (quoting Wetlands Action Network, 222 F.3d 1105, 1121 (9<sup>th</sup> Cir. 2000)). In other words, "When the adequacy of proposed mitigation measures is supported by substantial evidence, the agency may use those measures as a mechanism to reduce environmental impacts below the level of significance that would require an EIS." National Audubon Soc. v. Hoffman, 132 F.3d 7, 17 (2d Cir. 1997). "In practice, mitigation measures have been found to be sufficiently supported when based on studies conducted by the agency,...or when they are likely to be adequately policed." *Id.*

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The courts have had little patience with agencies' failure to provide sounds scientific evidence to support the efficacy of their mitigation measures. In Wyoming Outdoor Council, the Court ruled

In short, the mitigation measures relied upon by the Corps, while mandatory, are not supported by a single scientific study, paper, or even a comment. This Court does not expect the Corps to conduct extensive research on the efficacy of wetland replacement. Neither can the Court defer to the Corps' bald assertions that mitigation will be successful. ... As such, the Corps was arbitrary and capricious in relying on mitigation to conclude that there would be no significant impact to wetlands. The Court remands to the Corps to support its reliance on mitigation.

351 F.Supp.2d 1232, 1252, footnote omitted. The court concluded, "This Court will not rubberstamp an agency determination that fails to consider cumulative impacts, fails to realistically assess impacts to ranchlands, and relies on unsupported, unmonitored mitigation measures. NEPA and the CWA require more." 351 F.Supp.2d 1232, 1260.

It is interesting to note that many of the BMPs in Appendix H specifically requested by the conservation community and the public (such as directional drilling, drilling multiple wells from a single pad, etc.) will specifically not be implemented under any action alternative (and some have been explicitly removed from further analysis by BLM), even though the Appendix H BMPs "will be applied under all alternatives as Conditions of Approval where projects conflict with identified resources." DEIS at H-1. These comments establish, with the backing of the best available science, that numerous and serious resource conflicts exist which merit the application of BMPs. However, it is equally clear that BLM has not intention of applying many of the identified BMPs, even though the agency itself often notes unresolved resource conflicts throughout the DEIS. Exactly when and where and under what conditions these BMPs will be applied by BLM needs to be clarified.

**Wildlife Mitigation Measures**

The WGFD (2005:6-7) lists under its "Important Misconceptions about Wildlife Responses to Oil and Gas Disturbances" the idea that "Existing seasonal use stipulations, standard operating procedures, and reclamation practices are adequate consideration for wildlife resources affected by oil and gas development." The BLM prescribes under its various alternatives mitigation measures designed to ameliorate the impacts of the Atlantic Rim project to wildlife. The Proposed Action and Alternative B have the standard suite of mitigation measures, while Alternative C offers a suite of more stringent but equally untested mitigation measures. The BLM has failed to provide any support or analysis of the effectiveness of the following mitigation measures for wildlife, despite its obligations under NEPA.

The BLM has access to a wealth of monitoring data gathered from oil and gas projects in similar environments where the standard mitigation measures proposed in this project have already been applied. The BLM should use these data to test the hypothesis that these standard measures are sufficient to prevent significant impacts to the wildlife in question.

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671-18-3 BLM states, "Prohibiting construction, drilling, *and other activities potentially disruptive to wildlife* during sensitive time periods (i.e., winter, brood rearing), would minimize the probability of displacement, nest abandonment, or reproductive failure during these critical times of the year." DEIS at 4-60, emphasis added. Setting aside the fact that such measures would still result in greater impact than Alternative A (and therefore cannot be said to "minimize"), the BLM's proposed mitigation measures do not prohibit other activities potentially disruptive to wildlife during sensitive time periods; only construction and drilling operations are prohibited. As we will discuss below, other potentially disruptive activities that occur in sensitive habitats after construction and drilling are completed in fact negate the mitigative value of seasonal restrictions as proposed by BLM.

#### 671-18-4 Mitigation Measures for Sane Grouse and Columbian Sharp-tailed Grouse

A reasonable alternative would be to place a moratorium on the constructions of well, roads, and other infrastructure for the important nesting habitat that occurs within 2 or even 3 miles of a sage grouse lek, or within 1 mile of a sharp-tailed grouse lek. This is an alternative which BCA requested during Scoping. During scoping, we called attention to the sensitivity of these species to energy development, which should have led BLM to examine a range of alternatives for grouse conservation, including at least one that adequately protects sage grouse and Columbian sharp-tailed grouse.

671-18 Holloran (2005:57) stated, "current development stipulations are inadequate to maintain greater sage-grouse breeding populations in natural gas fields." Under the Proposed Action and Alternative B, there would be no surface occupancy within ¼ mile of sage grouse leks, with an additional measure presenting human activity during certain hours of the day within this buffer. This is supplemented with the standard seasonal restriction of drilling and construction activities within 2 miles of the lek site (subject, of course, to waiver). DEIS at E-6. For sage grouse, Holloran (2005) demonstrated that wells sited within 1.9 miles (during the post-drilling, post-construction production phase) caused negative impacts on sage grouse. Under these two action alternatives, wells could be sited within 0.25 miles of a lek site.

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671-18-6 BLM has no data to support the untested hypothesis that a moratorium on human activity from 6 p.m. to 9 a.m. will prevent additional impacts to sage grouse. In fact most of the traffic to wells during the production phase (a direct cause of impacts measured by the Holloran study) takes the form of well tripping, condensate removal, and routine maintenance. These activities tend to take place during "normal business hours" (between 9 a.m. and 6 p.m.). Thus, it is most likely that the impacts to grouse leks that resulted from production wells were occurring during the very hours that the two action alternatives would still allow activity and disturbance under the Atlantic Rim project, which indicates that the additional moratorium on nighttime human activity will not prevent or significantly ameliorate impacts to breeding grouse. Furthermore, even if this measure is 100% effective, it only extends ¼ mile from the lek, meaning that wells as close as 0.25 miles away would be subject to unrestricted human activity around the clock.

671-18-7 Thus, it is clear that major impacts to breeding and nesting sage grouse would still be expected under the Proposed Action and Alternative B. The mitigation measures proposed by BLM have no basis in science, and there is no information provided to support any effectiveness. To the

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contrary, some very strong scientific evidence indicates that these mitigation measures will be ineffectual.

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Under Alternative C, the most protective alternative, there is an additional limitation within 2 miles of a sage grouse lek or within 1 mile of a sharp-tailed grouse lek, allowing a maximum of 3 miles of roads per square mile and a maximum of 160-acre well spacing. DEIS at 2-5. This is still quite dense. BLM provides no scientific basis for the effectiveness of this mitigation measure. Indeed BLM-funded sage grouse research (Holloran 2005) demonstrates that these measures are woefully inadequate to prevent significant impacts to breeding and nesting sage grouse. In fact, Holloran found that well densities exceeding 1 well per 699 acres had a negative impact on grouse. Thus, the effective and scientifically supported mitigation measure would read, "surface well spacing will not exceed 1 wellpad per 699 acres." Other aspects of this alternative's mitigation measures for sage grouse suffer from the same shortcomings as those in the other action alternatives.

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Wyoming sage grouse populations are some of the largest left in the nation and are relatively stable (showing a 17% decline from 1985-1994); nonetheless, sage grouse populations have experienced major declines rangewide in recent decades (Connelly and Braun 1997). The Wyoming Game and Fish Department ("WGFD") reported that since 1952, there has been a 20% decline in the overall Wyoming sage grouse population, with some fragmented populations declining more than 80% (WGFD 2000); one of WGFD's biologists reported a 40% statewide decline over the last 20 years (Christiansen 2000). These declines are attributable at least in part to habitat loss due to mining and energy development and associated roads, and habitat fragmentation due to roads and well fields (Braun 1998). The Rawlins RMP Draft EIS Comments of Dr. Clait Braun, the world's leading sage grouse expert, recommend that oil and gas facilities be located farther than 3 miles from lek sites to protect nesting habitat. We incorporate Dr. Braun's comments into this letter by reference.

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Oil and gas development poses perhaps the greatest threat to sage grouse viability in the region. In a study near Pinedale, sage grouse from disturbed leks where gas development occurred within 3 km of the lek site showed lower nesting rates (and hence lower reproduction), traveled farther to nest, and selected greater shrub cover than grouse from undisturbed leks (Lyon 2000). According to this study, impacts of oil and gas development to sage grouse include (1) direct habitat loss from new construction, (2) increased human activity and pumping noise causing displacement, (3) increased legal and illegal harvest, (4) direct mortality associated with reserve pits, and (5) lowered water tables resulting in herbaceous vegetation loss. All of these impacts must be thoroughly evaluated in the FEIS. Pump noise from oil and gas development may reduce the effective range of grouse vocalizations (Klott 1987). Thus, lek buffers are needed to ensure that booming sage grouse are audible to conspecifics during the breeding season. A consortium of eminent sage grouse biologists recommended, "Energy-related facilities should be located >3.2 km from active leks" (Connelly et al. 2000). And Dr. Clait Braun, the world's most eminent expert on sage grouse, has recommended even larger NSO buffers of 3 miles from lek sites, based on the uncertainty of protecting sage grouse nesting habitat with smaller buffers.

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The area within 2 to 3 miles of a sage grouse lek is crucial to both the breeding activities and nesting success of local sage grouse populations. One scientist described the lek site as "the hub from which nesting occurs" (Autenreith 1985). Grouse exhibit strong fidelity to individual lek sites from year to year (Dunn and Braun 1986). Female fidelity to individual nest sites is equally strong (Holloran 2005). During the spring period, male habitat use is concentrated within 2 km of lek site (Benson et al. 1991). A Montana study found that no male sage grouse traveled farther than 1.8 km from a lek during the breeding season (Wallestad and Schladweiler 1974). Other researchers found that 10 of 13 hens nested within 1.9 miles of the lek site during the first year of their southern Idaho study, with an average distance of 1.7 miles from the lek site; 100% of hens nested within 2 miles of the lek site during the second year of this study, with an average distance from lek of 0.5 mile (Hulet et al. 1986). In Montana, Wallestad and Pyrah (1974) found that 73% of nests were built within 2 miles of the lek, but only one nest occurred within 0.5 mile of the lek site. Because leks sites are used traditionally year after year and represent selection for optimal breeding and nesting habitat, it is crucially important to protect the area surrounding lek sites from impacts. Thus, the prohibition of surface disturbance within 2 miles (minimally) or 3 miles (optimally) of a sage grouse lek is the absolute minimum starting point for sage grouse conservation.

In fact, BLM's own analysis indicates that its proposed mitigation measures are inadequate to prevent significant impacts to sage grouse and their habitats. The BLM observes that "the long-term loss of shrubs combined with the indirect impacts on the habitat, such as dust, noise, and continued human presence during the drilling and production phase would result in habitat loss and disturbance levels exceeding the significance criteria" as one of the effects of the Atlantic Rim project. EIS at 4-69. This statement is an admission that significant impacts to the human environment will occur as a result of this project's implementation, and that mitigation measures proposed in the Proposed Action are inadequate to prevent these significant impacts.

BLM also adopted many standard conditions of approval and mitigation measures for the project without taking a hard look at whether these measures are effective. Numerous oil and gas projects in this region have adopted many of the same mitigation measures over the past twenty years and BLM failed to inventory these sites to measure their effectiveness. 40 C.F.R. § 1502.22 is triggered here. This provision requires "the disclosure and analysis of the costs of uncertainty [and] the costs of proceeding without more and better information." *Southern Oregon Citizens Against Toxic Sprays, Inc. v. Clark*, 720 F.2d 1475, 1478 (9th Cir. 1983); *see also Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1244 (9th Cir. 1984) ("On their face these regulations require an ordered process by an agency when it is proceeding in the face of uncertainty.") There has been no disclosure or analysis of the effectiveness of mitigation measures proposed for sage grouse within the Atlantic Rim project area.

BCA has repeatedly called into question the effectiveness of protective measures proposed by BLM for sage grouse lek sites (the traditional breeding and strutting grounds for this bird) and nesting habitats. The availability and quality of these habitats are key to preventing the collapse of sage grouse populations. Yet the BLM has repeatedly failed to provide any analysis, whether field experiments or literature reviews, that examine the effectiveness of the proposed quarter-mile buffers where disturbance would be prevented. These buffers would provide year-round

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671-18-16 | protection for only 1.56% of the land area around the lek site (encompassing 5.47 million square feet) that would be protected by the minimum two-mile buffers (encompassing 350.33 million square feet) recommended by experts (Connelly et al 2000) and 0.69% of the land area around the lek site that would be protected by the three-mile lek buffers (encompassing 788.24 million square feet) recommended by Dr. Clait Braun. Furthermore, the Proposed Action would allow roads and wells to be built within 2 miles of sage grouse leks (within sensitive nesting habitat) and within 1 mile of sharp-tailed grouse leks as long as construction occurred outside the breeding/nesting season. This is the very area for which experts have recommended that no oil and gas facilities or infrastructure be built (Connelly et al. 2000).

671-18-17 | Under Alternative C, road densities would be limited to less than 3 miles per square mile, and a maximum of 4 wellpads per section would be allowed. DEIS at 2-5. But nowhere has BLM provided any evidence that these actions have the potential to mitigate impacts to breeding and nesting sage grouse. Indeed, Holloran (2005) found that well densities greater than 1 well/1699 acres were deleterious to sage grouse. Stronger mitigation measures will be needed if BLM hopes to implement this project legally.

#### 671-18-18 | Mitigation Measures for Big Game

671-18-18 | In the Draft EIS, BLM claims, "The application of BLM seasonal restrictions to prevent drilling on CWR [Crucial Winter Range] between November 15 and April 30 reduces the displacement of big game during the most critical season." BLM has offered no supporting evidence to back up this claim. In fact, for mule deer on the Pinedale Anticline winter ranges, subject to the same stipulation, displacement from crucial winter ranges has been total during most years (Sawyer et al. 2005). Sawyer et al. recorded a 48% drop in mule deer populations wintering on the Pinedale Anticline winter ranges while seasonal stipulations were in full force *and* effect, with no corresponding decline for nearby populations unaffected by gas development. In addition, Powell (2003) found that elk in the northwestern Red Desert avoided lands within 0.6 mile of a road or wellpad, long after drilling and construction activities were completed.

671-18-19 | While seasonal moratoria on drilling and construction in antelope winter range might eliminate the disturbance by drilling and construction operations on wintering antelope, BLM admits that these mitigation measures do nothing to mitigate production-related activities, which can displace antelope 0.25 mile away from the disturbance (the science cited by BLM later on the same page indicates displacement for well development and associated activities up to 0.5 mile). DEIS at 4-63. Because the impacts of drilling and construction are of relatively short duration, and the production impacts will last for the 30-50 year life of the project, it is apparent that the mitigation measures proposed for pronghorn winter range will do little to prevent the exodus of pronghorns from their most critical ranges within the ARPA, and all of the impacts that BLM acknowledges that come from that outcome. See DEIS at 4-60. BLM also notes that several pronghorn migration routes traverse the ARPA; mitigation measures targeted at crucial winter range will have little benefit in preventing impacts to antelope migrations. BLM admits the ineffectiveness of mitigation measures in preventing impacts to migration corridors by stating, "This project could alter or block pronghorn migrations along existing migration routes." *Id.* The Atlantic Rim project needs mitigation measures that will allow pronghorns to migrate and use their winter ranges optimally; such measures are woefully absent from the three action

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alternatives. Such a mitigation measure would be allowing no surface disturbance on antelope CWR and migration corridors, which would certainly cure the problem. BLM should also analyze an alternative that at least requires all roads within antelope CWR and migration corridors to be gated, and places a moratorium on all human presence and vehicle traffic within CWR and migration corridors between November 15 and April 30. While the effectiveness of such a measure has yet to be tested in the field, and therefore would be unknown and experimental, well telemetry and piping of condensates should allow the wellfield to run more or less automatically during these months. BCA reached a settlement with Bill Barrett Corporation in which Barrett committed to these seasonal traffic/presence moratoria for areas within a mile of raptor nests and within 2 miles of sage grouse leks, and they are being implemented today for the 232-well Big Porcupine CBM Project on the Thunder Basin National Grassland.

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Similar problems exist for mule deer. As noted above the standard "seasonal stipulations" in the Proposed Action and Alternative B have been proven ineffective, resulting in the complete abandonment of crucial winter range during some years and over the long term, to population declines of affected mule deer herds (Sawyer et al. 2005). BLM openly admits for the Proposed Action and Alternative B, "The level of development within mule deer transitional range and CWR, compounded by the current poor condition of the crucial winter habitat would exceed the significance criteria." DEIS at 4-68. For Alternative C, there are some minor improvements, but impacts would still exceed the significance criteria. DEIS at 2-15. Mitigation measures should be developed and implemented that would reduce impacts to mule deer below the threshold of significance. Such a mitigation measure would be allowing no surface disturbance on mule deer CWR and migration corridors, which would certainly cure the problem. BLM should also analyze an alternative that at least requires all roads within mule deer CWR and migration corridors to be gated, and places a moratorium on all human presence and vehicle traffic within CWR between November 15 and April 30. While the effectiveness of such a measure has yet to be tested in the field, and therefore would be unknown and experimental, well telemetry and piping of condensates should allow the wellfield to run more or less automatically during these months.

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In addition, we support the mule deer study as a way to determine migration corridors and apply NSO COAs (see DEIS at H-9), but note that this study should be completed as part of the baseline data gathering for the EIS. The study should not be left until later, when advancing CBM may have already impaired the migration corridors. Also, the buffer for the migration corridor's NSO width must be defined. The Sublette Mule Deer Study (Sawyer et al. 2005) has developed numeric models for how far mule deer are displaced by roads and wells. These models should be used to determine the width of the migration corridor, so that it will be sufficiently protective for the animals to continue to use it after the full build-out of the Atlantic Rim project is completed. BLM needs to provide a scientific basis for the width of the NSO migration corridor to show that it will be effective; thus far, the agency has failed to do so.

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The deficiencies in BLM's mitigation measures for elk are the most problematic. Under the Proposed Action and alternative B, even with the mitigation measures in place, impacts will be "extreme" with the first phase of development "effectively fragment[ing] the CWR," with impacts reduced to "high" under Alternative C. DEIS at 4-70, 4-72. Significance criteria would

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be exceeded under all alternatives for elk. DEIS at 2-15. BLM openly admits that mitigation measures in the Proposed Action and Alternative B will have no mitigative value throughout the life of the project due to their absence of influence on production-phase impacts. DEIS at 4-65. Mitigation measures should be developed and implemented that would reduce impacts to mule deer below the threshold of significance. Such a mitigation measure would be allowing no surface disturbance on elk CWR and migration corridors, which would certainly cure the problem. BLM should also analyze an alternative that at least requires all roads within elk CWR and migration corridors to be gated, and places a moratorium on all human presence and vehicle traffic within CWR between November 15 and April 30. While the effectiveness of such a measure has yet to be tested in the field, and therefore would be unknown and experimental, well telemetry and piping of condensates should allow the wellfield to run more or less automatically during these months.

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Under Alternative C, road densities in certain areas would be held below 3 miles per square mile to mitigate impacts to wildlife for some sensitive landscapes. DEIS at 4-75. But a 1983 study showed that elk habitat effectiveness could be expected to decrease by at least 25% with a density of one mile of road per square mile of land, and by at least 50% when road density is 2 miles per square mile of land (Lyon 1983). And this study was conducted in forested habitat types; loss of habitat effectiveness may be even more severe in open country such as that found within the ARPA. BLM has provided no evidence that a road density of 3 miles per square mile will support big game (or other wildlife); indeed, the best available science indicates that densities must be held below 1 mile per square mile to maintain habitat function. Thus, this proposed mitigation measures cannot be supported as an effective one.

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Mitigation Measures for Raptors

For the Proposed Action and Alternative B, BLM blindly asserts that the mitigation measures will result in no exceedence of the significance criteria. DEIS at 4-69, 40-71. The agency provides no data or supporting analysis to buttress its conclusion, despite the fact that these same mitigation measures have been applied to numerous oil and gas projects throughout Wyoming, projects which are required to monitor the presence and nesting success of raptors. It is reasonable to expect the BLM to analyze and present the monitoring data it has in its own files, compare presence and nest success data to proximity to wells and roads (which data the BLM also possesses), and present some conclusions on the effectiveness of these mitigation measures (or lack thereof) by species.

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In addition, there is a wealth of scientific information that also calls into question the effectiveness of BLM's minimalist mitigation measures to protect nesting raptors. The primary impact to raptor populations is direct disturbance of raptors on the nest, leading to reductions or loss of viability for eggs or nestlings. Disturbance of nesting raptors may cause nest abandonment, damage to the eggs, subject eggs or nestlings to cooling, overheating, or dehydration leading to mortality, prevent young nestlings from receiving sufficient feedings to remain viable, and cause premature fledging (Parrish et al. 1994). Thus, to minimize environmental impacts, the BLM should have established adequate nest buffers (a minimum of 1 mile in diameter for all species, with larger buffers for ferruginous hawks) around nest sites, preventing all construction of developments (such as wells and roads) that would lead to future

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disturbance of nesting raptors through focusing human activities in these areas. Seasonal restrictions are insufficient; a well or road constructed outside the nesting season is still likely to lead to nest abandonment or reductions in recruitment due to disturbance from vehicle traffic that does occur during the nesting period.

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White and Thurow (1985) recommended quarter-mile nest buffers during years of prey abundance, but noted that sensitivity to disturbance increased when prey were scarce, and recommended that nest buffers be "considerably larger" during years of prey scarcity. Although an earlier researcher recommended buffer zones of only ½ mile for ferruginous hawk nests, he recommended much larger buffers during periods of prey scarcity (Olendorff 1993). Because it is impractical to move roads away from nest sites when prey bases decline, the appropriate way to ensure the persistence of ferruginous hawks at traditional nesting sites is to use large buffers within which ground-disturbing activities are prohibited. Wyoming Game and Fish biologists reviewed the issue of appropriate nest buffers and recommended a 1-mile buffer, kept free from human disturbance (Cerovski et al. 2001). These alternative mitigation measures are reasonable, they are scientifically supported by the studies above, and they were specifically requested by BCA in scoping comments on the Atlantic Rim project. The BLM's failure to analyze these science-based mitigation measures as an alternative, or to provide data or science-based reasoning that explains why these measures do not merit detailed study, thus constitutes and especially flagrant violation of NEPA's requirement to consider a range of reasonable alternatives.

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Ferruginous hawks are among the most sensitive of all raptor species, and are prone to nest abandonment if disturbed (Parrish et al 1994). Nest abandonment, egg mortality, parental neglect, and premature fledging are common results of disturbing ferruginous hawk (White and Thurow 1985). Other researchers noted that increased human access is a primary threat to the viability of ferruginous hawk nest success (Smith and Murphy 1982). For their central Utah study, these researchers found that "in all instances of nesting failure where the cause could definitely be determined, humans were at fault." Id., p. 87. White and Thurow (1985) found that walking disturbance and vehicle use had the greatest effect on ferruginous hawk nest success, while vehicle use had the greatest flushing distance. Both walking disturbance and vehicle use would be allowed within ¼ mile of ferruginous hawk nest sites under the Proposed Action and Alternative B. Instead of becoming habituated, most hawks in this study increased their flushing distances with repeated disturbance. In addition, this study showed that disturbed nests averaged one less offspring fledged per nest when compared to undisturbed control nests. Still other researchers pointed out that the cumulative effects of oil and gas development may impact large areas of ferruginous hawk habitat (Oakleaf et al. 1996).

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The BLM's mitigation measures under the Proposed Action and Alternative B would prevent surface-disturbing activities (i.e., construction of roads and drilling of wells) within 825 feet of a raptor nest, 1,200 feet in the case of ferruginous hawks. DEIS at E-8. Thus, wells and roads could be built within 1/6 of a mile for golden eagles, merlins, and other sensitive raptors, and closer than ¼ mile to the nests of ferruginous hawks. Once the roads and wells are built, there is no restriction on human presence at the wellsites, or vehicle traffic along roads and to wellpads, during the critical nesting season. Expert recommendations for ferruginous hawk nest buffers

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range from ¼ mile during years of prey abundance (with larger buffers during years of prey scarcity) to 1 mile from the nest site. BLM's proposed mitigation measures for ferruginous hawk to not even meet the standards of the least restrictive recommendation. BLM also provides a 0.75 to 1 mile seasonal buffer around nests with limitations on drilling and construction activities, but this measure does nothing to limit the activities that have the greatest impact – people on foot (which commonly occurs at wellsites) and vehicle traffic, which is a constant impact along wellfield road systems. Thus, the BLM cannot claim that the mitigation measures proposed in the Proposed Action and Alternative B, when paired with the massive scale and intensity of the project, will lower impacts to nesting raptors below the "significance" threshold. Indeed, the best available science suggest that even if these measures are rigorously complied with (an aspect that the BLM has not studied to date), it is likely that nesting raptor populations will be extinct within the ARPA by the time the 30- to 50-year life of project has run its course.

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#### Mitigation Measure for Mountain Plover

BLM states, "Given the implementation of mitigation measures in Appendix E, mountain plovers are not expected to be significantly impacted." DEIS at 4-80. BLM appears to have reached this conclusion in the absence of any supporting data or analysis. Mountain plover habitat would be "avoided when practical." DEIS at E-7. But the language of other mitigation measures makes clear that the construction of roads and wellsites would be allowed within mountain plover nesting habitats as long as surface-disturbing activities do not take place between April 10 and July 10. *Id.* Mountain plovers are rare enough (about 10,000 individuals nationwide) that the loss of a single pair, or the failure of a single nest or brood, would constitute a significant impact on the local population. Where is the disclosure and modeling of the size of local populations? How can the BLM conclude that there will be no significant impacts to local breeding populations, when the agency has failed to even determine the size of these populations, much less estimate the numerical impact of project activities on mortality rates and recruitment for plovers? In the absence of any analysis, the agency's determination that impacts will be insignificant is arbitrary and capricious.

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#### **Noxious Weed Mitigation Measures**

The BLM has recognized that the Atlantic Rim exploratory drilling has already led to noxious weed problems (particularly regarding halogeton) that will take years to bring under control. DEIS at 4-47. The exploratory pods were drilled under the same "BMPs" as are proposed for the Proposed Action for the Atlantic Rim project. BLM notes that "Most of the soil series in the ARPA overlay alkaline subsoils which affects plant germination, plant growth, and species composition." DEIS at 3-23. BLM further notes that halogeton can actually accumulate salts from lower soil horizons and intensify the salinity of surface soils. *Id.* The DEIS states, "with expansion of disturbance as a result of the interim drilling for coalbed methane, halogeton has expanded along roads and pipelines with inadequate control treatments and reclamation." DEIS at 3-64. In addition, BLM notes a "rapid invasion and expansion of halogeton" in much of the project area during 2003 and 2004. DEIS at B-11. BLM knew that halogeton was an issue prior to approving the exploratory PODs. And yet mitigation measures for halogeton in the exploratory PODs have clearly failed. If 2,000 wells and 1,000 miles of roads are to be approved under the Atlantic Rim project, with the same mitigation measures as under the exploratory pods, the impacts from noxious weeds in the project area could cause serious and long-term problems.

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671-19-2 | 671-19 | The BLM has not adequately analyzed the extent of these problems to date, nor has the agency provided any evidence that the proposed mitigation measures are effective at combating noxious weeds. Indeed, the agency's own information demonstrates the opposite.

### **Mitigation Measures for Roads and Pipelines**

To mitigate impacts to water quality at road and pipeline crossings, BLM proposes to implement a series of "Best Management Practices" that "would protect these channels from long-term changes." DEIS at 4-39. These derive from the Wyoming Standard Mitigation Guidelines. DEIS at H-6. And yet, mitigation failures have been documented for the Atlantic Rim exploratory pods, also approved under the same Wyoming Standard Mitigation Guidelines. In the Red Rim POD, stream crossings had culverts without downstream armoring, which allows gullying downstream of the culverts. DEIS at 3-48. In the central PODs, "Many of the roads were inadequately designed for drainage features and have excessive erosion in ditches and around culverts." DEIS at 3-49. For the Cow Creek POD, "inadequate road surfacing, not enough road drainage features and some poor reclamation" have caused problems. *Id.* The BLM even provides a graphic color photograph documenting one such failure. DEIS at 4-85. The BMPs referenced in Appendix H do not include a requirement for downstream armoring at stream crossings. There is nothing in the BMPs that would prevent impacts of the type documented for the exploratory pods, In fact, the BMPs referenced in the EIS as sufficient to prevent impacts are the same BMPs that apparently failed to prevent impacts when implemented on the ground in the ARPA. The problem does not appear to be one of failure to implement the BMPs, but rather a failure of the BMPs themselves to achieve their desired goals. Thus, BLM's assertion that these BMPs will protect drainage channels from impacts are arbitrary and capricious and an abuse of discretion.

671-20-3 | 671-20 | BLM also fails to provide any analysis whatsoever that the BMPs in question will be effective in preventing impacts to watercourses. Although the Wyoming Standard Mitigation Guidelines have been in place for some time, and a number of oil and gas projects in arid lands have employed them throughout the state, the agency has been unable to marshal any support for their contention that these so-called "BMPs" will reduce or eliminate impacts. In fact, the agency's own observations lead to the opposite conclusion.

The BLM states that a coordinated transportation plan would be developed to minimize the construction of new roads and establish maintenance responsibilities. DEIS at 4-150. This is a connected action to the Atlantic Rim project, and to avoid illegally segmenting the EIS, the BLM must undertake this action as part of the EIS and alternatives process. In this way, the public will have a chance to comment on the proposed travelway locations, the agency will study various alternative transportation plans, and the agency will determine where the impacts from roads will occur, which is necessary information to determine the impacts to the various resources, which are often (if not typically) determined by where exactly the impacts associated with roads will occur.

671-20-4 | The BLM must also consider as a reasonable alternative mitigation measure the closure of roads to vehicle traffic and human activity during sensitive seasons for wildlife (e.g., big game crucial winter and calving ranges, migration corridors, lands within 3 miles of sage grouse leks and 1

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mile of sharp-tailed grouse leks, areas within 1 mile of raptor nests or 2 miles of ferruginous hawk nests, prairie dog colonies during non-hibernation periods). This is a feasible alternative, as condensate can be pipelined to less-sensitive habitats for disposal, and well telemetry can obviate the need for "well tripping." Bill Barrett Corporation agreed to close and gate all roads within 2 miles of a sage grouse lek or within 1 mile of a raptor nest site during the sensitive season for its Big Porcupine CBM project. If Barrett can do this, there is no reason why Anadarko and other Atlantic Rim operators can't do the same.

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For this project, topsoil will be removed and stored for later use in reclamation. DEIS at B-4, B-5. In a study in the Curlew Valley on the Idaho-Utah border, James and Jurinak (1978) found that soil nitrogen limits plant growth in Great Basin shrubsteppe ecosystems. Livestock grazing is the land use that potentially has the most widespread effects on soils. According to Miller et al. (1994), "Long term heavy grazing can gradually deplete soil nutrients. The greatest loss of nutrients may result from alteration of plant community structure which influences overland flow, erosion, infiltration rates, and nutrient turnover rates." The effectiveness of this mitigation measure needs to be studied and disclosed. The life of project is predicted at 30-50 years, but could be longer. After many years, what will be the state of the soil microflora, and how does this compare with undisturbed topsoils? Will any soil microbes remain? Will any mycorrhizal propagules remain viable in soil stored for this length of time, and what impact will there be to mycorrhizal fungi? We have significant concerns that no viable mycorrhizal propagules will remain in a viable state. It is obvious that biological soil crusts will be completely destroyed by topsoil collection and yarding. Will any spores remain viable to inoculate the newly-restored topsoil after 30-50 years? How much organic matter will remain in the topsoil after yarding, and what will its nutrient values be? We are concerned that it is likely that all readily-digestible organic compounds will be lost over the decades of soil yarding, and that only mineral soil with indigestible (and therefore low-value) organic compounds such as lignins will remain, radically reducing the effectiveness of this mitigation measure. The BLM has required the set-aside of topsoils at oil and gas facilities in similar environments for a number of years; it would be a simple exercise to gather topsoil samples from yarded piles and test the parameters outlines above, going back at least to the point where topsoils have been yarded into such piles. The fact that BLM has failed to perform this simple analysis renders the EIS deficient.

### **Mitigation Measures for 303(d) Impaired Waters**

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The Draft EIS defines "significant impacts" and concludes that negative impacts to 303d-listed waters qualify as "significant." DEIS at page 4-1, 4-24. BLM identifies a number of negative impacts (increased sedimentation, habitat degradation in pools and riffles, increased salinity) to waters that are on Wyoming's 303d list. DEIS at 4-39, 4-45, 5-11. These significant, negative impacts are expected to occur under the Proposed Action and Alternative B. DEIS at 4-45. However, BLM has provided absolutely no analysis whatsoever showing that the mitigation measures under any of the action alternatives will reduce or avoid the significant impacts to the 303d-listed waters. BLM must emplace further controls that do not contribute further to the degradation of impaired waters on the Clean Water Act 303(d) impaired list. This is particularly important because these waterways are home to three species of BLM Sensitive fishes (bluehead sucker, flannelmouth sucker, and roundtail chub) and Muddy Creek, one of the impaired waterways, is the only waterway where these three native species still coexist.

### Historic and Cultural Resource Mitigation Measures

The mitigation measures designed to protect the settings of National Register of Historic Places- (NRHP-) eligible cultural and historic sites are not sufficient to prevent significant impacts to these resources, in violation of the National Historic Preservation Act (NHPA). For such sites, BLM offers only a 1/4-mile buffer where well facilities and roads could not be built (DEIS at H-2), but it is obvious that wells built up to 3 miles away and visible from a historic site or trail would cause a degradation of the setting of such sites, in violation of the NHPA. Yet the BLM has provided no evidence that this quarter-mile buffer will be sufficient to eliminate the possibility of significant impacts to the setting of eligible sites.

In addition, mitigation measures for Native American Traditional Cultural Properties remain completely undefined. DEIS at H-3. The effectiveness of a mitigation measure that will be "determined on a case-by-case basis" cannot be evaluated, and the impacts to TCPs under the various action alternatives cannot be analyzed as a result. BLM must provide additional information on what kinds of mitigation measures will be applied to protect TCPs and other Native American respected sites.

### Visual Resources Mitigation Measures

The BLM presents a suite of mitigation measures to reduce the impacts to visual resources. DEIS at H-5. However, as BLM admits there will be significant impacts to visual resources above and beyond the limits of the Class III VRM areas in the ARPA under the Proposed Action and Alternative B, it is obvious that these mitigation measures are insufficient to prevent significant impacts that violate the Great Divide RMP. As a result, stronger measures must be applied.

### THE DEIS FAILS TO PROVIDE ADEQUATE BASELINE DATA

Importantly, 40 C.F.R. §1502.15 requires agencies to "describe the environment of the areas to be affected or created by the alternatives under consideration." Establishment of baseline conditions is a requirement of NEPA. In *Half Moon Bay Fisherman's Marketing Ass'n v. Carlucci*, 857 F.2d 505, 510 (9<sup>th</sup> Cir. 1988), the Ninth Circuit states that "without establishing . . . baseline conditions . . . there is simply no way to determine what effect [an action] will have on the environment, and consequently, no way to comply with NEPA." The court further held that, "The concept of a baseline against which to compare predictions of the effects of the proposed action and reasonable alternatives is critical to the NEPA process." Clearly, BLM has failed this basic duty in this EIS and therefore violated NEPA's requirement that environmental consequences can be satisfactorily assessed.

#### *Baseline Information on Surface Water Quality*

BLM's presentation of surface water quality provides baseline data on only a subset of the important waterways within the ARPA. See DEIS at 3-39. Indeed, only four streams are measured: Little Snake River, Muddy Creek, Cow Creek, and Dry Cow Creek. *Id.* The DEIS fails to present baseline water quality data on Wild Cow Creek and Cherokee Creek (Class 2C waterways supporting warmwater fishes), Deep Creek (providing important big game watering in crucial winter range), Sugar Creek, and only limited data on Separation Creek (which feeds important riparian habitats that are disproportionately important to wildlife in the Great Divide

671-24-1

Basin, see DEIS at 3-43). And while the soil classification percentages for these streams is presented, these data are useless for analysis purposes because the failure to gather baseline data on water quality for these streams prevents the legally required "hard look" at siltation and salt loading impacts of the proposed project for these watersheds.

671-24-2

*Baseline Information on Road Density and Type*

BLM reports for impaired watersheds of Muddy Creek and McKinney Creek, that **road** densities are currently less than 2 miles per square mile, and only "a small amount of sedimentation" is contributed by these roads. However, the agency fails to define what it considers a "road." Are two-track jeep trails lumped into this 2 mi./square mile figure? Certainly, two-track jeep trails contribute very little sedimentation in comparison to engineered, crown-and-ditch gravel roadways of the type proposed for the Atlantic Rim Project.

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It is critically important that an accurate accounting of present road density, by road type, is presented in the EIS for each watershed HUC as baseline information, so that present levels of road-based siltation and salinification can be compared to road density levels in the three alternatives. This has not been done.

671-24-4

*Baseline Information on Sage Grouse and Sharp-Tailed Grouse Populations*

The Draft EIS states that 88 sage grouse leks in or within two miles and 6 Colmbian sharp-tailed grouse leks in or within one mile of the ARPA. DEIS at 3-73, 74. However, the BLM has provided no population estimates for these species. How many of the leks are currently active, how many inactive, and how many historic? What are the lek count data at each lek? (WGFD lek count data should be readily available). What proportion of the Wyoming populations of these species are represented by the ARPA populations? What are the lek attendance trends for each lek, and what current human activities are affecting these trends? What are the hunter success/bag count data, and what do these data say about grouse population trends within the ARPA? These absences of baseline data render the Draft EIS noncompliant with NEPA.

671-24-5

*Baseline Information on Raptors and Important Nesting Areas*

While the BLM's Affected Environment section lists 542 known raptor nests within a mile of the ARPA (and thereby likely to be impacted by the project) and categorizes the 357 that occur within the boundary by species, crucially important baseline information is missing. See DEIS at 3-74. For each species, which nest sites are active and which are inactive? What is the overall population of nesting raptors in the ARPA vicinity? What is the current population trend for each species? What are the fledging data for each species within the ARPA, and how has this metric changed in recent years? What other habitat attributes and/or human activities in the ARPA are currently impacting population size and trend, and in what way? These data will be needed in order for the BLM to undertake a "hard look" at impacts to raptors (which it has not done to date).

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**THE BLM'S CUMULATIVE IMPACTS ANALYSIS IS DEEPLY FLAWED**

Impacts can be direct, indirect, or cumulative. See 40 C.F.R. § 1508.8(a) and (b). Cumulative impacts result "fi-om the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions[. . .] Cumulative impacts can result from individually

minor but collectively significant actions taking place over a period of time." 40 C.F.R. § 1508.7. Because of the importance of cumulative impacts, "the consistent position of the case law is that ... the agency's EA must give a realistic evaluation of the total impacts and cannot isolate a proposed project, viewing it in a vacuum." *Grand Canyon Trust*, 290 F.3d 339, 342 (citations omitted). To satisfy NEPA's hard look requirement, the cumulative impacts assessment must do two things. First, BLM must catalogue the past, present and reasonably foreseeable projects in the area that might impact the environment. *Muckleshoot Indian Tribe v. USFS*, 177 F.3d 800, 809-810 (9<sup>th</sup> Cir. 1999). Second, BLM must analyze these impacts in light of the proposed action. *Id.* If BLM determines that certain actions are not relevant to the cumulative impacts analysis, it must "demonstrat[e] the scientific basis for this assertion." *Sierra Club v. Bosworth*, 199 F.Supp.2d 971, 983 (N.D. Ca. 2002). In *Wyoming Outdoor Council v. U.S. Army Corps of Engineers*, the court ruled,

The Court cannot defer to an EA/FONSI which has neglected, by its own terms, to even attempt to assess the extent of cumulative impacts that might be attributed to the agency action....The Corps must assess cumulative impacts to such a degree as to assure this Court that its issuance of a FONSI was not arbitrary and capricious.

351 F.Supp.2d 1232, 1243 (D. Wyoming 2005). The legal standard for an Environmental Impact Statement is even higher

The BLM's framing of cumulative impacts contains important omissions. The agency has failed to acknowledge or study the impacts of an additional 2,000-3,000 natural gas wells called for by BP in the Continental Divide – Wamsutter field, or the additional 1,250 wells proposed under the Creston – Blue Gap II project, which has been scoped for the lands immediately adjacent to the ARPA. Both of these developments are so reasonably foreseeable that BLM has already begun planning for them. The agency has also failed to study the impacts of development south of the Colorado border. This is a critical error, because the Baggs Elk Herd is known to use lands on both sides of the state line, and will be impacted in a cumulative way by the Atlantic Rim project as well as neighboring projects in both Wyoming and Colorado.

In addition, the BLM has artificially constrained the Cumulative Impacts Area for raptors to the ARPA plus a one-mile buffer. DEIS at 5-17. To get a handle on cumulative impacts to raptors on a population level, BLM must analyze a much larger area, because these species are typified by large home ranges. It would not be unreasonable to expect BLM to analyze cumulative impacts in summer habitats (including the ARPA) as well as wintering grounds for migratory species. How big is the area containing interbreeding populations of birds for each raptor species? What is the biologically meaningful unit of measure? Certainly it is not limited to the ARPA plus a one-mile buffer.

The BLM notes that for pronghorn, some 83.1% of the crucial winter range for the Baggs pronghorn herd lies within the ARPA or another area slated for full-field development (presumably the Creston – Blue Gap project area). DEIS at 5-15. Based on the fact that pronghorns avoid heavily developed areas (Berger et al. 2006), it can safely be assumed that these areas will have limited or no habitat value for pronghorn when the initial build-out is

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complete. See Attachment 7. And yet the Draft EIS make no effort to analyze or estimate what effects that this development of sensitive ranges will have on the population of the Baggs pronghorn herd, in violation of NEPA. Furthermore, there is also no analysis of cumulative impacts of these projects on pronghorn migrations; BLM states that these are "unknown at this time." DEIS at 5-15. The BLM must make some effort at quantifying the cumulative impacts of the project together with other neighboring impacts on pronghorn migrations and overall population levels.

671-25-5

The BLM notes that for mule deer, some 50.3% of the crucial winter range for the Baggs mule deer herd lies within the ARPA or another area slated for full-field development (presumably the Creston – Blue Gap project area). DEIS at 5-15. Based on the fact that pronghorns avoid heavily developed areas (Sawyer et al. 2005), it can safely be assumed that these areas will have limited or no habitat value for pronghorn when the initial build-out is complete. And yet the Draft EIS make no effort to analyze or estimate what effects that this development of sensitive ranges will have on the population of the Baggs mule deer herd, in violation of NEPA. Furthermore, there is also no analysis of cumulative impacts of these projects on mule deer migrations; BLM states that these are "unknown at this time." DEIS at 5-15. The BLM must make some effort at quantifying the cumulative impacts of the project together with other neighboring impacts on mule deer migrations and overall population levels.

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For sage grouse, 145 of the 185 sage grouse leks (78.4%) in the Bitter Creek and Sierra Madre Upland Game Bird Management Areas will be inside or within 2 miles of a full-field development project. DEIS at 5-17. Impacts of oil and gas development on grouse are severe (Holloran 2005). The BLM recognizes that the ARPA is part of an important sage grouse stronghold (DEIS at 5-17), yet fails to analyze the cumulative effects of development (presumably severe) on the two sage grouse populations in question. BLM notes "lower productivity and a long-term decline" as outcomes, but neglects to analyze how severe these impacts are likely to be. A mere listing of impact categories does not satisfy NEPA.

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Similarly, BLM notes that Columbian sharp-tailed grouse populations are an extension of a population that is centered in northwest Colorado. DEIS at 5-17. Yet the agency fails to analyze the cumulative effects of the Atlantic Rim project together with other projects and activities occurring in Colorado. It also fails to forecast the long-term impacts on population and productivity of the sharp-tailed grouse population from cumulative impacts.

671-25-8

For the four species of Endangered fishes living immediately downstream of the ARPA, BLM recognizes that increased salt and sediment inputs from the ARPA pose a threat to the habitat and survival of these fishes. DEIS at 4-79. But the BLM states that "these materials would become highly diluted before they would reach any downstream waters where these species occur; consequently, the potential risks from such occurrences are negligible." *Id.* First off, in order to support this statement, BLM must provide estimates of the turbidity and salinity loads of the Little Snake and Yampa Rivers, together with estimates of how turbidity and salt concentrations would change throughout the year (impacts from the same ARPA salt and sediment discharge would be much different during spring runoff than during the low flows of September). The BLM has failed to conduct this analysis for any of its alternatives. Secondly, the "solution to

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pollution is dilution" approach to water pollution is an outdated and discredited approach because it contributed to major water pollution problems throughout the first three-quarters of the 20<sup>th</sup> Century. The BLM should be ashamed of espousing such a reckless and short-sighted approach. Thirdly, if BLM is counting on dilution to water down salts, turbidity, and trace minerals to levels safe for these Endangered fishes, then it needs to undertake a comprehensive analysis of reasonably foreseeable additional inputs of salt and sediment into the Little Snake and Yampa systems, on a watershed-wide basis, for the projected 30-50 year life of the Atlantic Rim CBM project. The agency has failed to present such an analysis.

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The Cumulative Impact Analysis on Water Resources would be expected to make quantitative estimates of inputs of salts, sediment, and other pollutants into the Little Snake and Yampa River systems, both for the Atlantic Rim project and other activities that contribute impacts to these waterways; it does not. See DEIS at 5-10. BLM lists various types of activities (e.g., irrigation, coal mines, ranching and farming, etc.) but makes no effort to present their current inputs or projected inputs throughout the life of the project. These inputs could be gathered today; data are available from such sources as the Conservation Districts, State departments of environmental quality, the U.S. Corps of Engineers, and perhaps also the USGS. But the agency has made no effort to gather data on the baseline conditions or gather the data needed to effectively model the cumulative impacts in these two watersheds. It has not even modeled the known and projected oil and gas developments in Wyoming and their projected inputs (i.e., Creston-Blue Gap, Continental Divide-Wamsutter, Desolation Flats, Pacific Rim) to these two sensitive watersheds. Indeed, BLM's cumulative impacts analysis for fishes and watersheds makes a mockery of the NEPA process.

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The cumulative impact analysis contains many other significant errors as well. It lists coal mining as "none currently planned" despite the fact that there are several large and active open-pit coal mines within the Yampa watershed that will likely continue to operate, and continue to contribute impacts to the Yampa River system (which has the four species of Endangered fishes) in the foreseeable future. It omits the reasonably foreseeable increase in gas development under the Little Snake RMP revision, which is currently underway. If BLM has talked with its sister offices in Colorado and Utah, it could get an estimate of the number of wells planned for at least the next 10-15 years, use that as an index for future development, and make some educated estimates about salt and sediment loading that might occur as a result of oil and gas projects in those areas. The BLM has also failed to consider the cumulative impacts of oil shale development, which is surprising since the agency recently finished taking comments on its Oil Shale Leasing Programmatic EIS, which shows major oil shale deposits throughout the Little Snake and Yampa watersheds. Furthermore, the cumulative impacts analysis for Endangered fishes in particular is not only deficient; there is no analysis or even mention of these species in the Cumulative Impacts Analysis. DEIS at 5-17, 5-18.

### **SOCIOECONOMIC ISSUES**

In making land use decisions, federal agencies have an obligation under the National Environmental Policy Act (NEPA) to take a "hard look" at the environmental consequences of a proposed action, and the requisite analysis "must be appropriate to the action in question." These comments present a framework and indicators to be used in analyzing the impact of coalbed

methane development on the economies of the local communities. Federal agencies cannot evaluate the consequences of proposed decisions or determine how best to avoid or mitigate negative impacts without adequate data and analysis. Through the application of the methodology we have provided below, using data collected from identified sources and measuring potential impacts through key indicators, federal agencies can best fulfill their obligations to evaluate the direct, indirect, and cumulative impacts of various alternative decisions.

The first section of comments describes the changing economy of the western region, and how public land management planners should evaluate the economic impacts of proposed alternatives. Next, we present key economic indicators with which to measure the vigor of the West's economy and discuss the implications of these indicators for the analysis of land management and development alternatives. We provide examples of the statistics and data available to analyze each of the key indicators. Next we outline the methodology we recommend agencies use to analyze the economies of western communities, in order to fully account for information that is traditionally absent in public land management economic assessments. We also provide a detailed list of our specific recommendations for analyzing economic trends and conditions affected by the proposed management decisions. The final section discusses the hidden costs of oil and gas development and presents the necessary analyses the BLM must do in order to accurately account for both these hidden costs and the true benefits of oil and gas development.

### **Overview of the Western Economy**

In the last 30 years, the West has evolved from a region largely focused on extractive industries into a much more diverse area with a more diverse economy (Bennett and McBeth 1998, Johnson 2001). Recent research shows that most western counties are no longer "resource dependent," and have instead developed diversified economies based on recreation, tourism, knowledge-based industries and the service sector. A recent study examining the impact of public lands on economic well-being in eleven western states found that only three percent of western counties could be classified as resource-extraction dependent (Rasker et al. 2004). Public land management decisions all too often rely on a misconception of a resource-extraction-dependent rural West. Given the changing nature of the western economy, such assumptions exclude important non-extractive economic drivers and may even harm the economy of the region in the long run by ignoring the evolving nature of its economy.

As the economies of rural communities in the West diversify, the basis for making public land management decisions must also evolve. Merely counting jobs in resource extraction is not a sufficient way to measure the economic impact of public land management decisions. Many of these communities have diversified economies that are no longer solely dependent on the export of fossil fuels or logs. Management plans for public lands need to account for all aspects of the economic and social systems of these communities, including recreation, tourism and entrepreneurial businesses attracted to scenic locations, when evaluating alternatives.

There is a vast and growing body of research that indicates that the environmental amenities provided by public lands are an important economic driver in the rural West (Rudzitis and

Johansen 1989; Johnson and Rasker 1993,1995; Rasker 1994; Power 1995,1996; Duffy-Deno 1998; Rudzitis 1999; Rasker et al. 2004; Holmes and Hecox 2004). In a letter to the President and the Governors of the western states, economists from universities and other organizations throughout the United States pointed out that "The West's natural environment is, arguably, its greatest long-run economic strength" (Whitelaw et al. 2003).

The western United States is growing at a rate faster than any other region (U.S. Census Bureau 2001), and, counter to the norm, population growth has preceded employment growth in the rural West (Vias 1999). Furthermore, counties with high levels of natural amenities (such as in the Red Desert) are more likely to experience higher growth than those counties with fewer such amenities (McGranahan 1999). Along with that growth comes demographic change. As Shumway and Otterstrom (2001) point out, "Population change represents more than a simple redistribution of people; it is an indicator and, in many instances an instigator, of a wide range of economic, social, cultural, political/policy, and environmental changes." As more people move from urban areas to rural communities they bring with them expectations about how local public lands ought to be managed. Changing community values must be assessed and accounted for in the Final EIS for the Atlantic Rim project.

Management plans for the public lands in the West must consider the increasing importance of industries and economic sectors that rely on these public lands, but not necessarily on the extraction of their natural resources. As the population of the entire country grows, the presence of undeveloped lands becomes more and more important. Indeed, much recent research has concluded that the presence of protected public lands strengthen western rural economies by meeting growing needs for clean water, wildlife habitat and recreation opportunities (Power 1995, 1996; Rasker 1994; Rasker et al. 2004; Rudzitis 1999; Rudzitis and Johansen 1989; Johnson and Rasker 1993, 1995; Whitelaw et al. 2004).

### **Key Economic Indicators of the Economy of Western States**

Wyoming's economy, like the economy of much of the West, is characterized by certain indicators that must be considered in the economic analyses performed by land management agencies. These include the growing importance of non-labor income from investments and retirement, increasing employment in high technology, knowledge-based, and service industries, the important role that recreation and tourism plays in providing jobs and income, and the rise of small businesses and other entrepreneurial endeavors. Other features of the western economy include the decline in extractive industries, the increase in public awareness and appreciation of the environmental and recreation amenities of their home counties, and the diversification of rural economies. This section describes a concise set of indicators that should be examined in the socio-economic analysis for the Atlantic Rim EIS.

#### **A. Non-labor income**

A complete analysis of regional economic trends should include an analysis of total personal income, including all sources of income, rather than relying solely on employment. A full accounting of income is necessary to an understanding of the important role that non-labor income, such as retirement income, interest payments, rents, and profits, plays in the regional economy. Investment and retirement income makes up nearly thirty-two percent of total personal income in

Wyoming, which would make it the top "industry" in the state. An economic impact analysis that excludes this income is inadequate and misleading.

Researchers have found that areas with high levels of natural amenities attract residents, many of whom rely on non-traditional sources of income (Duffy-Deno 1998, Nelson 1999, McGranahan 1999, Rudzitis 1999, Shumway and Otterstrom 2001, Lorah and Southwick 2003). When an investor living in a community receives dividends on his or her investments, that money represents an influx of income for the local community. The same thing is true of a retiree's income. Due to the high levels of natural amenities in the coastal and mountain regions of the West, these non-labor sources of income are concentrated in those areas (Nelson 1999).

An influx of retirees in those rural communities has been shown to have positive effects on both income and employment (Deller 1995), with non-labor income fueling increases in income and employment for many other sectors including health, financial and real estate services.

It should be noted that non-labor income also includes income support payments such as Medicaid, welfare and unemployment. However this category is consistently a small portion of total non-labor income and therefore a small portion of total personal income. Income support is only three percent of total personal income and only nine percent of non-labor income in Wyoming. It is important for a complete analysis of non-labor income to make a distinction between income support and other forms of non-labor income.

A complete analysis of the economy of Carbon and Sweetwater Counties must consider non-labor income, and a thorough evaluation of land management alternatives must consider the impacts of each alternative on non-labor income.

#### B. Knowledge-Based, Service Sector and Other Non-Recreation Businesses

Bennett and McBeth (1998) cite the emergence of a trend toward increasing western rural populations as early as the 1970s and state that this trend was partly motivated by the high quality of life in these areas. Johnson (2001) points out the importance of technology in this transition. He credits the advancement of technology with both the downward trend in extractive employment (where improved technology results in reduced labor requirements) and the potential (currently being realized in many communities) for economic growth and stability. Johnson points out that improving technology, especially in information and communication, also mitigates the constraints imposed by remoteness and permits employment in knowledge-based and service industries previously unavailable for rural residents.

Many of the counties in the Rocky Mountain West with economies that are characterized by a predominance of service industries have the highest incomes (Shumway and Otterstrom 2001). Over the past quarter century, the U.S. economy has seen a shift from extractive and primary manufacturing industries to service oriented businesses. A common misconception about the service sector is that it includes only low paying jobs. This is not the case. The service sector in the West includes several high-paying industries, many of which are linked closely with the increase in non-labor income. Employment and income in the health care services increases as the number of

retirees in an area increases. As people with investment income move into a region, the demand for financial, insurance, and real-estate service also increases.

The service sector includes occupations and industries that are classified as "knowledge based," defined by Henderson and Abraham (2004):

Knowledge-based activities emerge from an intangible resource that enables workers to use existing facts and understandings to generate new ideas. These ideas produce innovations that lead to increased productivity, new products and services, and economic growth.

Knowledge-based occupations have grown nationwide since 1980, with growth in the Rocky Mountain region being among the highest (Henderson and Abraham 2004). Local amenities that enhance quality of life are among the factors correlated with this growth. Other factors contributing to the growth of knowledge-based occupations are a high quality workforce, colleges and universities, infrastructure in the area, and the size and diversity of the local economy. These factors are likely to be interrelated and in many cases dependent on the quality of the environment and the availability of public lands, as cities and counties in the region leverage scenic amenities to attract high quality workers and knowledge-based industries. Other research confirms the role that amenities, including environmental and recreational amenities, play in attracting businesses to locations in the rural Rocky Mountain West (Whitelaw and Niemi 1989; Johnson and Rasker 1993, 1995). The most recent income data available from the Bureau of Economic Analysis (BEA) includes a category called "information," which captures a good deal of the new knowledge-based industry. Land management decision makers should take advantage of these expanded industry classification categories when analyzing the potential impacts of public land management on the diverse economies of western counties.

A complete analysis of the economy of Carbon and Sweetwater Counties must take into account the growth in income and employment in the service and professional sectors, and consider the impacts of each alternative on those sectors.

### **C. Recreation & Tourism**

Many rural communities in the Rocky Mountain region have experienced firsthand the surge in demand for recreation experiences outdoors, especially on federal public lands. Often these towns see an upswing in migration and economic health as they become "discovered" by recreationists (Rasker, et al. 2003, 2004; Holmes and Hecox 2004).

A 2005 report by the Outdoor Industry Association estimates that 159 million Americans participate in outdoor recreation each year. A 2002 study by the same organization estimates annual spending on outdoor recreation at \$18 billion. The public lands provide much of the open space that makes this important economic activity possible.

In 2000, the Forest Service estimated the economic impacts of their program areas. These estimates account for the impact a range of activities exerts on both income and employment.

Recreation and protection programs account for a much greater economic impact than do extractive programs (Alward et al. 2003).

#### Economic Significance of Forest Service Program Activities (for 1999)

	Percentage of Total Value Added (GDP)	Percentage of Total Income	Percentage of Total Wages	Percentage of Total Jobs
Recreation and Landscape Protection <i>Recreation, Heritage &amp; Wilderness; Wildlife, Fish &amp; Rare Plants; Watershed &amp; Air Mgt.; Ecosystem Mgt. Coord.; Access &amp; Travel Mgt.</i>	70%	69%	71%	76%
Extraction of Commercial Resources <i>Range Mgt.; Forest Mgt.; Minerals &amp; Geology Mgt.</i>	22%	22%	20%	17%
Other <i>Lands &amp; Realty Mgt.; Fire &amp; Aviation Mgt.; Law Enforcement; Facilities Mgt., General Admin.; S&amp;P Forestry; R&amp;D</i>	9%	9%	8%	7%

*Source: Alward et al. 2003.*

Quality hunting and fishing opportunities require wildlife habitat, which generally means large areas of open land. As the population grows, these are increasingly found only on the federal and other public lands. Pickton and Sikorowski (2004) estimate that the total economic impact of hunting, fishing, and wildlife-watching in Colorado at over \$1.8 billion, with corresponding employment at 33,000 full-time jobs. Wyoming has a similar abundance of important hunting and fishing opportunities with the corresponding economic impact they bring to a region. An April 2004 report from the Center for the Study of Rural America calls wildlife recreation "rural America's newest billion-dollar industry" (Henderson 2004), with wildlife-related activities boosting tourism, spurring business growth and contributing to increased property values. The US Fish and Wildlife Service and the Census Bureau team up to track participation and expenditures on wildlife-related recreation. These activities generate \$634 million for local economies in Wyoming (U.S. FWS and U.S. Census Bureau 2001). Within the Great Divide RMP area, annual economic inputs from hunting and wildlife viewing total \$115 million (WGFD 2004).

A complete analysis of the economy of Carbon and Sweetwater Counties must present data and analysis that fully accounts for the important role that tourism, recreation, hunting, and fishing play in ensuring a sustainable and diversified economy for rural western communities.

#### **D. Entrepreneurs**

All of the indicators previously discussed are related to the increasing entrepreneurial activity being experienced West-wide. Entrepreneurs in high technology and knowledge-based industries can often choose their location, and are likely to choose high-amenity locations (Rasker and Glick 1994, Snepenger et al. 1995, Johnson and Rasker 1995, Beyers and Lindahl 1996, Rasker

and Hansen 2000, Low 2004, Henderson and Abraham 2004). Recreation- and tourism-oriented businesses are often founded by footloose entrepreneurs seeking to live and work in places rich in amenities. Retirees and others relying on investment income also choose amenity-rich locations that include certain businesses and services. These new migrants bring with them entrepreneurial opportunities for those who can provide the services they seek. While wage and salary income is still the largest portion of total personal income in Wyoming, non-farm proprietors' income has shown an upturn in recent years.

As the proportion of total personal income from non-farm proprietors grows, implications for rural communities and for management of the public lands that surround them also grows. As Low (2004) points out: "Entrepreneurs create local jobs, wealth, and growth — and are themselves innovative users of other regional assets and resources." Furthermore, Low notes: "Entrepreneurs bolster a region's quality of life while promoting economic prosperity. Research has found a strong correlation between entrepreneurship and long-term regional employment growth."

Beyers and Lindahl (1996) specifically examine businesses which provide "producer services" and find these businesses are expanding rapidly in rural areas, and that most of them conduct much of their business interregionally or even internationally, bringing outside income into the rural region where they are located. These researchers also found that the decision to locate in rural areas is mostly for quality-of-life reasons, providing further evidence of the importance of such factors to local economies and the need to examine public land management activities and the potential impacts on quality of life.

A complete analysis of the economy of Carbon and Sweetwater Counties must take into account the growing role of entrepreneurial businesses, and consider the impacts of each alternative on those businesses attracted by the environmental amenities provided by public lands in those communities.

**E. The Role of Protected Public Lands**

More and more people in the West, and all over the US, are able to choose where they live and work. Technology makes it easier for professionals to "telework" using electronic communications. Many businesses are able to conduct national or international commerce from any location they choose. Other entrepreneurs simply choose to live in a particular place and build a business in response to local needs. Retirees and others who collect non-labor income are not tied by a job to a specific location. All of these people seek an attractive place to live. More and more, as development pressures increase, public lands become a backdrop or setting which contributes to or even creates the amenities on which a community's economy will thrive and grow. Research supports the assertion that protected public lands contribute to rural economic health (Rudzitis and Johansen 1989, Rudzitis and Johnson 2000, Rasker et al. 2004).

Local communities with protected wildlands reap measurable benefits in terms of employment and personal income. For instance, the Sonoran Institute (Sonoran Institute 2004b) has found that protected lands have the greatest influence on economic growth in rural isolated counties that lack easy access to larger markets. From 1970 to 2000, real per capita income in isolated rural

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counties with protected land grew more than 60 percent faster than isolated counties without any protected lands.

These findings confirm earlier research showing that wilderness is in fact beneficial for local economies. Residents of counties with wilderness cite the presence of that wilderness as an important reason why they moved to the county, and long-term residents cite it as a reason they stay. Recent survey results also indicate that many firms decide to locate or stay in the West because of scenic amenities and wildlife-based recreation, both of which are strongly supported by wilderness areas (Morton 2000).

As noted by Freudenburg and Gramling (1994):

"...it needs to be recognized as a serious empirical possibility that the future economic hope for resource-dependent communities of...the United States could have less to do with the consumption of natural resources than with their preservation."

This sentiment is reiterated by Deller et al. (2001):

"Rural areas endowed with key natural resource amenities can manage those resources to capture growth more effectively. This may entail expansion beyond policies that have historically been focused on extraction of the resource base."

We therefore request that the BLM fully address the economic importance to the communities in Carbon County of protecting public wildlands from resource extraction.

### **Sources of Socio-economic Data**

This section presents selected sources of economic, demographic, and recreation data.

#### **A. Economic and Demographic Data**

Data are available for several economic indicators by county from the U.S. Department of Commerce, Bureau of Economic Analysis and the U.S. Department of Labor, Bureau of Labor Statistics. The U.S. Census Bureau also tracks economic trends along with demographic trends, most by county as well. Economic profiles showing these and other trends by state, county, or groups of counties are available from the Sonoran Institute's Economic Profile System.

#### **Economic and demographic data sources:**

Bureau of Economic Analysis (Department of Commerce): <http://www.bea.doc.gov>  
Data on income, farm income, transfer payments, and employment for states, counties, and regions. Annual data, 1969-2000 (Standard Industry Classification) and 2001-2003 (North American Industry Classification System)

Bureau of Labor Statistics (Department of Labor): <http://www.bls.rzov>  
Data on income, wage and salary, employment, unemployment rates by industry, for counties, states, and regions. Monthly data, 1990-2005

Census Bureau (U.S. Department of Commerce): <http://www.census.gov>  
Data on population, demographics, business, and economics for states and counties

The Sonoran Institute Economic Profile System: <http://www.sonoran.org>  
Generates detailed economic profiles, including trends in employment and income, farm income, economic resilience, and demographics for states, counties, or groups of counties. The companion, Economic Profile System — Community, will generate profiles to reflect just the rural or urban areas of a county.

The National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, (U.S. Department of the Interior, Fish and Wildlife Service and US Department of Commerce, Census Bureau): <http://www.census.gov/prod/www/abs/fishing.html>

Data at the state level on participation in and expenditures for wildlife-associated recreation Wyoming Department of Administration and Information, Economic Analysis Division: <http://eadiv.state.wy.us/>

## **B. Recreation Data**

Data on recreation use in the area of the Atlantic Rim Coalbed Methane project is critical to making an informed decision. Surveys of users at recreation areas can be used to obtain information on the levels and types of recreation use. Information on users' expenditures in the area is also important to learn the overall impact of public lands recreation.

Other information may be obtained through surveys of local residents, recreation visitors and through using existing data on the recreation and tourism revenues to local businesses, and the value of these activities to participants. The lack of complete visitation data does not justify ignoring the jobs and income from recreation. Furthermore, the Data Quality Act requires use of the best available, reliable data on all impacts and affected sectors of the economy.

The National Survey on Hunting, Fishing and Wildlife-Associated Recreation (noted above) is also a source of state-wide data on participation in wildlife recreation that should be used to supplement more specific studies for the location in question. The Wyoming Game and Fish Department is also a source of data on fishing and hunting and other wildlife-associated recreation. (<http://gf.state.wy.us/>)

## **C. Data Gaps and Other Issues**

The BLM analysts preparing the Final EIS for the Atlantic Rim project may encounter gaps in county- or state-level economic data or may notice that data series are not continuous. These are not, however, obstacles to doing a thorough and comprehensive analysis of the trends in the economies of the local area.

### **1. Disclosure Gaps**

Some data gaps are due to disclosure restrictions. The Bureau of Economic Analysis and the Bureau of Labor Statistics will suppress data in cases where disclosing it may reveal private information about individuals. For example, if only one business represents a specific industry in a given area, any data on employment and/or income in that industry will not be publicly disclosed since it may make it possible to identify an individual's or business' private information. Disclosure suppression is more likely to be a problem in counties with small populations. The Sonoran Institute suggests several potential techniques to address the issue of

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data gaps due to disclosure issues. The Economic Profile System will also automatically estimate the data gaps for major industry categories. These are described in detail in the User's Manual for the EPS (Sonoran Institute 2004b.)

**2. Other Data Gaps**

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BEA and Bureau of Labor Statistics (BLS) data are sometimes not available for certain industries and/or certain years. Other data are suppressed, but are identified as falling within a range of values. Data gaps where an "L" appears instead of a number are described as follows:

- Less than 10 jobs, but the estimates for this item are included in the totals, or
- Less than \$50,000 (for income data), but the estimates for this item are included in the totals.

**3. Industry Classification Using SIC and NAICS**

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Income and employment data from the Bureau of Economic Analysis and the Bureau of Labor Statistics for 1969-2000 are classified according to the Standard Industry Classification system (SIC), while the most recent data (2001 and forward) are classified by the North American Industry Classification System (NAICS). NAICS was developed jointly by the U.S., Canada, and Mexico in order to make statistics comparable across all three countries.

The NAICS provides greater detail for the service and **professional** sectors which are of growing importance in the rural West, and indeed all over the country. This classification scheme also includes some emerging industries such as "information" which includes the growing Internet and information phenomenon. The Bureau of Economic Analysis' Regional Economic Information System (REIS) uses SIC to classify industries and the Sonoran Institute's EPS system uses SIC data from the REIS in order to show trend analyses, along with NAICS data.

**Recommended Methods for Analysis of Socio-economic Issues and Impacts**

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In general, it is inappropriate to examine a region's economy solely as a single point in time. To the extent that data are available, the economic profile of an area should be developed based on the trends in key economic indicators. This can help guide resource management by showing the likely future situation in an area and can point out periods of economic downturn. It may be instructive to look at other variables during these periods to see if there are correlations between land management activities and economic activity.

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Looking at the changes in the employment and income (including non-labor income) is important to understanding the overall direction in which an area's economy is moving. Trend analysis will show long-term patterns in income and employment that may be masked when looking at only a point in time. Data on employment and income are available from 1969-2000 from the BEA under the SIC system. The BEA changed to the NAICS in 2001, and reconstructed NAICS data for years prior to 2001 are not yet available. However, one can certainly look at a general picture of the economy over time by using both sets of data. This analysis should be applied to all the segments of the economy to see the long-term trends in both extractive and other industries along with non-labor income.

671-38-2

A lack of data on recreation activities on public lands is often cited as a reason to avoid analysis of potential impacts of public land management decisions on this important sector. Several

examples of research on recreation use, values to participants, and expenditures are available (a very limited sample includes: Fix and Loomis 1997, Chakraborty and Keith 2004, Cordell and Tarrant 2002, Kaval and Loomis 2003). Rosenberger and Loomis (2001) present a detailed bibliography of recreation valuation studies and present methods by which analysts can transfer estimates of the value of recreation in one area to other similar areas. Of course the best way to truly understand the value of recreation in an area is to conduct a survey specifically focused on that area. At a minimum, such a survey should collect information on recreation visitation and expenditures. An estimate of the economic impacts of recreation can be made by multiplying the total number of recreation visitors in an area by the estimated expenditures per visitor day. These data need to be collected and analyzed as part of a comprehensive analysis of the socio-economic impacts of land management.

### **Recommended Analyses of Socio-economic Issues and Impacts**

The preceding sections of this brief have presented the key indicators for performing economic analysis, identified data sources for conducting that analysis, and provided methods for completing an analysis that more accurately reflects the West's economy. In making land-use decisions, federal agencies have an obligation under NEPA to take a "hard look" at the environmental consequences of a proposed action, and the requisite analysis "must be appropriate to the action in question."<sup>1</sup> The impacts and effects of a proposed action, such as oil and gas development, that federal agencies are required to assess include: "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative."<sup>2</sup> Under the Data Quality Act, federal agencies are required to use information that is of high quality and that is objective, useful, and verifiable by others.<sup>3</sup> The agency must also use "sound statistical and research" methods.<sup>4</sup>

Federal agencies cannot evaluate the consequences of proposed decisions or determine how best to avoid or mitigate negative impacts without adequate data and analysis. NEPA's hard look at environmental consequences must be based on "accurate scientific information" of "high quality."<sup>5</sup> Essentially, NEPA "ensures that the agency, in reaching its decision, will have available and will carefully consider detailed information concerning significant environmental impacts."<sup>6</sup> The Data Quality Act and the agencies' interpreting guidance expand on this obligation, requiring that influential information or decision-making input be based on "best

<sup>1</sup> 42 U.S.C. § 4321 et seq.; *Metcalf v. Daley*, 214 F.3d 1135, 1151 (9th Cir. 2000); *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989).

<sup>2</sup> 40 C.F.R. § 1508.8.

<sup>3</sup> Treasury and General Government Appropriations Act for Fiscal Year 2001, Pub.L.No. 106-554, § 515. See also, Office of Management and Budget "Information Quality Guidelines," available at [http://www.whitehouse.gov/omb/inforeg/iqg\\_oct2002.pdf](http://www.whitehouse.gov/omb/inforeg/iqg_oct2002.pdf) and individual "Agency Information Quality Guidelines," available at [http://www.whitehouse.gov/omb/inforeg/agency\\_info\\_quality\\_links.html](http://www.whitehouse.gov/omb/inforeg/agency_info_quality_links.html).

<sup>4</sup> *Ibid.*

<sup>5</sup> 40 C.F.R. § 1500.1(b).

<sup>6</sup> *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).

available science and supporting studies conducted in accordance with sound and objective scientific practices.”<sup>7</sup>

Through the application of the methodology, key indicators and data sources we have provided, federal agencies can best fulfill their obligations to evaluate the direct, indirect, and cumulative impacts of various alternative decisions. In this section, we have provided both general recommendations on the scope of the socio-economic analysis that should occur and specific inquiries to be made in this analysis.

**We formally request that the final NEPA analysis fully reflect and account for the following:**

**A. The socio-economic analysis should include an analysis, graphs and discussion of historic personal income trends — including non-labor sources of income.**

The analysis of economic impacts must include an analysis of all sources of income, including non-labor income. A full accounting of all sources of income is necessary to understand the important role that retirement and investment income — as well as other sources of non-labor income, such as interest payments, rents, and profits — play in the regional economy. An economic impact analysis that excludes non-labor income is inadequate and misleading.

**➤ Specific Requests and Requirements for examining the Total Personal Income and the Importance of Non-Labor Income as Part of the NEPA Process:**

**For Carbon and Sweetwater Counties, please show the role of non-labor income in the area's economy.**

- Show the percentage of current total personal income that is non-labor income (excluding income support).
  - Analyze and discuss the role that retirement and investment income currently plays in the area's economy, including the spillover effects that retirees have for businesses in the area.
  - Analyze and discuss the role that amenities, including recreation opportunities and environmental quality, currently play in attracting and retaining non-labor income to the area.
  - Analyze and discuss the potential impacts that public land management alternatives will have on the level and trend of investment and retirement income in the area.
- Show the trend in non-labor income (again excluding income support) as a percentage of total personal income.

<sup>7</sup> Treasury and General Government Appropriations Act for Fiscal Year 2001, Pub.L.No. 106-554, § 515. See also, Office of Management and Budget "Information Quality Guidelines," available at [http://www.whitehouse.gov/omb/inforeg/igq\\_oct2002.pdf](http://www.whitehouse.gov/omb/inforeg/igq_oct2002.pdf) and individual "Agency Information Quality Guidelines," available at [http://www.whitehouse.gov/omb/inforeg/agency\\_info\\_quality\\_links.html](http://www.whitehouse.gov/omb/inforeg/agency_info_quality_links.html).

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**B. The socio-economic analysis must include an analysis and discussion on the indirect role public lands play in the regional economy in attracting knowledge-based businesses, service sector business, recreation and tourism businesses, and other entrepreneurs.**

Public wildlands often define the character of an area and are an important component of the quality of life for local residents and future generations. Their protection enables the customs and culture of western communities to continue. The socio-economic analysis also must account for these economic benefits.

A growing number of economists are recognizing that protecting the quality of the natural environment is key in attracting new residents and businesses, and that therefore the environment is the engine propelling the regional economy. A letter to President Bush from 100 economists concludes, "The West's natural environment is, arguably, its greatest, long-run economic strength... A community's ability to retain and attract workers and firms now drives its prosperity. But if a community's natural environment is degraded, it has greater difficulty retaining and attracting workers and firms" (Whitelaw et. al, 2003). Given these findings, we request that, as part of the economic impact analysis of management alternatives, the socio-economic analysis fully consider the indirect role of public lands in attracting and retaining non-recreational businesses and retirees and encouraging entrepreneurial efforts.

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➤ **Specific Requests and Requirements for Examining the Role of Protected Public Lands in the Local Economy in the Final EIS for the Atlantic Rim Coalbed Natural Gas Development:**

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For Carbon and Sweetwater Counties, please show the role of various industries in the area's economy.

Show the current distribution of employment and income by industry (for each industry, show employment as a percentage of total jobs and income as a percentage of total personal income).

Discuss the relative importance of each industry.

Analyze and discuss the impacts that public land management alternatives will have on non-extractive industries if extractive activities are accelerated on public lands in the area.

Show a complete analysis of the segments of service and professional employment and income for the area.

Analyze and discuss the potential impacts of land management alternatives on these sectors of the economy.

Show trends in employment and income by industry, including a detailed examination of the service and professional sectors.

Discuss the level of diversity in the region's economy. Discuss trends in income and employment that have led to the current mix of industries

Analyze and discuss the potential impacts of public lands management alternatives on the overall makeup of the economy of the area.

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Show trends in non-farm proprietor's income as a percentage of total personal income for the area.

Collect data on the various sectors that make up non-farm proprietors. Analyze the sectors where entrepreneurship is growing.

Analyze and discuss the factors which have attracted new businesses to the area.

Analyze and discuss the potential impacts that public land management alternatives will have on these sectors and the ability of proprietors to start and grow businesses.

**C. The socio-economic analysis must account for the economic importance of the recreation, hunting, and fishing that occurs on public land.**

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The recreation opportunities provided by wilderness-quality lands also yield direct economic benefits to local communities. The socio-economic analysis must include an analysis of the income and jobs associated with recreation, hunting and fishing from each alternative.

**➤ Specific Requests and Requirements for Examining the Economic Importance of Recreation, Hunting and Fishing on Public Lands in the Final Atlantic Rim Coalbed Natural Gas Development EIS:**

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For Carbon and Sweetwater Counties, show the role of recreation, hunting and fishing in the area's economy.

Collect data on participation in all recreation activities (hunting, fishing, hiking, camping, backpacking, biking, skiing, wildlife watching, boating, ORV use, etc.)

Collect data on expenditures by recreation visitors in the region.

Analyze the economic impact of hunters' and anglers' expenditures on area businesses and local economies.

Analyze the economic impact of other recreationists' expenditures on area businesses and local economies.

Show the impact of lodging taxes, sales taxes, and property taxes in the local economy.

Analyze and discuss the impact of public land management alternatives on recreation, hunting, and fishing businesses.

**Correctly Characterizing Oil and Gas Development**

As an agency prepares a management plan or an environmental impact statement, it must do a full accounting of the costs and benefits of each of the alternatives proposed. Analyses by land management agencies of extraction alternatives tend to emphasize the benefits of extraction and ignore the costs. For these alternatives an agency must fully evaluate all of the costs associated with extraction activities. Only when all the costs and benefits are fully accounted for can a truly informed assessment of the alternatives occur. To facilitate informed investment decisions about

671-41 publicly owned wildlands, economic analysis must take into consideration both market and nonmarket benefits and costs (Loomis 1993).

### **A. Correctly Estimate the Volume of Oil and Gas Resources**

Analyses of the benefits of oil and gas development must be made based on accurate and appropriate estimates of the resources available. Exaggeration of the resources available distorts the analysis in two ways. First the projected benefits will be too large when they are based on inflated resource estimates. Second, the costs of protecting other resources and mitigating impacts from oil and gas development will be overestimated in terms of oil and gas foregone when these resource estimates are too large.

#### **1. Economically Recoverable vs. Technically Recoverable Oil and Gas**

671-42-1 As the management plan and Reasonably Foreseeable Development scenario are developed, we formally request that they be based on economically recoverable amounts of oil and gas, not technically recoverable oil and gas. The economically recoverable resources are that part of the technologically recoverable resources that can be recovered with a profit. To be considered economically recoverable the market and non-market costs of gas recovery must be less than or equal to the gas price. When economic criteria are considered, the oil and gas actually recoverable drops significantly (Attanasi, 1998; LaTourrete, et. al, 2002).

671-42 Recent research by economists at The Wilderness Society indicates that the federal government's assessments of the oil and gas resources on public lands are flawed and consistently overestimate their value (Morton, et al., 2002; The Wilderness Society, 2004a, b). Federal reports inappropriately use technically recoverable gas rather than economically recoverable gas in their conclusions, fail to consider improved access to gas from directional drilling and drill bit technology, and fail to examine access to existing gas reserves.

If economic factors are not considered, the potential oil and gas will be overestimated as will the opportunity costs of protecting the wilderness character of public lands as well as all forms of environmental protection. For example, basing analysis on estimates of technically recoverable resources will lead the agency to dramatically overestimate the impact of oil and gas development on employment (new job creation) in the region. Conversely, the agency will also likely overestimate the cost of lease stipulations, wilderness designation, and other protective measures if technically recoverable estimates are used. In studies looking at the impacts of lease stipulations on current gas supply, the Department of Energy has overestimated the adverse impacts because a large majority of the undiscovered gas, while perhaps technically recoverable, is not economical to extract. This agency should not make the same mistake.

If the oil and/or gas is not economical to extract, there is no adverse impact on gas supply from protecting wildlife, archeological sites, recreation sites and other public resources with leasing stipulations. Further, an EIS that relies on misleading economic information or fails to include all relevant costs in its economic analysis will violate NEPA, because it does not provide decision-makers and the public a valid foundation on which to judge proposed projects.

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The Congressional Research Service (Corn, et al. 2001) and most, if not all, economists agree that the policy relevant opportunity cost of an environmental regulation is the economically recoverable amount of gas – not the technically recoverable amounts. Shanley et al. (2004), who are veterans of the oil and gas industry, conclude with respect to natural gas in the Rockies, "**it is likely that resource volumes are substantially overestimated, while the risks associated with finding and recovering those resources have most certainly been underestimated**" (emphasis added) – reinforcing the need to examine the economically recoverable amounts of gas and oil. As noted by LaTourrette, et al. (2002), economic constraints are in most cases the limiting factor on gas production in the Rocky Mountains, not environmental laws.

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#### **a. Economic Recovery Rates for Undiscovered, Unconventional Oil and Gas**

Economic recovery rates are even lower for unconventional oil and gas resources (continuous-type gas and coalbed methane) than for the conventional resources. For continuous-type gas, only 7 and 15 percent of the technically recoverable gas is economic to find, develop and produce at \$2.46/mcf and \$4.11/mcf, respectively (Attanasi 1998). For continuous-type oil accumulations at \$22.11 and \$36.85 per barrel, about 7 percent and 50 percent, respectively, of the technically recoverable oil is economically feasible to exploit (Attanasi 1998). For unconventional coal bed gas, about 30 percent of the technically feasible gas is economically recoverable at \$2.46 per mcf, while at \$4.11 per mcf, the financial portion increases to slightly more than 50 percent (Attanasi 1998).

#### **B. Correctly Estimate the Employment and Income Benefits from Oil and Gas Development.**

The IMPLAN model is an economic model used by the Forest Service and the agency to project jobs and income from proposed actions. While the IMPLAN model can be useful as a static analysis of the regional economy, communities must be aware of the shortcomings and poor track record of the model. A more accurate, dynamic, and complimentary approach examines regional trends in jobs and income. We formally request and recommend that the agency analyze economic trends using the EPS model developed by, and available free from, the Sonoran Institute.

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In general, models like IMPLAN are grounded in economic base theory. These models assume that an economy is static (i.e. it does not change) – which everyone knows is not true. IMPLAN models also do not consider the impacts of many important variables that affect regional growth in the rural west, such as amenities like high quality hunting, fishing and recreational opportunities, open space, scenic beauty, clean air and clean water, a sense of community, and our overall high quality of life. Many of these amenities are associated with attracting new migrants as well as retaining long-time residents.

Many long-time residents and new residents earn retirement and investment income. As shown by an analysis of economic trends, retirement and investment income is becoming increasingly important to rural economies of the west. A recent letter **from** 100 economists (Whitelaw, et al. 2003, attached) reinforces the importance of non-labor income to the economy of the West. Unfortunately, most IMPLAN models completely fail to consider the important economic role of

retirement and investment in the economy of a community – which can be a fatal flaw of the model.

Our more specific concerns have to do with the technical assumptions used in most IMPLAN models. These questionable assumptions include: no changes in relative prices, no input substitution or technological change in the production processes; no labor mobility; no change in products or tastes; no regional migration; and no changes in state and local tax laws. The assumption of no labor mobility draws into question the issue of local versus non-local job creation, and this is particularly important when analyzing a proposal such as oil and gas development. There is no guarantee that the oil and gas jobs projected by IMPLAN will be filled by local workers. And with respect to oil and gas drilling, workers in non-local wildcat crews fill most, if not all the direct jobs.

Another major assumption with IMPLAN is the constant technology assumption. Most IMPLAN models, by failing to consider the downward impact of technology on job growth, will exaggerate the job potential from oil and gas drilling. As with other resource extractive industries attempting to maximize profits, technological improvements reduce labor costs and result in fewer jobs. In Northwest Colorado for example, companies now produce about twice the amount of coal with half as many workers. It is likely that current coal jobs are much less than originally forecasted by coal companies. The downward trend in resource extraction jobs only becomes apparent if the agency completes a trend analysis of the change in jobs and income over time.

With respect to oil and gas, the constant technology assumption contradicts the fact that technological change occurs in the oil and gas industry. Investments in technology have resulted in fewer workers required for each well drilled. Computer technology has over time also reduced the number of workers required to produce natural gas and oil. The trends of technology replacing jobs in the oil and gas industry will continue. As a result of holding technology constant IMPLAN tends to overestimate future job gains associated with an increase in drilling and production of gas and oil (and coal). A review of government data confirms this.

Laitner, et. al (1998) cite Bureau of Labor Statistics data which indicate that in 1988, oil and gas drilling generated about 1.72 jobs per million dollars of spending. By 1998 that number fell to 1.44 jobs per million dollars. Further, BLS estimates this number will fall to 0.71 jobs per million dollars of spending by 2008. This indicates that the direct jobs estimated with a static model like IMPLAN model will be much less than the number actually created from drilling. As a result of this failure to account for technology improvements, input-output models are well known to predict higher multiplier effects than are actually experienced (Hoffman and Fortmann, 1996).

In a review of 23 studies that empirically tested the economic base hypothesis, Krikelas (1991) found only four studies that provided any evidence in support of economic base theory as a long run theory of economic growth -- a dismal track record. History is replete with cases of communities and areas that lost their export base and continued as reasonably successful economies with their social capital intact. The local-serving sectors of the economy were the persistent ones, as new exports were substituted for the old.

Tiebout (1956) recognized the shortcomings of the economic base theory when he wrote, "Without the ability to develop residentiary activities, the cost of development of export activities will be prohibitive." Krikelas (1992) concludes that economic base theory has severe limitations, especially for economic planning and policy analysis. This is a conclusion that community leaders and land management officials and planners can no longer ignore, and one that should be incorporated into public land and community-level planning. As Haynes and Horne (1997) note:

**Where the economic base approach gets into trouble is when it is used inappropriately as a tool for planning or predicting impacts of greater than one year in duration; a snapshot of current conditions tells little about the form a region's future economy may take** (emphasis added).

Economists with both the Forest Service and the Office of Technology Assessment concluded that while IMPLAN is useful for appraising the total economic impacts of a management plan, the model is insufficient for evaluating the economic impacts for communities (Hoekstra, et. al, 1990; OTA, 1992). According to the OTA (1992), IMPLAN has an additional shortcoming for assessing community impacts: the economic data used to construct IMPLAN do not provide comparable details for all resource-based sectors of the economy. While economic data for oil and gas is classified as a separate manufacturing industry, recreation is scattered among a variety of industries generally classified in services and retail, with some in transportation. The ease of data acquisition for estimating oil and gas impacts combined with the difficulty of estimating the impacts of recreation and tourism underscores the potential oil and gas bias in IMPLAN modeling.

The 25th anniversary issue of the Journal of Regional Science included an article by H.W. Richardson, a noted regional scientist, who believed that 40 years of research on economic base models "has done nothing to increase confidence in them." In addition, he concluded that it would be hard to "resist the conclusion that economic base models should be buried, and without prospects for resurrection" (Richardson, 1985). He is not alone. Many have suggested that economic base theories be abandoned in favor of other, more comprehensive theories of regional growth and development (Krikelas, 1992; Rasker, 1994; Power, 1995 and 1996). Many of these economists recommend analysis of regional trends in total personal income as a better way to understand where the local economy came from and where it is headed.

The concern over the accuracy of regional growth models like IMPLAN combined with concern over the use of these models for planning, suggests that it is not only inappropriate but a disservice to rural communities to rely on IMPLAN to estimate the economic impacts of public land management alternatives on rural communities. We recommend that the agency stop relying on IMPLAN and other models derived from economic based theory. If the agency decides to use IMPLAN, we insist that the agency shall fully discuss the assumptions, the shortcomings, and the poor track record of the model in planning efforts. At the same time the agency must also complete a trend analysis of regional jobs and income – to provide a better and more complete

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understanding of their economic past and their economic future. We recommend the Economic Profile System that is available free from the Sonoran Institute.

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The concern over the accuracy and outright condemnation of input-output models strongly suggests that it is not only inappropriate but a disservice to rural communities to continue to use the IMPLAN model for estimating the effects of public land management alternatives on rural economies throughout the West.

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### **C. Correctly Account for Budget Constraints**

The NEPA analysis should be based on reasonable budget expectations, which should be clearly stated. In 1991, the U.S. General Accounting Office reviewed federal land management budgets and found that the funding received by public land management agencies has been significantly less than the budgets required to fully implement plans. The lower-than-planned budgets have prevented public agencies from producing many of the outputs projected in land management plans, and mitigation measures promised in NEPA documents (Morton 1997).

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To remedy this, the agency needs to consider budget constraints when evaluating each management alternative as part of the NEPA process. This will require more detail as to where money will be spent, which programs will be fully funded and which ones will not. Planners should, for example, estimate the labor and capital costs of fully mitigating the environmental consequences as a result of implementing each management alternative. By ignoring budget constraints, the plan presents the public with an unrealistic picture of what will be accomplished given limited financial resources.

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Successful organizations can rarely afford to ignore budgets when developing long-term plans. Without acknowledging budget constraints, the mitigation plans and hence resource protection described in management plans will not be attainable. Rather than presenting the maximum production potential of public lands unconstrained by budgets, the agency should consider presenting the public with a more accurate picture of what can actually be accomplished given expected appropriations. Williams (1998) says, "policy is the effective result of 'what is intended' and 'what actually happens.'" (p. 456) One of the purposes of the NEPA process is to produce documents that will help set policy for the future management of an area. The agency should therefore, as part of the NEPA process, include a reasonable budget limitation and evaluate a set of management alternatives that are constrained by that budget level.

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The agency must include a fiscal analysis of alternative implementation and mitigation costs. As discussed, we are especially concerned with a potential lack of analysis of the costs to mitigate the environmental consequences of each alternative. Ignoring budget constraints is completely unrealistic and somewhat deceiving to the public, because planners have not considered the costs of implementing each alternative and the costs of mitigating the potential damage from each alternative. While the budget available to manage the planning area should be considered constant across alternatives, the costs to implement each management alternative are not equal. For example, an alternative resulting in resource damage will require more money to mitigate resource damage than the "do-nothing" or conservation alternative. It makes no sense for taxpayers to subsidize a more damaging and costly alternative when a less damaging and costly

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alternative is available, There is simply no justification for any assumption that funding will be sufficient to implement each alternative and that all resource damage will be fully mitigated – unless costs and budgets are fully analyzed.

According to a Council of Environmental Quality memorandum on NEPA requirements [cited in NEPA Compliance Manual, 2nd Edition (1994)] :

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[T]o ensure that environmental effects of a proposed action are fairly assessed, the probability of the mitigation measure being implemented must also be discussed. Thus the EIS and the Record of Decision should indicate the likelihood that such measures will be adopted or enforced by the responsible agencies. (Section 1502.16(h), and 1505.2)

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The "probability of mitigation measures being implemented" is directly related to how much the mitigation will cost and how those costs relate to the expected budget available. In order to fully comply with NEPA, the agency must include an analysis of the costs of implementing each alternative, and the costs of the mitigation plans contained within each alternative. These costs must then be compared to the expected budget level to assess the probability of mitigation measures being fully implemented.

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**D. Correctly Estimate and Evaluate the Socio-economic Costs to Communities from Oil and Gas Development**

The agency should analyze and discuss the boom and bust cycles and the socio-economic costs to communities associated with oil and gas development. An historic emphasis on resource extraction industries has resulted in repetitious cycles of socio-economic distress for rural communities (Limerick, et al., 2002). This emphasis has inhibited the diversification of rural economies throughout the West. And the continued emphasis on export activities, if left unchallenged, will only insure future cycles of socio-economic distress in rural communities in the West, especially in isolated western communities. History is replete with cases of communities and areas that lost their export base in resource extraction, only to continue as reasonably successful economies with their social capital intact. In these examples, the local-serving sectors of the economy were the persistent ones, as new exports were substituted for the old. It becomes reasonable to ask: which are the important sectors of rural economies, the enduring or the transitory ones?

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Past research has indicated significant social costs (e.g. employment that is only sporadic or seasonal, higher unemployment rates, etc.) associated with economic specialization and dependency on resource extractive industries. In essence, resource extractive communities have an inherent economic instability associated with them. This instability, in income and employment, for example, is a result of laborsaving technological improvements, business cycles sensitive to interest rates and housing starts, and fluctuations in world resource markets -- macroeconomic forces completely outside local control. The socio-economic risks to communities associated with boom and busts **from** oil and gas development should be addressed as part of the NEPA process

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Economic instability is of concern to community leaders because if a local economy is unstable, economic development plans are more likely to fail. The economic instability created in the "boom

and bust" economies associated with resource extraction increases the risk for capital investment in linked industries. As such, resource specialization and the resulting economic instability can prevent the formation of forward and backward economic linkages in the local and regional economy.

There are other drawbacks to specialization in resource extractive employment. After examining the less desirable aspects of the wood products industry Fortmann et al. (1989) concluded:

Disincentives for stable employment, preferences for younger and cheaper labor that leave the less mobile and less trainable older worker out of work, cycles of market activity that carry with them high rates of unemployment, injury and illness rates and fatality rates that top all other employment categories are not attributes of a stabilizing industry, no matter how stability is defined.

Similar socio-economic trends are associated with oil and gas industries (Goldsmith, 1992; Guilliford, 1989; Smith, 1986) and should be examined when analyzing public land management alternatives.

Stevens (1978) found that resource extractive workers could gain more by changing jobs than by remaining with the same employer. The conclusion found by Stevens is partially a result of resource extractive workers being stuck in the vicious cycle of relatively high paying jobs with frequent layoffs and unemployment. This cycle is what Freudenburg (1992), a sociologist, calls the "intermittent positive reinforcement regime" -- which is one of the most effective of all behavioral reinforcements (Freudenburg and Gramling 1994).

Basically, resource extractive workers develop high skills that are not readily transferable to other jobs and they become overspecialized (Freudenburg and Gramling, 1994). Investment in education and job retraining is low because "the potential return on their investment in their education is either too low or too uncertain to justify sacrifice" (Humphrey et al., 1993). The resultant pattern of "rational under-investment" in the development of skills and other forms of human capital can result in reduced economic competitiveness in resource-dependent and specialized communities. The socio-economic risks and costs associated with oil and gas development alternatives must be fully accounted for, analyzed and discussed as part of the NEPA process involved with oil and gas development.

The current boom-bust cycle has generated significant costs to communities in the Powder River Basin of Wyoming – costs that must be considered by public agencies promoting accelerated oil and gas development elsewhere. Many landowners are spending thousands of dollars on attorneys in order to negotiate surface damage agreements to protect their property (i.e. the split estate problem). Other landowners have seen dramatic declines in property values. The City of Gillette has experienced a 12 to 15 percent increase in truck traffic plus a 26 percent increase in traffic violations between 1999 and 2000 (Pederson Planning Consultants, 2001). As a result, the expected life of city streets has decreased, while road operation and maintenance costs have increased. Dust from poorly constructed access roads causes health problems with horses, reduces the grass available for cattle, and negatively impacts air quality and visibility. County

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officials and residents are concerned that they will have to pay for clean up and restoration costs, as the bonds posted by CBM companies for plugging and abandoning a well are inadequate.

As a result of recent coal-bed methane boom, Campbell County has seen an increase in larceny, traffic accidents, destruction of private property, family violence, and child abuse – resulting in the county spending money to add 36 cells to its existing jail. The fire department has seen a 40 percent increase in emergency calls between 1997 and 2000 (Pederson Planning Consultants, 2001). Similar trends have occurred in other counties in the Powder River Basin. There has also been a shift in the labor force. County workers have left for CBM jobs, resulting in instability in the labor force and making it more difficult to hire public workers (e.g. policemen, firemen) at a time where the counties and cities are stretched thin to handle the increased work load. The accelerated oil and gas development has left many counties and communities unable to pay for or finance the increase in public service costs. We have every reason to believe that similar costs and burdens will be placed on other communities where public and private land is threatened by oil and gas development. The socio-economic risks and costs associated with expedited oil and gas development must be fully accounted for as part of the NEPA process.

### **E. Correctly Estimate and Evaluate the Environmental Costs of Oil and Gas Development**

The environmental costs of drilling include erosion, loss of wildlife and fish habitat, declines in the quality of recreational opportunities, proliferation of noxious weeds, and increased air and water pollution. These costs increase with the scale of oil and gas operations and when data are limited. Lease stipulations help protect wildlife but only if they are enforced, and data from the Bureau of Land Management and other sources indicate that they are not. In the Rocky Mountain West, where hunting, fishing, and wildlife viewing generated \$5.9 billions in revenue in 2001, drilling (and its direct impacts on wildlife and their habitat) has hidden economic costs in terms of lost revenues from license fees, equipment sales, and other related purchases. See Morton et al. (2004), Morton et al. (2002), Weller, et al, (2002), Hartley, et. a, (2003), Thomson, et. al, (2004,) and Thomson, et al (2005), which we incorporate by reference and attach.

#### **1. Water Pollution**

One of the major environmental costs associated with oil and gas drilling concerns increased water pollution. Greatly increased drilling activity for coal bed methane is having profound real life impacts on many families and communities in the West. In order to "release" the methane gas from coal beds, enormous amounts of ground water must be pumped from coal aquifers to the surface. The water discharged on the surface comes from shallow and deep aquifers often containing saline-sodic water. The total amount of water produced from individual coalbed gas wells is generally much higher than that from other types of oil and gas wells (USGS, 1995). Coal bed methane wells in Wyoming and Colorado discharge between 20,000 to 40,000 gallons per day per well (Darin, 2000). The disposal of the produced water not only affects the economics of development, but also poses serious environmental concerns.

The amount of water discharged from CBM wells in Wyoming has skyrocketed in recent years, increasing from approximately 98 million gallons (300 acre feet) per year in 1992, to 5.5 billion gallons (17,000 acre feet) per year in 1999 (Wyoming State Engineer's Office cited in Darin 2000). The discharging of 17,000 acre feet of water in the arid west is wasteful in the short-term

(generally an acre-foot of water will supply a family of four for one year), and has potentially devastating economic impacts for affected communities in the long-term. Dewatering of deep aquifers may upset the hydrologic balance, eliminating or reducing the availability of this water for future agricultural and domestic uses, as well recharge for shallow aquifers and surface water.

The altered water flows from the surface release of the produced water will negatively impact thermal and flow regimes, and likely contribute to bank erosion and changes in riparian vegetation (Allan, 2002). Gore (2002) warned that the loss of habitat caused by increased water flows from discharged water at coal bed methane projects could eliminate up to 30 aquatic species within 20 years. Trout Unlimited recently contracted for a literature review of the impacts of oil and gas development and exploration on coldwater fisheries (Trout Unlimited, 2004). The findings of the report include that many of the studies reviewed "point towards confirmed deleterious effects caused by gas and oil exploration and development" and also identify a study, investigating the accumulations and sublethal effects of Wyoming crude oil on cutthroat trout, which found that the allowable discharge level in most states of 10 mg/L were far too high, 400 times that recommended by the EPA, and produced significant physical and toxic effects on the trout. While also pointing out the need for further studies, the Trout Unlimited report highlights the support for concluding that oil and gas development results in substantial negative effects on water and the wildlife that depends on it for survival.

The discharge of ground water can deplete freshwater aquifers, lower the water table, and dry up the drinking water wells of homeowners and agricultural users. The short-term economic costs include drilling new, deeper wells for current and future homeowners, ranchers and farmers, assuming successful wells can be found and/or the costs of relocating families to new homesites. If the freshwater aquifers do not fully re-charge, the long-term economic costs to affected landowners, homeowners, communities, and states across the west could be severe, including the foregone opportunity (option value) to use aquifer water in the future. The agency must fully examine and account for these risks and costs associated with water pollution from drilling.

The water discharged from oil and gas wells can be highly saline with a very high sodium absorption ratio (SAR) – a ratio that affects how water interacts with soil. Water with a high SAR can permanently change chemical composition of soils, reducing soil, air and water permeability and thereby decreasing native plant and irrigated crop productivity.

The discharge of tens of thousands of gallons of ground water transforms many streams that normally flow intermittently only during spring runoff or after storms into all-season streams. The influx of water has resulted in deep channel scouring, erosion, and increased sedimentation. Increased sedimentation in streams can negatively impact native fisheries found in mainstream drainages with increased likelihood and financial costs from fishery restoration projects. The discharge of water into intermittent stream channels damages native flora and fauna not adapted to year-round water and promotes the spread of noxious weeds such as Scotch burr and Canadian thistle. The change in native vegetation composition, combined with the increase in noxious weeds, negatively impacts threatened and endangered species and other wildlife, as well as cattle. The loss of native species and the spread of noxious weeds across the west has enormous

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economic costs to the public and private interests. The agency should analyze the additional costs from noxious weed mitigation from increased oil and gas drilling.

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The landscape is also impacted from the retaining ponds or reservoirs constructed to store the water discharged from the drilling operation. The constructed earthen dams and retaining ponds destroy additional habitat and introduce artificial structures to the landscape. Habitat and homes on property nearby reservoirs also have potential flood risk from structural failure of the poorly designed, quickly built retaining ponds and reservoirs during storm events, for example.

And finally, drilling for oil involves ecological risks and potential economic costs associated with blowouts -- the catastrophic surge of the highly pressurized fluid from the drill hole that can cause fires, loss of life and property, and the potential contamination of surface drinking water sources. To reduce the number of blowouts, rotary drilling operations typically inject a fluid of drilling muds into the drill hole in order to lubricate and cool the drill bit. While reducing the number of blowouts, the drilling fluids themselves create a risk of contamination of adjacent freshwater aquifers (Gauthier-Warinner, 2000).

## 2. Pipelines

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In order to bring gas to market, thousands of miles of pipeline must also be constructed – extending the impacts of gas drilling far from the actual drill site. There are currently more than 270,000 miles of gas transmission pipelines and another 952,000 miles of gas distribution lines. The cumulative costs and environmental impacts associated with pipeline construction must be included in the agency analysis – because drilling wells and building pipelines are connected actions.

## 3. Roads and Subsequent ORV Use

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Oil and gas exploration also requires roads that increase ecological costs and invite cross-country travel and habitat damage by ORVs. Oil and gas drilling often require daily vehicular trips to monitor and maintain wells and pipelines. The increased traffic disrupts wildlife, may result in more road kill, and diminishes quality of life for local residents. The linear deforestation associated with road construction degrades habitat and fragments travel corridors needed by wildlife species. Roads become conduits for non-native species that displace native species resulting in significant mitigation costs for taxpayers. Roads, by providing access, increase the frequency of human-caused fires. Humans cause ninety percent of all wildfires in the national forests; more than half of those wildfires begin along roads. In addition, roads increase the damage to historical, cultural and archeological resources due to increased ease of access. Roads increase sediment deposits in streams resulting in reductions in fish habitat productivity. In addition to keeping sediment from access roads and drill sites out of community water sources, roadless areas protect communities from mass wasting (e.g. landslides).

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The economic costs from road construction for oil and gas drilling include increased ORV monitoring costs, increased frequency and costs of stream restoration projects, increased noxious weed mitigation costs, increased damage to archaeological sites and the decline in future benefits from visiting these sites, increased water treatment costs for downstream communities, and

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increased road maintenance and closure costs for taxpayers. The agency must include a detailed analysis of these costs as part of the NEPA analysis.

The agency also needs to analyze the costs of road maintenance and restoration and compare these costs with the budgets available to complete the work. For example, on average, the annual maintenance cost of a mile of Forest Service road is about \$1,500 per mile. Each new mile of road added to the FS transportation system competes for limited road maintenance funding, as Congressional funding is less than 20% of the funding necessary to maintain the existing road infrastructure. These problems must be accounted for in the plan.

#### **4. Ecological Footprint of Oil and Gas Exploration and Drilling**

Oil and gas drilling operations leave behind a large footprint on the landscape – a footprint that extends well beyond the several-acre drilling sites. Beginning with exploratory activities, large trucks with seismic surveying equipment crisscross the landscape using a crude system of roads designed for lowering the financial costs of gathering geophysical information with at times little consideration for wetlands, fragile soils, storm water runoff or critical habitat. Exploratory drilling operations then require more large trucks with drill rigs using a network of constructed roads to access drill sites. If the exploratory well is determined to have no potential for production, the well is plugged, but the landscape scars remain. Depending on the agency with oversight, there is typically little enforcement or monitoring of environmental regulations. In addition, no surety bonds are required for restoration or clean up.

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If the well has potential for production, the well is cased with pipe and cemented (in an attempt to prevent oil and gas from seeping into nearby aquifers), and the drilling rig is replaced by a well head. Electric or gas powered motors are used to power the pumps that collect the gas at each well and to power the series of 24-hour compressor stations that pressurize gas for pipeline transport from the wells to customers in distant markets (WORC, 1999). Many drill sites also involve the construction of sediment ponds and retention reservoirs to collect storm water drainage and store the ground water brought to the surface as a result of the drilling and extraction operation – the latter process is called dewatering. Injection wells are sometimes used to dispose of the water produced and to enhance oil and gas recovery – an action that may necessitate additional drilling of a few to hundreds of injection wells throughout the field (Gauthier-Warinner 2000). The ecological footprint not only extends across the forest and range landscape, it also penetrates to shallow aquifers as well as aquifers thousands of feet below the earth's surface. The agency must fully examine the environmental impacts from the footprint associated with energy development.

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Additional costs are associated with the inability of agency enforcement staff to adequately inspect oil and gas wells and associated facilities for violations of applicable laws and to enforce requirements for protection and restoration of the area. A recent report by the Western Organization of Resource Councils (2005) found that:

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- agency enforcement staff levels have not kept pace with the rapid expansion of oil and gas development;
- oil and gas wells and associated facilities are not inspected often enough;
- agency environmental compliance inspectors spend too much time on other activities;
- agencies take too few enforcement actions; and
- citizen complaints are often ignored.

The Government Accountability Office (2005) also found a similar lack of resources for monitoring and enforcement of oil and gas development and attributed this lack to an unbalanced emphasis on processing permits to drill. The resulting costs are evidenced in the impact on the ecosystem.

### **Recommended Analyses for Correctly Characterizing Oil and Gas Industry and Drilling Impacts**

**We formally request that the NEPA analysis fully reflect and account for the following:**

- The agency must base analyses of the impacts of leasing proposals on estimates of economically recoverable resources, rather than technically recoverable resources.
- The agency should avoid IMPLAN or other input-output models that are grounded in Economic Base Theory when estimating jobs-income for each alternative.
- If the agency decides to use IMPLAN, we insist that the agency shall fully discuss the assumptions, the shortcomings, and the poor track record of the model in planning efforts. At the same time the agency must also complete a trend analysis of regional jobs and income – to provide a better and more complete understanding of their economic past and their economic future.
- We recommend that the agency rely on trend analysis of income and employment for the counties impacted using the Economic Profile System (EPS) developed by the Sonoran Institute ([www.sonoran.org](http://www.sonoran.org)).
- The agency must analyze and discuss the boom and bust cycles and the socio-economic costs to communities associated with oil and gas development. In general, when looking at the economic implications of various management alternatives, agency must complete a full accounting of the costs and benefits – including the non-market costs. See the attached report – Drilling in the Rockies: How Much and at What cost – which includes a table summarizing the hidden costs from oil-gas drilling that must be counted in the NEPA analysis.
- The agency must fully and correctly account for the environmental costs of oil and gas development. These costs include: water pollution, impacts from drill sites, pipelines,

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roads and subsequent ORV use, and the ecological footprint of oil and gas exploration and drilling.

- We formally request that the agency analyze and compare the fiscal cost of each alternative with reasonable expectations about agency budgets – based on an analysis of historic budgets. Rather than presenting the maximum production potential of public lands unconstrained by budgets, the agency should consider presenting the public with a more accurate picture of what can actually be accomplished given expected appropriations.

#### AIR QUALITY

The Wyoming Outdoor Council and other groups have recently submitted a number of comments regarding air quality for a number of BLM NEPA documents/ projects. Sometimes those comments were prepared directly by the Outdoor Council and sometimes they were prepared by attorney Robert Yuhnke or engineer Vicki Stamper, who were under contract to the Outdoor Council and/or other groups. The documents that we have submitted to BLM are the following:

- Comments of Robert Yuhnke on the Rawlins Resource Management Plan draft environmental impact statement.
- Comments of Vicki Stamper on the Rawlins Resource Management Plan draft environmental impact statement.
- Comments of Robert Yuhnke on the Jack Morrow Hills supplemental draft environmental impact statement.
- Protest of the Jack Morrow Hills final environmental impact statement prepared by Robert Yuhnke.
- Comments of the Wyoming Outdoor Council et al. on the Jonah Infill Project draft environmental impact statement.
- Comments of Robert Yuhnke on the Jonah Infill Project draft environmental impact statement air quality supplement.
- Comments of Vicki Stamper on the Jonah Infill Project draft environmental impact statement air quality supplement.
- Comments of the Wyoming Outdoor Council et al. on the Jonah Infill Project draft environmental impact statement air quality supplement.
- Comments of the Wyoming Outdoor Council et al. on the Jonah Infill Drilling Project final environmental impact statement, dated February 13, 2006

All of these documents were submitted to the BLM in the comments submitted by the Wyoming Outdoor Council and Environmental Defense dated January 31, 2006 on the Seminole Road Natural Gas Development Project draft EIS, with the exception of the last document referenced, the comments on the Jonah Infill Drilling Project final EIS. The comments on the Jonah Infill Drilling Project final EIS are included herewith. See Attachment 8. Consequently, the BLM's Rawlins Field Office has all of these documents in its possession. All of these documents are incorporated into these comments by this reference and we ask that BLM consider them fully.

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These comments have relevance to the Atlantic Rim DEIS because the methodologies used to estimate air quality impacts do not differ between the projects and the assumptions used in preparing the air quality analyses are the same among projects. So, for example, the concern expressed in a number of the comments regarding the appropriateness of using background concentrations of pollutants as a measure of the effects of existing pollution sources on air quality, particularly relative to consumption of allowable increment in Class I and Class II areas, is just as relevant here as it was in the comments on the prior projects. Moreover, some if not all, of these other air quality analyses were prepared by the same consultant that prepared the air quality analysis for the Atlantic Rim DEIS—TRC Environmental Consultants and Compliance Partners, Inc----so all the documents have a very similar layout, presentation, wording etc., in addition to using the same methodologies, assumptions, etc. About all that changes between the various analyses are the "outputs" —the number of days with increase haze in Class I areas, for example. Thus, these comments have relevance to the Atlantic Rim DEIS air quality analysis.

In fact, these documents contain at least one commonality that is of great relevance. The modeling domain that is used is exactly the same for some or all of these projects. See, e.g., Jonah Infill Drilling Project Final Environmental Impact Statement at 3-7; Air Quality Technical Support Document, Atlantic Rim Natural Gas Project and Seminole Road Gas Development Project at 2 (showing these projects have exactly the same modeling domain). The consequences of this are great. It means that for analytical purposes BLM has defined all of these projects as being one project, and thus their impacts must be considered together, as one project. It means, for example, that non-project source emissions for far-field analyses should have the same emissions estimates. But they are not the same. See, e.g., Jonah Infill Drilling Project Final Environmental Impact Statement at J-9 (Table J-9), Atlantic Rim Draft Environmental Impact Statement at 4-10 (Table 4-1) (presenting widely diverging estimates of non-project emissions despite using the same modeling domain).<sup>8</sup> BLM must correct or at least explain these greatly diverging estimates that are being applied to the same modeling domain during much the same time frame.

The Atlantic Rim DEIS shows that the NAAQS for 8-hour ozone concentrations is coming perilously close to being violated. Atlantic Rim DEIS at 3-18 (showing the measured background concentration of ozone is  $147 \mu\text{g}/\text{m}^3$ , ninety-four percent of the ozone 8-hour NAAQS). It is not "well below" the NAAQS, as claimed. *Id.* at 3-17. Despite the heightened importance of this criteria pollutant due to the near-violation of the standard, the ozone analysis in the Atlantic RIM DEIS is deficient. The DEIS predicts that the concentration of ozone that will result with the construction of the Atlantic Rim project will be  $91.3 \mu\text{g}/\text{m}^3$ , arriving at this figure by eliminating the stated background concentration ( $147 \mu\text{g}/\text{m}^3$ ) and replacing it with a much lesser background concentration of  $75.2 \mu\text{g}/\text{m}^3$ . See Atlantic Rim DEIS at 4-14 (Table 4-2). If

<sup>8</sup> It should also be noted that the defined time frame for making these estimates does not differ much. For the Jonah Infill Project this time frame was January 1, 2001 through June 30, 2003. Final Air Quality Technical Support Document for the Jonah Infill Drilling Project Environmental Impact Statement (Volume 1) at 16. For the Atlantic Rim project this time frame was January 1, 2001 through March 31, 2001, a ten month difference. Air Quality Technical Support Document, Atlantic Rim Natural Gas Project and Seminole Road Gas Development Project at 27. Thus, any differences must be explained by an increase in emission during this short period. BLM should provide that explanation.

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the stated background concentration of 147 µg/m<sup>3</sup> were used, the ozone concentration resulting from the Atlantic Rim project would be 163.1 µg/m<sup>3</sup>, a violation of the ozone 8-hour NAAQS of 157 µg/m<sup>3</sup>. See *Id.* at 3-18, 4-14. The inappropriateness of this approach was also raised and discussed in much more detail in the Wyoming Outdoor Council et al.'s various comments on the Jonah Infill Drilling Project environmental impact statement that were referenced above. BLM is substituting a long-term average of background ozone concentrations for an 8-hour estimate, which is clearly inappropriate for making an estimate of the 8-hour background concentrations. To quote just one point regarding the ozone analyses made in our various comments on the Jonah Infill Project (these being from the February 13, 2006 comments):

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Likewise, our earlier comments discussed the fact that in its near-field ozone analysis, BLM incorrectly added a long-term average ozone concentration from the Green River Basin Visibility Study to the ozone concentration it estimated with the Scheffe model to derive total ozone concentrations for comparison to the NAAQS and WAAQS. BLM has failed to correct this error, again using a long-term average background concentration for comparison with the standards. FEIS at J-3 (Table J-6). As discussed in our previous comments, the ozone standards are short-term standards, based on 8-hour and 1-hour average concentrations, respectively. The background concentrations used to estimate total concentrations for comparison to the standards must therefore reflect the same averaging times. The January 2006 Final Support Document states that it would be "overly conservative" to add background concentrations that reflect short-term averaging times to results from the Scheffe screening model, presumably because BLM believes the screening model overestimates ozone concentrations. However, BLM has not provided any support for the suggestion that the screening model is biased in this direction, let alone any estimate of the magnitude of the bias. BLM must use an adequate model in the first place, and not arbitrarily adjust the background concentration downward in hopes of correcting for some purported bias in the model.

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As has been noted in great detail in a number of the above-referenced comments we have previously submitted to BLM, the Atlantic Rim DEIS uses an inappropriate "cutoff" date of March 31, 2004 for its purported "regional emissions inventory." Air Quality Technical Support Document, Atlantic Rim Natural Gas Project and Seminoe Road Gas Development Project at 27. This is full year-and-half or more before the Atlantic Rim DEIS was released and will be essentially two years before the comment period ends on the DEIS. It will be well beyond two years prior to the release of the FEIS. As discussed in many of the comments mentioned above and submitted herewith, this sort of cutoff date is inappropriate because, among other things, it eliminates the consideration of many emissions sources and does not comply with the requirements regarding analysis of the consumption of increment in prevention of significant deterioration areas. It is also deficient because there is no analysis of whether these background values are even remotely representative of background levels in the Atlantic Rim project area (particularly for background levels assumed from far-away and/or long-ago monitoring). The background values seem to have more to do with what was easily available or already in hand

than with ensuring that the data used were relevant. That fails to meet the requirements of NEPA. See 40 C.F.R. §§ 1502.22, 1502.24

Table 5-1 on page 5-6 of the Atlantic Rim DEIS presents "projects included in cumulative analysis." There appear to be a number of underestimates of the magnitude of these projects, which was likely carried into the air quality analysis. In particular it is not clear that a number of "infill" projects that are currently being pursued by BLM were considered. Creston-Blue Gap, a project in the immediate vicinity of the Atlantic Rim project, is referenced but it is not clear it includes the Creston/Blue Gap II infill project that BLM is currently in the process of approving. The Creston Blue Gap project allowed for 200 wells; BLM's recent scoping notice for the Creston/Blue Gap II project states 1,250 infill wells will be drilled. The Moxa Arch project is referenced, but it is not clear that it includes the Moxa Arch Infill project that BLM is currently analyzing. BLM's scoping notice for the Moxa Arch Infill project states that there are currently 1,400 wells in production and an additional 1,226 are proposed in the "core" area alone in the infill proposal. Under any standard, it is unreasonable for BLM to not consider the air quality impact of these and other projects by adopting unreasonable cutoff dates that are literally years removed from current conditions.

BLM claims that there are no relevant standards relative to visibility. This is incorrect. For one, the Clean Air Act itself establishes that the national goal is the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I Federal areas which impairment results from manmade air pollution." 42 U.S.C. § 7491(a)(1). "Reasonable progress" toward this goal must be "assure[d]" *Id.* § 7491(a)(4). Furthermore, EPA's regional haze rule requires that state implementation plans must "provide for an improvement in visibility for the most impaired days . . . and ensure no degradation of visibility for the least impaired days . . ." 40 C.F.R. § 51.308(d)(1). BLM estimates that the Atlantic Rim project will degrade visibility in Class I areas, at least on a cumulative basis. Specifically, cumulatively there will be 4 days of increased haze in the Bridger Wilderness Area when visibility is reduced by 1 dv or more (10 days if the 0.5 dv standard is used). Air Quality Technical Support Document, Atlantic Rim Natural Gas Project and Seminoe Road Gas Development Project at Appendix A Table F1.8.2 . BLM should acknowledge that the Atlantic Rim project will contribute to a lack of progress toward the national goal and will make it more difficult or impossible for the State of Wyoming to submit an approvable regional haze state implementation plan to EPA.<sup>9</sup> The BLM should also acknowledge that it is making policy decisions regarding what type of development is most important and when and where this development will occur, taking options for making these decisions away from the State. BLM has decided that oil and gas development should have primacy in the industrial development that will be permissible under the Clean Air Act. Once BLM acknowledges that its actions will be contrary to the national goal and make it more difficult or impossible for the State to abide by EPA regional haze rule requirements, it should state what it will do to prevent these problems (see below).

The Seminoe Road Project and the Atlantic Rim Project were subject to a joint far-field (cumulative) air quality impact assessment. See Air Quality Technical Support Document,

<sup>9</sup> The State of Wyoming's regional haze state implementation plan is due to EPA on December 17,2007.

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Atlantic Rim Natural Gas Project and Seminole Road Gas Development Project. Yet the impacts of these projects are presented separately and are not considered together. Using visibility as an example of the implications of this approach, BLM claims that the Atlantic Rim project standing alone will contribute less than four percent (0.04 dv) to the visibility degradation on the four days in which visibility will be degraded by 1 dv or more in the Bridger Wilderness Area, allowing BLM to claim "the Atlantic Rim project emissions would not cause or contribute to any visibility degradation at any of the Class I and sensitive Class II areas." DEIS at 5-7. *See also Id.* at 5-8 to -9. But this is the wrong way to frame the question. The question is whether the impacts of the Seminole Road Project and the Atlantic Rim Project together will exceed the 0.04 dv standard that BLM has accepted as showing significant impacts. The impacts of the Seminole Road Project must be added to the impacts of the Atlantic Rim Project to determine whether the 0.04 dv standard has been exceeded. Furthermore, at a minimum, they must also be added to the impacts of the very nearby Desolation Flats project because it has almost exactly the same modeling domain as the Atlantic Rim and Seminole Road projects. *See* Air Quality Technical Support Document, Atlantic Rim Natural Gas Project and Seminole Road Gas Development Project at 2; Desolation Flats Natural Gas Exploration and Development Project, Technical Support Documents for the Ambient Air Quality Impact Analysis at 2 (Figure 1-1) (showing these projects have nearly exactly the same modeling domain).

When this is done, it is clear there will be significant impacts to Class I areas due to these projects. The direct impacts to the Bridger Wilderness Area will be 0.02 dv due to the Atlantic Rim Project.<sup>10</sup> Air Quality Technical Support Document, Atlantic Rim Natural Gas Project and Seminole Road Gas Development Project at Appendix F1, Table F1.8.1. The impacts due to the Seminole Road project will be 0.01 dv in the Bridger Wilderness Area. *Id.* at F2.8.1. The direct impacts due to the Desolation Flats project are 0.079 dv in the Bridger Wilderness Area. Desolation Flats Natural Gas Exploration and Development Project, Technical Support Documents, Near and Far Field Analysis Technical Report at 100 (Table 6-9). When these impacts are added, as they must be, the total direct impact is 0.11 dv, far in excess of the 0.04 dv standard for a project's contribution to cumulative impacts that BLM considers significant.<sup>11</sup> It was BLM's choice to determine that these projects should be analyzed jointly--explicitly with regards to Atlantic Rim and Seminole Road, and implicitly due to the way the modeling domain was defined for Desolation Flats--so it must adhere to that decision. If BLM fails to do this, it will be violating the NEPA regulations by not considering cumulative, connected, and/or similar actions together, as it must.

Despite the fact that this project at a minimum will contribute to significant impacts to air quality in Class I areas and potentially cause an exceedance of the NAAQS for ozone, BLM does not propose to do any air quality monitoring in the Atlantic Rim field or provide for any mitigation of air quality impacts. As will be shown below, additional adverse impacts from this project are expected, including exceedance of significance levels and deposition analysis thresholds

<sup>10</sup> This is based on the more favorable results from the IMPROVE modeling. If the FLAG modeling were used, the impact would be 0.03 dv.

<sup>11</sup> The impacts may be more severe than this. On page 5-6 of the DEIS it is stated that the Atlantic Rim project will cause 0.2 dv of impacts, not 0.02 dv.

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(“DAT”). The failure to discuss how these impacts can be mitigated fails to meet NEPA requirements. An EIS must discuss “steps that can be taken to mitigate adverse environmental consequences.” Robertson v. Methow Valley Citizens Council, 109 S.Ct. 1835, 1846 (1989). “Implicit in NEPA’s demand that an agency prepared a detailed statement on “any adverse environmental effects which cannot be avoided should the proposed be implemented,” 42 U.S.C. § 4332(C)(ii), is an understanding that the EIS will discuss the extent to which adverse impacts can be avoided.” Id. at 1846-47. “[O]mission of a reasonably complete discussion of possible mitigation measures would undermine the “action-forcing” function of NEPA.” Id. at 1847. See also 40 C.F.R. §§ 1500.2(f) (BLM must use “all practicable means” to prevent environmental impacts), 1502.14(f) (alternatives presented in an EIS “shall” include appropriate mitigation measures), 1502.16(h)(means to mitigate impacts must be discussed in the environmental consequences section of an EIS). Recently EPA demanded that BLM must reduce emissions from the Jonah Infill project by at least 80 percent, and BLM in a letter dated October 5, 2005 stated that the 80 percent reductions alternative was now the BLM’s preferred alternative. Having established this level of emissions reductions as reasonable and practical, not to mention necessary to ensure that air quality standards are not violated, BLM must continue to abide by this agreement in all oil and gas development projects. This is particularly true since the Atlantic Rim/Seminole Road and Jonah Infill Project modeling domains are exactly the same. Both the Atlantic Rim and Seminole Road projects will contribute to significant impacts to visibility in Class I areas, so BLM must seek to mitigate those impacts. At a minimum, BLM should require the use of Tier II technology and flareless completions to the maximum extent possible, as it is purporting to do in the Jonah field. Moreover, it must ensure that there is adequate air quality monitoring in place, including in the Atlantic Rim field. Absent any monitoring, the air quality impacts of this project will remain undocumented, the kind of blindness NEPA specifically prohibits. See 40 C.F.R. § 1502.22 (requiring the collection of complete information), 1502.24 (requiring that professional integrity and scientific accuracy be assured).

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The conclusion in the Seminole Road EIS that there will be four days of cumulative impacts to visibility in the Bridger Wilderness Area that exceed 1 dv is demonstrably wrong. The Desolation Flats project will contribute to five days of cumulative impacts exceeding the 1 dv standard. Desolation Flats Natural Gas Exploration and Development Project, Technical Support Documents, Near and Far Field Analysis Technical Report at 102 (Table 6-10). Thus, with the addition of the 2000 wells proposed here (not to mention the 1,240 wells from the Seminole Road project that are supposedly part of a joint cumulative air impacts analysis), the level of cumulative impacts affecting the Bridger Wilderness must exceed four days. The Atlantic Rim DEIS should be corrected so that the proper cumulative impact is presented, or at a minimum an explanation must be provided as to why the Desolation Flats project, which has far fewer wells (385), has greater cumulative impacts than does the Atlantic Rim project. Should the cumulative impacts from the two projects be added together? Moreover, an explanation should be provided as to why the much smaller Desolation Flats project will have cumulative impacts on a number of other Class I areas while the Seminole Road project will not. See Id. (showing impacts from the Desolation Flats project to the Fitzpatrick Wilderness Area, and a number of other sensitive areas). Additionally, the Jonah Infill Project final EIS shows that that project will have six days of significant cumulative impacts (and 3 days of direct project impacts) to visibility in the

Bridger Wilderness Area.<sup>12</sup> Similarly, the Powder River Basin Coalbed Methane EIS showed that that project would contribute to eight to twelve days of significant cumulative visibility impacts in the Bridger Wilderness (with four days of direct project impacts). Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project at 4-391, Appendix F. Again, should the impacts of the Jonah and Powder River Basin projects be added to the Atlantic Rim project impacts? Why or why not? Certainly, at a minimum, the direct project impacts of these projects must be added to the cumulative impacts of the Atlantic Rim project. If the Seminoe Road, Atlantic Rim, Desolation Flats, Jonah, and Powder River Basin projects are considered together—as they must be in order to do a proper cumulative impacts analysis—the significant cumulative visibility impacts in the Bridger Wilderness Area would appear to be on the order of about two to three weeks per year, at a minimum. At a minimum BLM must provide an explanation of how the impacts analyses from these (and other) projects relate to each other and to what degree the impacts are additive or not, and why.

With respect to air quality impacts resulting from the Atlantic Rim project, BLM has little more to say than this: "Potential visibility impacts are predicted to be above the "just noticeable visibility change (1.0 dv) threshold at the Bridger Wilderness Area and Popo Agie Wilderness Area using FLAG background visibility data and at Bridger Wilderness Area, Popo Agie Wilderness Area, and Wind River Roadless Area using IMPROVE background visibility data." DEIS at 5-6. But a review of the information in the Air Quality Technical Support Document, Atlantic Rim Natural Gas Project and Seminoe Road Gas Development Project ("Support Document") shows that there will be additional impacts, and the DEIS fails to provide an adequate analysis of these impacts.

Table F1.1.3 shows that the cumulative impacts of this project would be extraordinarily close to the  $\text{NO}_2$  significance level in the Bridger Wilderness Area. Support Document at Table F1.1.3. Certainly there is no where near enough confidence in the data input into these models to claim that a  $0.0936 \mu\text{g}/\text{m}^3$  level differs statistically from a  $0.1 \mu\text{g}/\text{m}^3$  significance level (i.e., the data are too variable for the confidence interval for the 0.0936 level to not include, overlap with, 0.1). BLM should acknowledge the near-exceedance of this standard and discuss its importance. If BLM is claiming that a 0.0936 concentration differs statistically **from** a 0.10 level it must provide support for that claim. The 24-hour cumulative  $\text{PM}_{10}$  levels do exceed the significance level in the Bridger Wilderness area;  $0.481 \mu\text{g}/\text{m}^3$  are predicted and the significance level is  $0.30 \mu\text{g}/\text{m}^3$ . *Id.* at Table F1.3.3. On a cumulative basis, the DAT for nitrogen is exceeded in a number of Class I areas. *Id.* at Table F1.6.1. And of course, the significance level relative to cumulative visibility impacts is exceeded, although the DEIS is notable for providing no explanation of to what degree impacts are occurring. In fact, there will be four days of cumulative significant impacts to visibility in the Bridger Wilderness Area Class I area (10 days if the 0.5 dv standard is used), and visibility could be reduced by over twenty percent (2.08 dv) on those days. *Id.* at Table F1.8.3. The DEIS must acknowledge, discuss, and seek to mitigate these various impacts.

<sup>12</sup> Early Project Development Stage impacts will be much greater. *See* Final Air Quality Technical Supplement Document for the Jonah Infill Drilling Project Environmental Impact Statement (Volume 2 of 2) at G-ix.

In addition to the above comments regarding air quality, we have several other comments:

- The Atlantic Rim DEIS ignores air quality impacts and issues in sections of the DEIS where they should at least be mentioned and/or acknowledged. These include pages S-4 to -7 (Executive Summary), 2-4 to -6 (air is not treated as a unique and important resource under Alternative C), 2-10 to -23 (air is not mentioned in this environmental consequences table).
- The Jonah Infill Project EIS has established the need to engage in "early project development stage" modeling so that air quality impacts can be adequately considered before Tier II and other air pollution control technologies become widely available. The Atlantic Rim DEIS should provide similar modeling so that a full understanding of air quality impacts can be had.
- The only modeling that was done was of the Proposed Action and No Action Alternatives. See DEIS at 4-9. The No Action alternative modeling was apparently not even reflective of the true state of affairs under the no action scenario because it did not reflect the 720 wells that will be drilled on state and private lands. DEIS at 5-7. This fails to meet BLM's obligations to provide an analysis that is useful for decision-making in an environmentally informed manner.<sup>13</sup> Furthermore, since BLM is pursuing a combination of Alternatives B and C as its Preferred Alternative, it should have modeled that scenario so that an estimation of impacts from what BLM actually plans to do could be made and consideration given to the significance of those impacts. That is not possible with the analysis presented. The failure to analyze the impacts of the Preferred Alternative, a plan of action that differs substantially from the Proposed Action, fails to meet the underlying requirements, policies, and purposes of NEPA. *See, e.g.,* 40 C.F.R. §§ 1500.1, 1500.2, 1501.2, 1502.1.
- DEIS at 4-14 (Table 4-3). No conclusions can be reached regarding whether the NO<sub>2</sub> increment will be exceeded without an estimate of how much increment has already been consumed. No indication of how much increment has been consumed is provided in the DEIS. Thus, any conclusions regarding exceedance of the NO<sub>2</sub> Class I or Class II increment (or the increment for any other criteria pollutant) have no basis.

## INFRASTRUCTURE

<sup>13</sup> BLM's attempt to explain away this oversight is unavailing. DEIS at 5-7. BLM weakly asserts that "[t]otal far field impacts would be slightly less than those analyzed for the Proposed Action given the reduced number of wells developed." Does this mean 1 percent less? Five percent? Fifteen percent? The DEIS provides no basis for making this comparison. This "analysis" fails to meet the requirements of NEPA. BLM can only avoid providing a valid No Action impact analysis if it can show the costs of correcting its mistakes are exorbitant. 40 C.F.R. § 1502.22. It has not done so. In fact the alternatives section is the "heart" of the NEPA process, and analysis of the No Action Alternative is central to that. *Id.* § 1502.14. Thus, BLM must provide and analyze a valid No Action alternative and circulate it for public review.

With such as large project, sprawling across more than a quarter million acres, it will be critically important for BLM to properly plan the supporting infrastructure. We have the following concerns in addition to infrastructure-related concerns outlined elsewhere in these comments.

### Powerlines

The powerline infrastructure required for this project has not been considered in the Draft EIS for the Atlantic Rim project. DEIS at 2-9. As this is a connected (indeed, integral) part of the Atlantic Rim project, BLM's failure to plan and study the impacts of electrical powerline systems associated with the Atlantic Rim project constitutes a serious violation of NEPA. Powerlines serve as perches for raptors, and can therefore concentrate predation pressure around powerline corridors. Thus, it is critically important that powerlines not be sited within 4 miles of sage grouse leks, within two miles of sharp-tailed grouse leks, or within one mile of prairie dog colonies.

### Pipelines

Both gas-gathering and water-gathering pipelines should be paired in the same right of way, in order to reduce the overall surface impacts of pipeline networks in the project. Both water and gas pipelines should be buried in road rights of way, instead of being sited in separate ROWs, to further reduce the surface footprint of the project. This clustering of transportation facilities would help to minimize the overall surface acreage disturbed in the project. It is a reasonable alternative, and should be adopted as a standard practice in this project. If there is ever a circumstance where there is a pipeline that is not buried beneath a roadbed, then the pipeline ROW should be prepared using brush-hogging (not blading), which reduces the surface disturbance needed to a small proportion of the ROW used by ditching machinery. This practice retains most ROW soils intact, and allows for shrubs other than sagebrush resprouting from the rootstock, and reducing the opportunities for noxious weed invasion.

### Roadways

Under Alternative C, we support the idea of limiting arterial and collector roads to existing two-tracks. DEIS at 4-42. Most CBM projects in the Thunder Basin National Grassland require the use of two-tracks for accessing CBM wells instead of the higher-impact gravel roadways. Soils in the TBNG are equally susceptible to mud in wet weather (and indeed experience we weather more often) compared to the ARPA. It would be reasonable (and indeed prudent) for BLM to require the use of jeep trails for wellfield access across the board in the ARPA, with improvements made only where routes cross stream channels and culverts would provide a measure of protection for streams and water resources. The maximum density of 3 miles per square mile is still excessive, as road densities of two miles per square mile have been shown to displace big game in forested habitats, and due to the lack of hiding cover in the ARPA, it would be prudent to assume that the animals found here have an even lower tolerance for increasing road densities.

Rees et al. (2005a) noted that undersized or improperly designed road culverts could serve as barriers to the passage of roundtail chubs, particularly in low-water situations. What are the specifications of road culverts required for this project, and what will be their impacts on the movements of rare native fishes?

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**Pitless Drilling**

One method that is universally applicable to reduce drilling impacts is "pitless drilling," entailing closed-loop systems that recycle drilling mud rather than dumping it into open pits. This practice would be required under Alternative C (DEIS at 4-43), and should be implemented throughout the ARPA to reduce impacts to wildlife and water quality should the project move forward. BLM notes that pitless drilling reduces the surface disturbance of individual wellpads and reduces the chance of surface water contamination (from toxins in the reserve pit). DEIS at 4-43. Reserve pits can also attract waterfowl and other wildlife, who can then succumb to poisoning, particularly if pits are not netted. In addition to the elimination of toxic waste pits on the surface, this method reduces wellfield truck traffic by up to 75%, reduces water consumption by 80%, and is actually 8% less costly than constructing and maintaining a reserve pit (Longwell and Hertzler 1997). See Attachment 9. This method has proven successful in Alaska (Phillips Petroleum 2002) and Colorado (Longwell and Hertzler 1997), and is planned for the Sakhalin I project in Russia (Sumrow 2002). We are now seeing a number of oil and gas wells throughout Wyoming being drilled using pitless drilling methods. Due to its environmental advantage, pitless drilling should be mandated as a standard requirement for drilling operations under the Atlantic Rim project.

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**RECLAMATION**

Although reclamation is much less important in terms of reducing environmental impacts than reducing the footprint of the project in the first place, it is imperative that reclamation procedures allow the re-establishment of native vegetation cover as rapidly as possible to minimize the opportunity for the invasion of noxious weeds.

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**Interim Reclamation**

BLM seems to believe that interim reclamation following initial construction activities will allow wildlife to return to developed areas and minimize project impacts. We have found no scientific evidence that this is the case. While interim reclamation is likely to result in a slight reduction of the visual impact of a wellsite, avoidance of the area by wildlife is more closely tied to vehicle traffic and human presence (which are unaffected by interim reclamation) than it is to the reseeding of wellpad fringe areas.

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It is important to note that, because 81.5% of the ARPA is occupied by poor to fair soils, resulting in only fair to poor reclamation potential. DEIS at 3-40. Under Alternative C, interim reclamation would be required within 1 year of spud date, but only in areas of excess salts or poor topsoils. DEIS at 2-4. BLM has noted that for the central PODs, "Many of the PODs without reclamation were showing riling (sic) and gulying in response to snow melt from the pad sites." DEIS at 3-49. This observation provides a compelling reason why interim reclamation should begin immediately upon well completion. BLM should require interim reclamation within a year of spud date as a requirement for all wells in all habitat types. This would not only reduce siltation and salt inputs to streams, but would also reduce fugitive dust pollution.

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671-57-3 | 671-57 Experience shows that reclamation is very difficult in the ARPA. In the Red Rim POD, "Seeding was generally ineffective due to wind erosion and lack of moisture." DEIS at 3-48. At the older Jolly Rodger facilities, "interim reclamation was generally unsuccessful." DEIS at 3-48. How many miles of roads and how many wellpads are unlikely to meet interim and long-term reclamation benchmarks? The BLM will need to plot the locations of roads, wellpads, and pipelines against the spatial distribution of soils, slopes, and vegetation types in order to perform this analysis. This analysis must be provided in order to fulfill NEPA "hard look" requirements.

### 671-58-1 | 671-58-2 **Final Reclamation**

The BLM presents reclamation measures in a "general, non-specific way" in its reclamation plan because "of the large geographic area covered by the project and the lack of site-specific locations of project facilities." DEIS at B-1. Final selection of procedures is to be completed later in coordination with the Operators. *Id.* This is an unacceptable state of affairs. The BLM must identify site-specific project locations so that it may go ahead and present the final reclamation practices as part of the EIS. Deferring part of the reclamation/mitigation measures until some undisclosed later time does not satisfy NEPA's requirements; the public deserves the opportunity to review and comment on the reclamation plan in full before the project is approved. In addition, by stating that "phased development would provide additional time to determine successful reclamation techniques for clay soils with alkali sagebrush (DEIS at 4-51), BLM infers that such successful reclamation techniques are not available to day. Because mitigation/reclamation measures are not currently available to return this land cover type to its natural state, surface-disturbing activities should not be permitted on clay soils with the alkali sage cover type.

671-58-3 | 671-58 The Sun Dog Pod is located "in some poor vegetation that has made reclamation difficult." DEIS at 3-49. What is the spatial distribution of such "poor vegetation" within the ARPA? How many wells and miles of roads will experience what amounts to a failure in reclamation due to "poor vegetation," soils with excess salts, poor topsoils, or other factors?

671-58-4 | 671-58-5 The BLM notes that in Mountain Big Sagebrush vegetation types, reclamation should be good due to higher moisture availability, and yet "most previous reclamation efforts in this type have not been [good]." DEIS at 3-59. It is confusing that the agency projects good reclamation potential in these sites, when past experience indicates poor reclamation potential. Why the discrepancy? And what is the expectation for reclamation here? Certainly, prescribed fires indicate that mountain big sagebrush may not return for 50 years post-fire. *Id.* The same results are reported for the Basin Big Sagebrush vegetation type. *Id.* at 3-61. One should assume that, following complete scarification of the soil and topsoil replacement, that sagebrush re-establishment and recovery to an adult cover type would take at least as long.

671-58-6 Recovery of Wyoming big sagebrush following a fire is estimated by BLM to take 75-150 years. DEIS at 3-60. This cover type is the second most prevalent vegetation type in the ARPA, covering 34% of the project area. *Id.* Once again, following the scarification of the soil and topsoil replacement following abandonment and reclamation of roads and wellpads, one would expect recovery to take at least this long for this vegetation type. Recovery rates in non-

671-58-6 | sagebrush vegetation types within the ARPA are not estimated within the DEIS. The BLM must provide this information to satisfy "hard look" requirements.

671-58-7 | It is worrisome that the BLM has been unable to establish a recovery rate for native shrubs, and that a shortage of native seed sources may threaten interim and long-term reclamation efforts in the ARPA. See DEIS at 4-50. What proportion of the project could reasonably be expected to be reseeded with native seed mixes, based on current seed sources? Are there additional seed sources that are known to be ready to come on-line in the near future? If seed sources cannot be relied upon, how can the re-seeding mitigation measures be judged to be satisfactory?

671-58-8 | BLM notes that "perennial forbs, brush, and trees generally are more effective at reducing rain splash and can provide structure on the soil surface that can reduce surface runoff energy, but are generally not required for reclamation." DEIS at 4-26. In the case of this project, with its overwhelming proportion of poor, erodible, and unstable soils, it would be a reasonable alternative to require the planting of such perennial forbs, shrubs, and trees in all locations where they were present prior to disturbance. It will also be necessary to require watering these types of plantings for a period of time until they become firmly established; planting these types of vegetation and then failing to provide the needed moisture would be a waste of resources and would not meet the need for successful revegetation. Watering of reclaimed areas is currently being implemented in the Jonah Field.

671-58-9 | Overall, the BLM's analysis of reclamation potential indicates that mitigation measures for interim and final reclamation are unlikely to achieve their stated goals. In light of the sensitive (often saline) soils, vegetation characteristics, and high erosion potential extant over much of the ARPA, BLM should analyze and emplace additional, more effective mitigation measures. In addition, the difficulties presented by long-term reclamation underscore the need to minimize the acreage of surface disturbance, shift disturbance away from areas where reclamation is likely to fail, and reduce overall well spacing densities for the project.

671-58-10 | **SOILS**  
The Proposed Action does not contain sufficient measures to protect sensitive soils. Some 87% of the ARPA is characterized with low strength soils typified by high sand and/or clay content, which "present severe limitations on road placement, construction, and maintenance." DEIS at 3-23, citation omitted. About 23,674 acres of the ARPA are typified by very sandy soils where reclamation will be difficult. DEIS at 3-23. An outright moratorium of road and well construction on steep slopes is needed. Alternative C provides a good starting point, but BLM should evaluate whether a threshold of 25% slope (which is quite steep) provides sufficient protection for soils, or whether the moratorium should be applied to other steep slopes as well (e.g., slopes greater than 8%). BLM should at least apply the protective measures from Alternative C for soil and water resources protection, and test these measures to ensure that they are sufficiently protective to prevent significant impacts.

671-58-11 | Some 41,215 acres of the ARPA is made up of soils with poor to fair topsoil and excess salt. DEIS at 3-22. According to BLM, "Severe wind and water erosion from these excess salt soils may increase the total salt load to the individual watershed and eventually to the Upper Colorado

River System." DEIS at 3-23. Further, under the Proposed Action, erosion of saline soils "would contribute to the non-point source of salt in the Colorado River Basin and can be expected to be a significant impact to this system since these rates would be above background conditions." DEIS at 4-39. The same can be said for Alternative B, which entails the same layout of wells, differing only in timing. Some 197,418 acres of the project area have moderate to high runoff potential, soils which can be "difficult to reclaim and stabilize once disturbed. These soils contribute sediment and salt loading into the watersheds." DEIS at 3-24. How much salt loading will be contributed to the watersheds, by HUC, under each alternative? This question must be answered in order to satisfy NEPA's hard look requirements. What is the daily quantity of salt input to the Colorado River system as a result of this project under the Proposed Action and Alternative B? Is it greater than 1 ton per day? If so, both the Proposed Alternative and Alternative B cannot be legally implemented, because they would violate interstate compacts on the quality of water in the Colorado River system.

### **Erosion**

BLM characterizes precipitation patterns in the ARPA as "a predominantly cool, dry, and windy climate punctuated by quick, intense precipitation events." DEIS at 3-29. These meteorological conditions increase the likelihood of surface runoff and erosion. Both the Proposed Action and Alternative B would lead to significant erosion problems on the one-third of the ARPA where slopes > 8% or alkali sage habitat types are found. DEIS at 2-13. Some 77,588 acres of the ARPA are typified by soils with moderate to high erosion potential, where soils have high clay content or shallow soils overlie bedrock. DEIS at 3-23. In such areas that are exceptionally erosion-prone, the construction of roads, wellpads, and pipelines should be avoided. In addition, the BLM should require additional mitigation measures, such as those contained in Alternative C, for the entire project area to minimize the potential for additional erosion.

There are already erosion problems cropping up within the ARPA as a result of CBM development. In the northern PODs,

Road ROWs had signs of rilling due to inadequate reclamation. Some of the newer roads had inadequate drainage features such as wing ditches and culverts leading to gully formation in the ditches along the roads.

DEIS at 3-48. This shows that currently required mitigation measures are failing to prevent significant problems, and that additional anti-erosion techniques need to be applied if the project is to move forward.

### **NOXIOUS WEEDS**

Several types of knapweed have been documented within the ARPA. DEIS at 3-64. Knapweed takes over as a monoculture, crowding out native vegetation. It is not used by wildlife or livestock as forage, and thus areas infested with knapweed are essentially destroyed as habitat.

The BLM has clearly erred in making its determination that none of the action alternatives would cause an exceedence of impact significance criteria for noxious weeds. See DEIS at 2-14. According to BLM, "Control of halogeton in 2004 was inadequate, forcing one operation trailing

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sheep to go miles out of their normal trail route to avoid this poisonous plant." DEIS at 4-54. As the existing level of development (95 wells) is already exceeding the impact significance criteria for weeds (DEIS at 2-13), how is it possible that adding an additional 2,000 wells can fail to meet the significance criteria under the action alternatives?

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For the northern exploratory PODs, "Weeds were present in many locations, especially at the older Jolly Rodger PODs, were (sic) interim reclamation was generally unsuccessful." DEIS at 3-48. In the central PODs, weed infestations were associated with poor reclamation at compressor stations. DEIS at 3-49. Because noxious weeds associated with oil and gas development are such a problem in the ARPA, and because this problem will be magnified by an order of magnitude under this project, every effort must be undertaken to minimize the well density, minimize the number of wellpads, roads, and pipelines, and thus minimize the spread of noxious weeds along surface disturbances and from there into undisturbed adjacent habitats. The current action alternatives do not address this need to minimize the surface footprint of the project, and therefore do not minimize the spread of noxious weeds.

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We are also concerned with the spread of tamarisk, as this noxious shrub destroys riparian plant communities, consumes large volumes of water, and is of negligible value to riparian-dependent wildlife. BLM notes that tamarisk is present in the ARPA, and could spread as a result of development activities. DEIS at 4-82. What is the current distribution of tamarisk? What streams are currently infected, and what lengths of stream reaches have them? What mitigation measures are proposed to deal with tamarisk now and in the future? Will BLM require the Operators to fund tamarisk cutting and removal operations? What is the likely spread of tamarisk given the proposed level of development under each alternative, and what is the effectiveness of proposed mitigation measures for this unique and difficult challenge? These questions must be answered by BLM in order to satisfy the requirements of NEPA.

#### WILDLIFE

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In light of the disturbance inherent to this project, BLM correctly observes that "the ARPA is not likely to return to its predisturbance wildlife habitat conditions for 70-80 years." DEIS at 5-18. BLM predicts that 20-35% of the available forage in the ARPA will be lost or unusable due to the effects of dust in the Preferred Alternative and Alternative B. DEIS at 2-13, 4-49. From a wildlife perspective, this loss is unacceptable. From these data alone, it is obvious that the action alternatives will cause a significant impact on small mammals, big game, and birds. The BLM correctly observes that impacts to grouse, big game, and songbirds exceed the significance criteria for the Preferred Alternative and Alternative B. However, based on the loss of forage production due to dust, increased roadkill mortality, and the simple loss of habitat due to conversion to roads and wellpads, the BLM's finding of no significant impact to small mammals and Sensitive Species under all alternatives is arbitrary and capricious.

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It is important to note that the level of impact and development for each of the three action alternatives exceed important thresholds set forth by WGFD for sensitive habitats (WGFD 2005). Exceedence of these thresholds denotes a net loss of habitat function. For mule deer and pronghorn winter ranges and sage grouse nesting and brood-rearing habitats, the 8 wells per section proposed for the project fall under the "high" impact category, as do treatments that call

671-62-2

for 20 acres or more of surface disturbance. For elk crucial winter range, these levels of development fall into the "extreme" impact category. In addition, WGFD recommends zero development within migration corridors (There are a number of migration corridors identified by WGFD within the ARPA. Id.

WGFD (1998) has set forth recommendations for allowing habitat-disturbing activities and mitigation for these activities if allowed. Federal Candidate Species and Native Species Status 1 and 2 receive a mitigation category of "Vital," for which habitat directly limits populations and restoration may be impossible; **habitat function must be maintained if habitat modification is allowed to occur**. In the DFPA, species in this category likely to be impacted by the project include mountain plover, bald eagle, Townsend's big-eared bat, roundtail chub, bluehead sucker, and flannelmouth sucker. Habitats such as Crucial Winter and Crucial Winter Relief Ranges also receive a mitigation category of "Vital," regardless of whether or not the crucial ranges of two or more species overlap.

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Native Species Status 3 receive a mitigation category of "High," for which WGFD recommend **no net loss of habitat function** through enhancement of degraded habitat when a habitat disturbing project is proposed. In the DFPA, species in this category likely to be impacted by the project include the merlin, peregrine falcon, long-billed curlew, western scrub-jay, juniper titmouse, bushtit, Scott's oriole, dwarf shrew, white-tailed prairie dog, Great Basin pocket mouse, silky pocket mouse, and swift fox. Big game winter-yearlong ranges and parturition areas also fall under the "High" reclamation category, demanding no net loss of habitat function. Furthermore, for Endangered or Threatened Species such as the razorback sucker, bonytail, Colorado pikeminnow, humpback chub, and black-footed ferret, WGFD recommends exclusion of any habitat impacting activity. For these species, "The Commission recognizes that some wildlife or wildlife habitats are so rare, complex and/or fragile that mitigation options are not available. Total exclusion of adverse impacts is all that will ensure preservation of these irreplaceable habitats" (*Ibid.*, p. 4). We concur wholeheartedly, and point out that FLPMA carries a legal requirement for the BLM to manage its lands in accord with state directives such as the WGFD Mitigation Policy.

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It is important to note that FLPMA requires the ROD to conform to established state policies and laws, including the Wyoming Game and Fish Department's Mitigation Policy. The WGFD Recommendations for Oil and Gas Development set forth the thresholds at which there is a net loss of habitat function (WGFD 2005). This project (all three action alternatives) exceeds this threshold. Currently, mitigation measures in the Proposed Action are not sufficient to prevent a net loss of habitat function for big game crucial ranges, prairie dog colonies, and other State Sensitive species. The Atlantic Rim EIS therefore violates FLPMA's requirements to maintain consistency with established state policies.

671-62-4

#### Habitat Fragmentation

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Habitat fragmentation occurs whenever there is a change in the spatial continuity of the habitat that affects occupancy, survival or reproduction in a particular species, whether or not a net loss of habitat accompanies the spatial change (Franklin et al. 2002). Oil and gas development, with

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its sprawl of drilling pads, access roads, and pipelines, is the primary cause of habitat fragmentation in the sagebrush steppes of the ARPA.

Although the portion of the landscape physically disturbed by roads, wellpads, and pipelines is often a relatively small percentage of the overall landscape, GIS analysis of full-field oil and gas development incorporating quarter-mile buffers to account for habitat degradation due to edge effects indicates that almost 100% of lands within a fully developed gas field at 160-acre spacing are degraded (Weller et al. 2002). In this way, the development of an oil and gas field results in widespread habitat destruction that extends well beyond the acreage of roads and wellpads that are bulldozed in.

Fragmentation of shrubsteppe habitats has a particularly strong negative impact on birds. Knick and Rotenberry (1995:1059) found that sage sparrows and sage thrashers decreased with decreasing patch size and percent sagebrush cover, and reached the following conclusion:

Our results demonstrate that fragmentation of shrubsteppe significantly influenced the presence of shrub-obligate species. Because of restoration difficulties, the disturbance of semiarid shrubsteppe may cause irreversible loss of habitat and significant long-term consequences for the conservation of shrub-obligate birds.

Kerley (1994) found that small patches had fewer shrub-nesting species than large patches, and the green-tailed towhee, an interior sagebrush species, was entirely absent from small patches. Remnant patches smaller than 1 ha will not support sagebrush shrub-nesting birds (Kerley 1994). Predation is believed to be the major factor in the decline of burrowing owl populations in Canada, and habitat fragmentation serves to increase predation risk in burrowing owls (James et al. 1997, Hjertaas 1997).

Even though oil and gas infrastructure can occupy relatively small percentages of a larger landscape, their broad distribution can have negative impacts on an area more than 20 times the size of that occupied area. When energy is developed, roads, pipeline corridors, well-heads, retention ponds, buildings, parking lots, and other components of the infrastructure pepper larger landscapes, coming within a quarter of a mile of as much as 97% of wildlife habitat. In addition to their direct effects (such as immediate landscape disturbance and habitat fragmentation), motorized routes also have negative impacts such as noise, dust, erosion, and human presence that extend beyond the immediately disturbed area. Road densities as low as 1% or less of a given landscape can impact more than 99% of that landscape, leaving little undisturbed area in which wildlife can thrive (Weller et al., 2002; Hartley et. al, 2003, Thomson et. al, 2004,2005).

The BLM acknowledges in passing that habitat fragmentation will result in impacts to wildlife, and that impacts extent beyond the edge of the disturbed area, which makes up 6% of the ARPA. DEIS at 4-60.

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However, the BLM's analysis of the consequences of this disturbance is badly flawed. BLM states that the avoidance zone "can extend up to a half a mile from the developed area." DEIS at 4-60. In fact, as BLM is well aware, this avoidance zone can extend much farther. Powell (2003)

671-62-6  
studied elk avoidance of roads and established drilling pads in the Steamboat Mountain area of the Red Desert, an area similar to the ARPA in terms of vegetation and available cover. Powell found that elk avoid areas within 0.6 miles of a road or drilling pad in winter, and avoid areas within 1.2 miles of a road or drilling pad during summer.

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Regardless of the fact that BLM has understated the avoidance area surrounding development for some species, the agency has also failed to apply even its misleadingly small ½ mile avoidance zone to the project at hand. With eight wells (or even four) per square mile, there will be zero acreage within developed areas that is ½ mile or more from roads and facilities. Thus, 100% of developed areas will be in the avoidance zone, at least for elk and other species that are sensitive to disturbance. The BLM could have presented an acreage or percentage figure for how much of the project area would fall within the avoidance zone for elk, and perhaps for other wildlife species as well. This analysis would have required as a prerequisite that BLM map and plan the location of all roads and wellsites, as it did for the Seminoe Road CBM project. Instead, BLM states that habitat avoidance would occur on 10-30% of the project area, a clear underestimate based on the agency's own data. DEIS at 4-61.

### 671-62-8 **Big Game**

The Atlantic Rim area contains very sensitive and important big game habitats for several important species. The eastern portion of the project area in particular has overlapping crucial ranges for elk and mule deer, with a number of migration corridors crossing the ARPA as well. Parts of the ARPA where overlapping wildlife values occur should be avoidance areas for road and well development.

### 671-63-1 671-63 *Antelope*

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The BLM has noted significant impacts in the form of "shifting antelope use" for the Proposed Alternative and Alternative B. DEIS at 2-13. To which habitat does the BLM expect the antelope use to shift? To the east of the ARPA, increased elevations and different plant community types render the habitat less optimal for antelope, and these habitat already have an indigenous population of their own. To the west, the ARPA is adjoined by a number of existing and proposed full-field development projects, which may provide a seamless and unbroken industrial gas field. See map, DEIS at M-6. This area will have what is left of the Bitter Creek antelope herd, which will be struggling to meet its own habitat requirements in a badly damaged area. In reality, it appears that displacement really equals extinction for antelope populations in the ARPA. At any rate, the emigration of antelope out of the ARPA is blocked to the north and west by woven-wire fences bounding Wyoming 789 and Interstate 80, effectively cutting off antelope from suitable habitats in these two directions. And emigration to the south is blocked by the Little Snake River. The BLM needs to analyze and implement an alternative that provides a strong likelihood that antelope populations within the ARPA will be able to survive and thrive, because prospects for displacement of these animals are so poor.

Under the heading of "Some Important Misconceptions about Wildlife Responses to Oil and Gas Disturbance," WGFD (2005:6-7) states,

- (1) Wildlife relocate to adjacent, unaffected habitats, so there really is no impact (i.e., they just "move out of the way").

This presumption contradicts the fundamental axiom of population ecology and wildlife management that has been known and confirmed since the time of Aldo Leopold – populations of organisms increase to fill vacant, suitable habitat and are then regulated by the essential component of their habitat that is in least supply....When activities associated with energy development displace animals from otherwise suitable habitats, the animals are either forced into marginal habitats or they compete with animals that already occupy the unaffected habitats. Consequences of such displacement and competition are lower survival, lower reproductive success, lower recruitment, and ultimately lower carrying capacity and reduced populations.

The prospect of fencing off wellpads and roads to prevent cattle from impairing reclamation efforts may increase the likelihood of reclamation success, but it also has the potential to impair the migration and dispersal of pronghorns. Road and well networks can be quite extensive, and it would be a significant impact on pronghorn (assuming there were any left to be impacted) to construct extensive fence networks along rights-of-way. Far better for the BLM to radically reduce the density of roads and wellpads; this would decrease the number of facilities that require fencing, increase the likelihood that antelope are maintained within the project area, and keep the landscape more permeable to antelope passage.

In addition, at the Atlantic Rim public hearing on February 2<sup>nd</sup>, Bill Nation of the Carbon County transportation department testified that three county roads (including the Sage Creek Road) will be the primary traffic routes for operators entering and departing the ARPA associated with drilling and production. He noted that traffic would increase markedly on these routes as a result of natural gas related activities. What will be the traffic volume through Bridger Pass during the construction phase(s) versus the drilling phases? What impact will this radical increase in traffic have on the direct vehicle-related mortality rates of big game animals? What will be the impacts of dust be? Will there be a 20 to 35% reduction in forage along the roadways, as in the ARPA? Or will the reduction be greater due to the greater concentration of vehicle traffic? Do these three county roads traverse crucial winter ranges, severe winter relief areas, or calving/fawning habitats, and if so, what will be the impacts of project-related traffic be on wintering or calving game animals? What will be the cumulative effect of traffic related loss of habitat function outside the AFWA in combination with the direct and indirect impacts of project-related developments and activities inside the ARPA? It is important to note that the impacts of this project will clearly extend beyond the ARPA boundary, and the BLM has an obligation under NEPA to analyze all of the impacts of this project, not just those that happen to occur in the ARPA.

Big game winter ranges in the ARPA are already under stress from the animals; further concentration of wintering elk, mule deer, and pronghorn could have dire consequences on these ranges, which then translate into dire consequences for big game populations. Juniper and mountain mahogany vegetation types (highly preferred as winter range habitats) already are

failing Rangeland Health Standard #3, indicating that winter range areas are already under great pressure prior to drilling. DEIS at 4-50. BLM also states, "Disturbance in aspen, juniper woodland, mountain shrub, and Wyoming big sagebrush communities within mule deer and antelope transitional and crucial winter range, would also require long-term recovery and may exacerbate existing issues that led to the failure of Rangeland Health Standards #3 (Upland Vegetation) and #4 (Wildlife Habitat)." DEIS at 4-52. Juniper woodlands within the ARPA are important winter "yarding" (or concentration) areas for mule deer and sometimes elk. DEIS at 3-61. Mountain mahogany and serviceberry vegetation types provide preferred forage for elk and mule deer, and are associated with concentration areas. DEIS at 3-62. And yet only 69% of these habitats would be protected under the Atlantic Rim project, even under Alternative C. DEIS at 4-53.

In addition, several years ago, there was an elk die-off near the site of the Daley Ranch, close to the project area. These would have been elk from the Baggs Elk Herd. The elk are believed to have died from eating toxic lichens, a condition that may have been brought about by being displaced from traditional winter ranges by CBM exploratory activities. The BLM must cooperate with WGFD and the Wyoming State Veterinary Laboratory to investigate the role of CBM development in this die-off, disclose results in the EIS, and then analyze the additional impact that 2,000 more wells might have on wintering elk.

### **Birds and Small Mammals**

We are concerned about the overall impacts of the proposed project (indeed, each of the action alternatives) and the massive impacts that it will have on birds and mammals. The general habitat function in developed portions of the ARPA are likely to be reduced to zero or near zero for all but the most disturbance-adapted species (i.e., coyotes, ravens, etc.). Aspens habitats are particularly high-value areas for passerine birds and small mammals. See DEIS at 3-62. BLM must lay out the locations of roads and wellpads so that the acreage of aspen habitats impacted by the project can be studied. Juniper woodlands are also important habitats for birds and small mammals within the ARPA. DEIS at 3-61. Likewise, the agency must disclose how many miles of road and how many wellpads will be sited in juniper woodlands. Finally, the importance of springs and riparian areas to wildlife cannot be overstated. The mileage of roads and number of wellpads to be sited in these areas must be sited, and an alternative that excludes facilities from these habitats should be studied and adopted.

#### *Juniper Obligate Songbirds*

Fitton and Scott (1984) listed 10 species virtually confined to Utah juniper communities in Wyoming: gray flycatcher, ash-throated flycatcher, western scrub jay, plain titmouse, bushtit, Bewick's wren, blue-gray gnatcatcher, gray vireo, black-throated gray warbler, and Scott's oriole. Fitton (1989) described these juniper obligates as follows. The ash-throated flycatcher is a secondary cavity nester that utilizes steeper slopes with old-growth juniper. The plain titmouse requires old growth juniper for cavity nesting and foraging. The Scott's oriole requires mature juniper with moderate to sparse canopy cover, often foraging on smaller junipers or deciduous shrubs. Fitton reported that the ash-throated flycatcher and scrub jay each declined 66-67% in its juniper range during the 1970s and 1980s. Bushtits are particularly sensitive to human disturbance, and abandon their nests easily. Fitton recommended the ash-throated flycatcher,

plain titmouse, bushtit, and Scott's oriole as "Species in need of special management in Wyoming." The ash-throated flycatcher, western scrub jay, and juniper titmouse have been granted Special Concern III status by the Wyoming Game and Fish Department (Pavlacky 2000).

Seven of these juniper obligate songbirds, rare in Wyoming, are found within the ARPA. These include the ash-throated flycatcher, gray flycatcher, plain titmouse, black-throated gray warbler, blue-gray gnatcatcher, Bewick's wren, and Scott's oriole. DEIS at Table D-1. Because these species are dependent on juniper habitats, which may be degraded under the Atlantic Rim project, BLM will need to quantify the proportion of juniper woodlands that will be directly, indirectly, and cumulatively impacted by the project. This analysis will require the BLM to plan and present the layout of roads, wellpads, and pipelines.

#### *Ringtail*

The WYNDD has a confirmed record of ringtail near Baggs, in or near the ARPA. See DEIS at D-2. Yet the Draft EIS does not discuss the significance of this sighting, nor does it discuss the potential impacts of the project on ringtails that may occur within the ARPA. This oversight must be corrected in the FEIS.

#### **BLM Sensitive Species**

Instruction Memorandum (IM) 97-118 governs BLM Special Status Species management and requires that actions authorized, funded, or carried out by the BLM do not contribute to the need for any species to become listed as a candidate, or for any candidate species to become listed as threatened or endangered. All three action alternatives clearly violates this IM for sage grouse, and Columbian sharp-tailed grouse, and also violates it for the Wyoming pocket gopher and BLM sensitive raptor species found within the ARPA; the Proposed Action and Alternative B also violate this IM for bluehead sucker, flannelmouth sucker, and roundtail chub. This IM recognizes that early identification of BLM sensitive species is advised in efforts to prevent species endangerment, and encourages state directors to collect information on species of concern to determine if BLM sensitive species designation and special management are needed. In addition, for special status species, including sensitive species, BLM must:

Identify strategies and decisions to conserve and recover special status species. Given the legal mandate to conserve threatened or endangered species and BLM's policy to conserve all Special Status Species, land use planning strategies and decisions should result in a reasonable conservation strategy for these species. Land use plan decisions should be clear and sufficiently detailed to enhance habitat or prevent avoidable loss of habitat pending the development and implementation of implementation-level plans. This may include identifying stipulations or criteria that would be applied to implementation actions. Land use plan decisions should be consistent with BLM's mandate to recover listed species and should be consistent with objectives and recommended actions in approved recovery plans, conservation agreements and strategies, MOUs, and applicable biological opinions for threatened and endangered species.

BLM Land Use Planning Handbook H-1601-1, Appendix C at 5. Additionally, if Sensitive Species are designated by a State Director, the protection provided by the policy for candidate species shall be used as the minimum level of protection. BLM Manual 6840.06. The policy for candidate species states that the "BLM shall carry out management, consistent with the principles of multiple use, for the conservation of candidate species and their habitats and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatenedendangered." BLM Manual 6840.06. Specifically, BLM shall:

- (1) Determine the distribution, abundance, reasons for the current status, and habitat needs for candidate species occurring on lands administered by BLM, and evaluate the significance of lands administered by BLM or actions in maintaining those species.
- (2) For those species where lands administered by BLM or actions have a significant affect on their status, manage the habitat to conserve the species by:
  - a. Including candidate species as priority species in land use plans.
  - b. Developing and implementing rangewide and/or site-specific management plans for candidate species that include specific habitat and population management objectives designed for recovery, as well as the management strategies necessary to meet those objectives.
  - c. Ensuring that BLM activities affecting the habitat of candidate species are carried out in a manner that is consistent with the objectives for those species.
  - d. Monitoring populations and habitats of candidate species to determine whether management objectives are being met.
- (3) Request any technical assistance from FWSINMFS, and any other qualified source, on any planned action that may contribute to the need to list a candidate species as threatenedendangered.

BLM Manual 6840.06. This provides additional baseline data gathering responsibilities for the Atlantic Rim Project, responsibilities that have yet to be fulfilled. Clearly, the BLM must survey for special status species before allowing any ground disturbance for this project, must develop site-specific management plans for these species, and must monitor special status species populations within the ARPA to ensure that the agency is promoting their recovery. The BLM must acquire baseline data and analyze the impacts of the four alternatives on these species. In the Draft EIS, the BLM has flouted its special status species obligations, which makes this safety net less meaningful and increases the need for Endangered Species Act protection.

### ***Wyoming Pocket Gopher***

The Wyoming pocket gopher is a unique, endemic, and very rare rodent that possesses a different number of chromosomes (and is therefore genetically distinct) from its nearest relatives (Clark and Stromberg 1987). The Wyoming pocket.gopher is known from Bridger Pass (just east of the ARPA), and likely occurs in the ARPA. DEIS at 3-82. The Draft EIS presents no baseline data on the population size and trend for Bridger Pass, nor does the agency purport to have conducted any field surveys for this extremely rare endemic mammal. Such field surveys are absolutely needed to establish the presence/absence, distribution, and population size of Wyoming pocket gophers within the ARPA, in order to fulfill NEPA requirements to gather baseline data. In

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 addition, the BLM has performed no analysis of impacts of the project on this BLM Sensitive Species. Because the heart of the Wyoming pocket gopher's range is immediately adjacent to the project area, because there is a strong likelihood of additional pocket gopher populations in the ARPA, and because the Atlantic Rim project will certainly impact the Bridger Pass population, a hard look at the impacts to this rare mammal is absolutely essential.

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 In addition, at the Atlantic Rim public hearing on February 2<sup>nd</sup>, Bill Nation of the Carbon County transportation department testified that the Sage Creek Road, which runs directly through Bridger Pass, will be one of the three primary traffic routes for operators entering and departing the ARPA associated with drilling and production. He noted that traffic would increase markedly. What will be the traffic volume through Bridger Pass during the construction phase(s) versus the drilling phases? What impact will this radical increase in traffic through the heart of the most important population of Wyoming pocket gophers have on the direct vehicle-related mortality rates of Wyoming pocket gophers? What will be the impacts of dust be? Will there be a 20 to 35% reduction in forage along the roadway, as in the ARPA? Or will the reduction be greater due to the greater concentration of vehicle traffic? It is important to note that the impacts of this project will clearly extend beyond the ARPA boundary, and the BLM has an obligation under NEPA to analyze all of the impacts of this project, not just those that happen to occur in the ARPA. In addition, protective stipulations for drier ridgetops that are the preferred habitat for this species (Clark and Stromberg 1987) should be studied under at least one alternative, and emplaced in the final decision.

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 BLM states that if pocket gophers are discovered in the project area at some later date, mitigation measures will be developed at that time. DEIS at 4-80. This is clearly a legally insufficient way to mitigate impacts to this very rare species. In the first place, mitigation measures would likely entail some changes to wellfield design in addition to operating procedures. And if pocket gophers are discovered only after the wells and roads are built, it will be too late to change the wellfield design to mitigate impacts to Wyoming pocket gophers. This statement also shows the need to survey the project area in advance, so that mitigation measures can be put in place before development occurs, through the EIS process as mandated by NEPA.

#### 671-65-9 *Mountain Plover*

The mountain plover is a BLM Sensitive Species that has been documented within the ARPA. DEIS at 3-83. In the Draft EIS, BLM fails to provide baseline information about the size of the present population, and also fails to predict the population trend as a result of the project. The BLM references a 1999 USFWS study that indicates that plovers use areas near roads and are therefore susceptible to traffic-related mortality, but the reference to this study does not appear in the Literature Cited section of the EIS. DEIS at 4-80. It is interesting to note that mountain plover nesting was initially believed to be compatible with oil and gas development based on observations of plovers nesting near drilling pads in the Myton Bench area of northeastern Utah. However, this observation has subsequently been undercut by the fact that the Myton Bench plover population ultimately went extinct in the face of intensifying oil and gas development. The last mountain plover to be recorded in Utah was sighted in 2003.

Mountain plovers are often found closely associated with prairie dog colonies of all species. Kotliar et al. (1999) listed the mountain plover as a species that is dependent on prairie dog colonies for its persistence, with abundances higher on prairie dog colonies, habitat selection for prairie dog colonies, reproductive fitness higher on colonies, and population declines occurring when prairie dogs decline. An analysis of pre-settlement records of mountain plover occurrence in Montana indicates that this species was closely associated with prairie dog colonies even before the arrival of EuroAmerican settlers (Knowles et al. 1999). Knowles went so far as to state that prairie dog colonies are "necessary to provide suitable habitat for mountain plovers" on Montana's Great Plains, and termed prairie dogs "necessary for the long-term persistence of mountain plovers" in that region (Knowles 1999). This study also found that even small areas of active colonies are important plover habitat. In Wyoming, the distribution of plovers has been linked with the widespread occurrence of white-tailed prairie dogs (Oakleaf et al. 1996).

The reduction in prairie dog colonies has been directly implicated as an important cause of mountain plover declines rangewide. Knowles et al. (1999) found that the disappearance of prairie dogs due to plague and/or recreational shooting also led to abandonment of nesting habitat by plovers, and plover numbers increased on sites where prairie dog populations were expanding. According to the U.S. Fish and Wildlife Service (1999: 7594), "Further loss of prairie dog towns within the current breeding range of the mountain plover would be detrimental to plover conservation. Conversely, the conservation of the mountain plover can be enhanced by implementing strategies to increase the distribution and abundance of prairie dogs on breeding habitat." Thus, the conservation of prairie dog colonies may be a prerequisite to maintaining viable populations of mountain plover.

Oil and gas development in nesting concentration areas is a direct threat to mountain plover population viability. The U.S. Fish and Wildlife Service found that the Seminole Road Coalbed Methane project "is likely to adversely affect the proposed mountain plover," stating that wellfields are likely to become an "ecological trap," attracting feeding plovers to roadways where they become susceptible to vehicle-related mortality, or alternately increased vehicle traffic could drive plovers away from preferred nesting areas (Long 2001). The USFWS (1999) added that vehicle traffic on roads could lead to stress and chick abandonment. These officials noted that any human disturbance that significantly modifies adult behavior could cause death to chicks, which can die in as little as 15 minutes due to exposure to sun at temperatures greater than 81° F. Long (2001) noted that construction equipment and permanent structures inherent to oilfield development constitute a radical increase in raptor perches that could result in increased predation pressure. In addition to these problems, wellfield development can lead to increased invasion rates of non-native weed species, which can have serious impacts on plover nesting habitat by decreasing the availability of bare ground (Good et al. 2001).

Mitigation measures for plover would be to avoid plover nesting habitat "where practical" and to avoid drilling and construction activities in plover habitat during the nesting season. DEIS at E-7. This optional type of mitigation measure makes us very uneasy, as we find it likely that many roads and wells will in fact be sited in plover nesting habitat. Were the BLM to lay out the roads and wellpads for this project as its NEPA requirements require the agency to do, it could determine definitively where avoidance of plover nesting habitat is "practical" and where it is

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not. The agency could then measure the number of wells and miles of road and pipeline that would be constructed within mountain plover habitat, providing a sufficient underpinning for a prediction of the level of impact to nesting mountain plovers that will result from this project. Absent such a thorough analysis, BLM's unsupported conclusion that "mountain plovers are not expected to be significantly impacted" (DEIS at 4-80) is arbitrary and capricious.

#### *Sage Grouse and Columbian Sharp-tailed Grouse*

Wyoming sage grouse populations are some of the largest left in the nation and are relatively stable (showing a 17% decline from 1985-1994); nonetheless, sage grouse populations have experienced major declines rangewide in recent decades (Connelly and Braun 1997). WGFD (2000) reported that since 1952, there has been a 20% decline in the overall Wyoming sage grouse population, with some fragmented populations declining more than 80%; Christiansen (2000) reported a 40% statewide decline over the last 20 years. These declines can be attributed to habitat loss (due to agriculture, mining and energy development, reservoirs, roads, and buildings), habitat fragmentation (due to fences, powerlines, roads, and reservoirs), habitat degradation (due to overgrazing, changes in fire regime, and mechanical and chemical sagebrush control efforts), drought, predation (the importance of which is controlled by the amount and quality of sage grouse habitat), and hunting (Braun 1998).

According to the Draft EIS, 88 sage grouse leks fall inside or within two miles of the ARPA. DEIS at 3-72. This is a very significant proportion of the overall Wyoming population, whose viability is the only thing standing between the sage grouse and listing under the Endangered Species Act. The BLM needs to implement mitigation measures and wellfield design criteria that make the Atlantic Rim project compatible with maintaining healthy and recovering sage grouse populations. But BLM's action alternatives would all allow roadbuilding and well development within 2 miles of sage grouse leks, the area most sensitive and important as breeding and nesting habitat. If BLM does not want the Atlantic Rim project to contribute to a trend toward the listing of this bird, no surface disturbance should be allowed within 2 miles of a sage grouse lek at minimum, and additional seasonal buffers extending at least 3.1 miles from the lek site should be required, and drilling and construction operations disallowed during the breeding and nesting periods.

Connelly et al. (2000) provide a review of the many short- and long-term effects of energy development on sage grouse. Aldridge (1998) noted that oil and gas development has contributed to the serious decline of Canadian sage grouse populations, stating,

the removal of vegetation for well sites, access roads, and associated facilities can fragment and reduce the availability of suitable habitat. Furthermore, human and mechanical disturbance at wells may disrupt breeding activities, and traffic on access roads could cause some fatalities of birds... Even if sites are reclaimed at a later date, birds may fail to return to previously used habitats.

Currently, only 7 of 31 historic lek complexes remain active in Canada (Braun et al., 2002). For this Canadian population, these researchers have stated, "The future plans for oil and gas developments within the range of sage-grouse are unknown, but expansion is expected. The

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cumulative impacts of further activities could result in reduction of the Alberta sage-grouse population to non-viable levels."

Coalbed methane development has even greater impacts on sage grouse. According to Braun et al. (2002), "Impacts to sage grouse from CBM development include direct loss of habitats from all production activities along with indirect effects from new powerlines and significantly higher amounts of human activity, both during initial development and during production." For leks within 0.25 mile of coalbed methane facilities, significant reductions in males/lek and rate of growth, presence of overhead power lines within 0.25 mile of a lek also depressed sage grouse population growth, and compressor stations within 1 mile of a lek significantly reduced sage grouse numbers (*Ibid.*).

But the definitive study on the impacts of oil and gas development to sage grouse was undertaken by Holloran (2005). This study is attached as Attachment 10 and we incorporate it into these comments by reference. The study considered sage grouse populations in the Pinedale Anticline and Jonah gas fields in Western Wyoming, as well as sage grouse in adjacent areas where development was not occurring. This study reached the following findings:

#### Impacts to Breeding Males

- Populations of breeding males on leks (sage grouse mating sites) in areas subjected to full-field natural gas development in the Pinedale Anticline and Jonah fields declined by an average of 51 percent from the year prior to development to 2004, compared to only a 3 percent decline at undisturbed leks.
- Males at three leks surrounded by natural gas development declined by 89%; two of the three leks were abandoned entirely within 3 to 4 years of initiation of gas drilling.
- Active drilling within 3.1 miles of a sage grouse lek reduced the number of breeding males that used the lek.
- After drilling and construction had been completed, the presence of producing gas wells within 1.9 miles of a lek site reduced the number of breeding males using the lek.
- As road traffic increased, the number of breeding males on affected leks decreased.
- As well densities increased, the number of breeding males on affected leks decreased.
- Well densities of 1 or more wells per square mile reduced the number of males at affected leks.

#### Impacts to Nesting Females

- Some 64% of sage grouse nested within 3.1 miles of a lek site.

Females showed strong fidelity to their nesting areas, and continued to nest in affected areas even after roads and wells were developed nearby. Older females remained in affected areas, while yearling females departed from gas fields.

- Overall, females strongly avoided nesting in areas of high well density.
- There was a 21 percent decline in the population of nesting females relative to undisturbed females over the 5 years of the study.
- Females nesting in developed areas had a significantly lower survival rate than female grouse in undeveloped areas. Although nest success rates were higher in developed areas, this increase was not sufficient to overcome the lowered female survival rates, resulting in an overall 21 percent decline in sage grouse population growth in developed gas fields relative to undeveloped areas.
- The study predicted that sage grouse populations would become extinct in the Pinedale Anticline and Jonah Fields within 19 years if current population trends continue. (Both of these fields are in the early stages of development. As impacts to sage grouse habitat become progressively worse with the planned increase in gas drilling, the population declines could become steeper in the future).
- Population reductions likely result from a combination of dispersal away from gas fields and increased mortality rates for birds affected by development.
- The author's findings suggest that "current development stipulations are inadequate to maintain greater sage-grouse breeding populations in natural gas fields" (page 57).

The findings of this study make clear that projects like the Atlantic Rim CBM project, under standard stipulations like those in the Proposed Action and Alternative B, are clearly insufficient to prevent significant impacts to and ultimate depopulation of sage grouse. It is important to note that the data for this study were gathered from 2000 to 2004, when the Pinedale Anticline Field had a similar or lower density compared to the Atlantic Rim CBM project under all action alternatives.

Importantly, because this study found that well densities greater than 1 well/169 acres negatively impacted sage grouse lek populations, proposed well densities of 80 to 160 acres spacing should be expected to have heavy impacts on sage grouse populations. Because the presence of production wells (post-drilling) within 1.9 miles of a sage grouse lek had negative effects on breeding populations, and because all alternatives will allow the siting of wells within 1.9 miles of lek sites, heavy impacts to breeding populations at impacted lek sites would be expected. However, because BLM has not planned the location of wells and roads, the agency will not be able to analyze the direct and cumulative impacts of the project on sage grouse, either on a project-wide basis or lek by lek.

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It is important to note that the sage grouse is a BLM Sensitive Species, which must be managed to avoid a trend toward listing under the ESA. The USFWS's "not warranted" decision on sage grouse was largely predicated on healthy and expanding populations in Wyoming. The ARPA contains 88 sage grouse leks, a significant proportion of the Wyoming proportion. The total number of sage grouse in the ARPA remains undisclosed, as BLM has failed its baseline information responsibility to gather and present lek count data gathered by the WGFD.

Sharp-tailed grouse populations are also perilously restricted. Based on his study in the western Sierra Madre Range of Wyoming, Klott (1987) made the following observations on the potential threats to sharp-tailed grouse: (1) Block spraying adjacent to sharp-tailed leks led to abandonment of 2 lek sites. Thus, vegetation treatments near lek sites should be avoided. (2) Areas near sharp-tailed leks should be avoided for the purposes of strip mining. (3) Pump noise from oil and gas development may reduce the effective range of grouse vocalizations. For this reason, oil and gas development should be sited well back from lek sites.

We support the mitigation measures in Alternative C prohibiting surface disturbance on sage grouse and sharp-tailed grouse wintering habitats. These measures should be incorporated into the final decision for this project.

#### *Swift Fox*

The swift fox was determined to be "warranted but precluded" for listing under the Endangered Species Act by the U.S. Fish and Wildlife Service in 1995 (60 Fed. Reg. 31663). The swift fox is listed as a Species of Special Concern by the Wyoming Game and Fish Department, and is protected from intentional take by state regulations (Oakleaf et al. 1996). This species has been listed as dependent on the prairie dog for its persistence, and that its populations decline when prairie dogs decline (Kotliar et al. 1999). In one study, swift fox home ranges averaged 32 km<sup>2</sup>. The diet of swift fox in various parts of its range is dominated by prairie dogs, grasshoppers, and beetles (Uresk and Sharps 1986), small rodents, including prairie dogs (Kilgore 1969), mainly lagomorphs (particularly jackrabbits) with some prairie dogs (Zumbaugh et al. 1985), and may include carrion and plant matter (Hines and Case 1991).

According to Kahn et al. (1997), "Swift fox are frequently observed along roadways, which may increase the rate of animals being killed specifically by vehicles. Factors such as road density, miles traveled and driver speed may increase the rate of swift fox mortalities" (p. 17). Kilgore (1969) noted, "The chief mortality factors to which swift foxes are subjected are those associated with the activities of man. These foxes are frequently killed crossing highways and county roads, shot by hunters or farmers, and killed by farm implements" (p. 525). Swift fox are also particularly vulnerable to poisoning programs targeted at rodents or other carnivores (Kilgore 1969, Uresk and Sharps 1986). In their conference opinion on the Seminoe Road Coalbed Methane Project, the USFWS recommended that activities which might disrupt denning swift fox be prohibited between March 1 and July 31 (Long 2001).

The BLM must census the ARPA for swift fox in order to determine the population size. Denning areas should be identified to satisfy NEPA baseline information requirements and protected from any activities that threaten the viability of swift fox populations. In addition, the

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density of roads and wellpads must be reduced to minimize the impacts of vehicle collisions on swift fox populations.

### *Grey Wolf*

There is no analysis of the effect of the Atlantic Rim project on the dispersal or recovery of gray wolves in the southern Red Desert in the Draft EIS. According to USFWS reports (Status Report of Ed Bangs, May 30, 2003), "We received a reliable report of a gray uncollared wolf-like canid about 7 miles north of Baggs, WY indicating that a wolf [or tame wolf hybrid] may have dispersed within spitting distance of Colorado." This area is in or near the ARPA, and within easy reach of a dispersing wolf. In light of this report, the BLM must initiate a Section 7 consultation with the USFWS concerning the possible impacts of the project on dispersing wolves (and also the potential of eventual wolf colonization of the ARPA). The passage of wolves southward has been confirmed by the death of a wolf along Interstate 70 in Colorado.

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And yet the BLM does not list the wolf among species likely or confirmed to occur within the ARPA. See DEIS at D-2. . The fact that the USFWS has not added the wolf to a list of species that occur in the ARPA does not alter the fact that BCA has provided solid evidence that dispersing wolves are likely to be present within the ARPA during certain times of year. And this possibility, backed by credible evidence confirmed by reputable biologists, may not be ignored. The BLM must therefore initiate consultation with the USFWS concerning potential direct and cumulative impacts to wolves pursuant to the Endangered Species Act. Specifically, the BLM must address the cumulative impacts of the Atlantic Rim project together with other reasonably foreseeable projects, such as the Desolation Flats project and the Seminoe Road project in addition to existing developments, on the dispersal abilities and regional habitat permeability to facilitate dispersal and recovery of this Threatened species.

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### *White-tailed Prairie Dog*

White-tailed prairie dogs have declined to 8% of their native range in North America, and the survival of remaining populations is threatened by habitat destruction and modification, sylvatic plague, recreational shooting, poisoning, oil, gas, and mineral extraction, fire suppression, overgrazing, off-road vehicle use, noxious weeds, and climate change (Center for Native Ecosystems et al. 2002). In Wyoming, the white-tailed prairie dog occupies less than 2% of the suitable habitat for the species (Center for Native Ecosystems et al. 2002). For Wyoming's Great Divide Basin, Maxell (1973) noted, "Most active prairie dog towns were located some distance from the main thoroughfares in the Basin, probably due to human predation in the form of varmint hunters" (p.85). Throughout the Great Divide RMP area, prairie dog colonies are radically reduced from historic distributions, and are in need of protection and recovery.

According to Miller et al. (1990), "Ecologically, the prairie dog ecosystem is an oasis of species diversity on the arid plains" (p. 764). Sharps and Uresk (1990) found that 134 vertebrate wildlife species are associated with prairie dog colonies in western South Dakota. The importance of prairie dogs as prey for raptors has been noted in many studies (e.g., Tyus and Lockhart 1979, Campbell and Clark 1981, MacLaren et al. 1988, Jones 1989, Cully 1991, Kotliar et al. 1999). In a comparative study which incorporated Wyoming sites, Clark et al. (1982) found that white-tailed colonies showed a greater number of associated vertebrate species (83 species) than either

black-tailed or Gunnison prairie dogs; larger towns had a greater species diversity than smaller towns.

Many rare and declining species, notably black-footed ferret, mountain plover, burrowing owl, ferruginous hawk, and swift fox are dependent on prairie dogs for their own persistence (Kotliar et al. 1999). In Wyoming, other species associated with white-tailed prairie dogs that are of particular note due to special status or management concern include the eastern short-horned lizard, northern plateau lizard, Great Basin gopher snake, midget faded rattlesnake, prairie falcon, merlin, sage grouse, burrowing owl, sage thrasher, Brewer's sparrow, sage sparrow, swift fox, and pronghorn (Clark et al. 1982).

For the Atlantic Rim project, we are concerned about the impact of proposed developments on prairie dogs. The impacts analysis in the Draft EIS is essentially nonexistent. See DEIS at 4-79. CBM development in the Blue Sky Pod (and perhaps elsewhere within the ARPA) has taken place atop prairie dog colonies. What has been the vehicle-related mortality in these areas? What is the population trend (or at least trend in active colony area) for affected prairie dog populations? What does the monitoring data from the exploratory pods say about the impacts of these projects on prairie dogs? These are crucially important questions, because so many rare species depend on the white-tailed prairie dog to provide appropriate habitat or forage. In addition, while the BLM's commitment that development "avoid prairie dog colonies whenever possible" (see DEIS at 4-79), this measure does not provide sufficient protection. BLM should study at least one alternative that prevents outright any roads and wellpads from being constructed within prairie dog colonies. The patchy distribution and relatively small size of colonies (see DEIS at M-31) makes this an eminently reasonable alternative, and BLM should adopt such requirements in its final decision for the project.

### **Burrowing Owl**

Nationwide, the burrowing owl is a species on the decline. As of 1997, over half of the agencies across North America tracking burrowing owl population trends reported declining populations, while none reported increasing populations (James and Espie 1997). Burrowing owl populations are highly susceptible to stochastic disturbances such as drought, and thus may decline more rapidly than would be predicted on the basis of demographic factors alone (Johnson 1997). In Wyoming, data suggest an overall population decline, with 17.5% reoccupancy of historic sites, but the spotty quality of historical data makes comparisons difficult (Korfanta et al. 2001). The burrowing owl has been identified as a species of concern by both the BLM and the Wyoming Game and Fish Department. Burrowing owls have been documented within the ARPA. DEIS at 3-83.

Burrowing owls are in a select group of wildlife most closely tied to prairie dog colonies, and prairie dog burrows are preferred nest sites for burrowing owls. Thompson (1984) reported that owls preferred abandoned prairie dog burrows in the early stages of succession. Green and Anthony (1989) found that nest burrows lined with dung were less susceptible to predation, perhaps explaining this unusual behavioral attribute. On the Great Plains, Sidle et al. (n.d.) found that burrowing owls actively selected for active prairie dog towns, and showed much lower usage of towns that had been decimated by plague, shooting, or poisoning. Desmond and Savidge

(1999) found that burrowing owl nest success was positively correlated with density of active prairie dog burrows, and recommended preserving prairie dog colonies to maintain the viability of burrowing owl populations. And in the Columbia Basin, where prairie dogs are absent, burrowing owls nested in badger burrows, but as a result were subjected to badger predation (Green and Anthony 1989). Thus, the ongoing loss of prairie dog colonies has undoubtedly been a prime factor in the decline of the burrowing owl.

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It is critically important that this project minimize impacts to the burrowing owl. We are concerned both with the impacts that this project might have in reducing prairie dog populations, and also with the potential for direct mortality of burrowing owls due to vehicle collisions, particularly at night. What are the nighttime traffic patterns likely to be in the ARPA as a result of this proposed project? How many miles of road will cross known prairie dog colonies (and index of burrowing owl habitat)? The BLM should require that prairie dog colonies be exempted from surface disturbing activities (except, perhaps, pipelines) to minimize the potential impact of the project to burrowing owls. The clustering of wells and facilities and the reduction of density of the wellfield is also needed to reduce impacts to this species.

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*Sage Thrasher, Sage Sparrow, and Brewer's Sparrow*

There are three species of sagebrush obligate songbirds found within the ARPA and on the BLM Sensitive Species List. According to WGFD data reported in the Draft EIS, all three of these BLM Sensitive sagebrush obligate passerines are known to occur within the ARPA. DEIS at 3-83, 84. Ingelfinger (2001) conducted a study of sagebrush birds in a western Wyoming gas field and found that as gravel roads increased, densities of sagebrush obligate birds, Brewer's sparrows, and sage sparrows declined, while horned larks (a grassland species) increased. According to his findings, "roads associated with natural gas development negatively impact sagebrush obligate passerines. Impacts are greatest along access roads where traffic volume is high" (p. 69), but "bird densities are reduced along roadways regardless of traffic volume" (p.71).

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Herptiles

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Reptiles sensitive to disturbance which occur within the ARPA include the greater (eastern) short-homed lizard, the Great Basin gopher snake, the northern sagebrush lizard, the pale milk snake, and the smooth green snake. DEIS at Table D-1. We are concerned about the project's potential impacts to these species. We would expect these species to be most sensitive to habitat fragmentation and vehicle-related mortality, which means that project facilities will need to be clustered and access roads minimized to minimize the impacts to these species. Gernano and Lawhead (1986) found that lizards increased in abundance with increasing patch complexity, indicating that spatial aspects of land management are important to maintaining reptile diversity. In addition, gravel roads attract reptiles wishing to raise their body temperatures, increasing vehicle-related mortality. Thus, using two-tracks instead of gravel roads for well access and trunk routes is needed to minimize vehicle mortality for these species.

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We are also concerned about the project's impacts on amphibians, as these species appear to be highly sensitive to both habitat degradation and changes in wetlands and water quality. The northern leopard frog has "a high probability of occurring" in the ARPA in wetland

environments, while the Great Basin spadefoot's range includes the ARPA, although there are no known occurrences of this species documented in the ARPA to date. DEIS at 3-84. In addition, the western boreal toad may also occur in isolated areas of the ARPA. *Id.* In addition, the northern leopard frog and tiger salamander have reliable records in or near the ARPA. DEIS at Table D-1.

Sensitive Fishes

Roundtail chubs, flannelmouth suckers, and bluehead suckers can be found in the ARPA. These species reside in large, slow-moving rivers and also in smaller tributary streams (Bezzarides and Bestgen 2002). According to Wheeler (1997), these species "have experienced dramatic reductions in their range in western Wyoming since 1965, and may need immediate conservation attention" (p. 54). In the Upper Colorado Basin, the roundtail chub has been extirpated from 45% of its historical range, bluehead suckers occupy about 45% of their historical range, and the flannelmouth sucker occupies about 50% of its historic range (Bezzarides and Bestgen 2002). All three of these species are on the BLM Sensitive Species list, and merit special conservation attention.

All three of these Sensitive Species occur throughout the Little Snake watershed and in downstream rivers as well. Roundtail chubs have been documented for the Little Snake River and Muddy Creek (Wheeler 1997). Flannelmouth and bluehead suckers have been documented in Savery Creek, and known occurrences of bluehead sucker have been recorded for Little Savery Creek, the North Fork of Savery Creek, Muddy Creek, Littlefield Creek, Big Sandstone Creek, and the Little Snake River (WGFD 1984). Johnson and Oberholtzer (1987) reported that flannelmouth suckers were "widely distributed" in Little Snake, roundtail chubs were widely distributed in lower reaches, above 6,500 feet. Oberholtzer (1987) reported that although roundtail chubs and flannelmouth suckers were collected from the lower reaches of Littlefield Creek in 1980, mountain suckers were the only non-game fish collected in 1986. Roundtail chubs and flannelmouth suckers were found during 1999 and 2000 surveys of lower Muddy Creek, and flannelmouth suckers were also found in Wild Cow Creek and upper Muddy Creek (Bower 2000). The Yampa River also holds important roundtail chub populations; Karp and Tyus (1990) reported that roundtail chub were three times more abundant in the Yampa than in the Green River.

Muddy Creek is a waterway of particular concern for conserving Sensitive native fishes. The presence of the rare bluehead sucker and roundtail chub led Knight et al. (1976) to propose Muddy Creek as a potential National Natural Landmark. But Oberholtzer (1987) reported that headcutting along Muddy Creek has lowered the water table in many areas of the stream. Muddy Creek historically had a perennial flow at its confluence with the Little Snake River, but in recent years, the lower reaches of this stream are intermittent, possibly impeding the dispersal and spawning runs of the flannelmouth sucker, bluehead sucker, and bluehead sucker in the stream (Bower 2000). According to Oberholtzer (1987), "Downstream of Wyoming Highway 789, irrigation withdrawals cause reduced flows, and the stream is often dry for several miles in this area" (p.13). Biodiversity Conservation Alliance's own reconnaissance of the lower Muddy Creek watershed revealed an enormous number of reservoirs built as "range improvements" by BLM and/or livestock permittees along tributary draws. These reservoirs rob water from the

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lower reaches of Muddy Creek and doubtless play a major role in the drying up of Muddy Creek during the summer and fall. Furthermore, several dams have been built across Muddy Creek itself in the vicinity of Mexican Flats, forming barriers to native fish migration and dispersal. In order to conserve native fishes in this watershed, barriers to fish passage and wastewater inputs into Muddy Creek should be removed as mitigation measures tied to the Atlantic Rim CBM Project.

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BLM correctly concludes that Sensitive Fishes in the Muddy Creek watershed will suffer significant impacts if the Proposed Action or Alternative B are implemented. DEIS at 2-16. BLM also notes that Muddy Creek would experience "alteration of stream geometry and increasing sediment to the point of degrading a streams (sic) designated use." DEIS at 4-45. This implies, in the case of Muddy Creek, that the stream would no longer be able to support nongame fisheries. BLM has noted that Muddy Creek is the only stream in the state supporting all three of the BLM Sensitive fishes found in the ARPA (bluehead sucker, flannelmouth sucker, and roundtail chub). The loss of this stream would likely contribute significantly to the trend toward ESA listing for these three species under the Proposed Action and Alternative B, as each species is down to less than 50% of its historic range (see Rees et al 2005a, 2005b; Ptacek et al. 2005). These two alternatives therefore violate the BLM's Sensitive Species policy, and should not be implemented.

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There are real problems with the condition of the Muddy Creek channel and its water, and the Proposed Action and Alternative B will only make them worse. BLM reports that as of 2004, "unstable stream channels and loss of riparian functions threaten aquatic life uses in Muddy Creek and McKinney Creek." DEIS at 3-43. According to Rees et al. (2005a:17), "Land use practices that can impact stream channels include construction of roads through highly erodible soils, improper timber harvest practices, and overgrazing in riparian areas." The same is true for bluehead suckers (Ptacek et al. 2005) and flannelmouth suckers (Rees et al 2005b). (These researchers recommended "minimization of sediment input due to anthropogenic sources (e.g., road building, timber harvest)" to maintain viable populations. Further, "It is likely that increased sediment loads or sediment deposition could negatively impact roundtail chub populations." *Id.* at 19. BLM correctly notes that increased siltation can degrade riffles and fill pool habitats, further degrading habitat. DEIS at 3-46. The appropriate response to these problems is for BLM to require all of the mitigation measures contained in Alternative C to reduce sedimentation, salinification, and other impacts to aquatic systems, plus decreasing the overall number of wellpads and roads required for this project (as these are the sources of the impacts).

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Four the four species of Endangered fishes living in the Little Snake and Yampa Rivers, BLM concedes that "water draining from the ARPA affects the downstream habitat for these species." DEIS at 4-78. It is mystifying, however, that downstream Endangered fishes are projected to be unaffected under all alternatives. See DEIS at 2-16. Indeed, BLM claims, "None of the threatened and endangered species found downstream of the ARPA within the Colorado River system are known to occur within the ARPA, therefore there would be no direct impact to those species." DEIS at 4-89. A more ridiculous fallacy is difficult to imagine. Increases in salt loading resulting from inadequate mitigation measures for roads and wellpads, which will assuredly impact fishes in the Muddy Creek watershed, will just as assuredly have direct impacts on the Endangered

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Species downstream, unless the BLM has some heretofore unmentioned method to magically stop the waters of Muddy Creek before they flow into the Little Snake River, where Endangered fishes have been recorded. Even the Biological Assessment states "the potential for project-related reductions in water quantity *and/or quality* to these tributaries to the Colorado River warrant [Endangered fishes'] inclusion in this document." DEIS at G-10, emphasis added. BLM's assertion that the only impacts of this project to Threatened and Endangered fishes are related to water depletion are both arbitrary and capricious and factually erroneous.

The Biological Assessment (BA) also contains a number of serious errors. The BA states "no produced water will be discharged into the Colorado River system; therefore, produced water discharges do not pose a risk to these species." DEIS at G-14. However, as noted elsewhere in these comments, the Cow Creek Pod would be allowed to increase its produced water discharge, which is filled with salt and other toxins, under this EIS. In addition, the BA states,

Implementation of all appropriate mitigation measures for water resources and soils identified in the ARPA would prevent potential downstream sedimentation and/or contamination caused by construction activities. Therefore, water quality in the Colorado River system is not expected to be impacted under any of the alternatives.

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DEIS at G-10,11. In fact, only Alternative C would implement "all appropriate mitigation measures for water quality, and the BLM has itself determined that in the absence of these measures, the Proposed Action and Alternative B would result in significant impairment of water quality. See DEIS at 2-10,11.

As noted by BLM, 75% of the ARPA is within the Colorado River watershed, draining directly into the Little Snake and Yampa Rivers, home to four species of Endangered fishes. DEIS at 3-27. This drainage is borne by the Muddy Creek HUC. DEIS at 3-31. Muddy Creek is itself home to BLM Sensitive fishes such as the bluehead sucker, roundtail chub, and flannelmouth sucker. DEIS at 3-84. According to the DEIS, "habitat degradation has been identified by the BLM and LSRCD as a serious water quality concern in Muddy Creek, from Red Wash downstream to the Little Snake River. " DEIS at 3-46.

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In addition, "physical degradation of the stream channels is threatening full aquatic life use support" for Savery and West Loco Creeks. DEIS at 3-46. Will the Atlantic Rim project cause further degradation of these streams? If so, what is the magnitude of the additional degradation, and what impacts will it have on thermal regimes, turbidity, and aquatic life?

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A small part of the Sage Creek watershed falls within the ARPA. DEIS at 3-34. Sage Creek is an impaired waterway where the reintroduction of beavers is apparently restoring hydrologic function. Apple (1985) reported that the restoration of beavers resulted in dissipation of streamflow energies and raising of water tables along Sage Creek in the Rawlins Field Office. In this study, the combination of beaver reintroduction and rest from grazing resulted in a 20% increase in avian species richness. Sage Creek is impaired at present due to sediment loading. DEIS at 3-47. How much additional sediment loading will occur within the watershed as a result

of project activities? What will be the impact of additional sediment loading on the viability of beaver populations downstream? We are concerned that additional sedimentation could fill beaver ponds, causing them to lose their habitat function for beaver and endangering the beaver population along Sage Creek.

#### Endangered Fishes

The Little Snake River is home to populations of Endangered humpback chub and Colorado pikeminnow, with spawning habitat for humpback chub as well as roundtail chub and bluehead and flannelmouth sucker in the Little Snake (Hawkins et al. 2001a). Marsh (1991) captured an adult Colorado pikeminnow in the Little Snake 18 km west of Baggs, and noted, "suitable habitat at least for adult big-river fishes remains available in the Little Snake River in Wyoming, and our capture of Colorado squawfish there is positive evidence for that species" (p. 1092). In the Little Snake River, specific spawning sites for razorback sucker and Colorado pikeminnow have been identified, and humpback chub have been monitored in this river for protracted periods of time during the spawning season, but spawning has not yet been confirmed (Hawkins et al. 2001a). According to Marsh (1991), the Little Snake should be considered among potential recovery sites for Colorado pikeminnow.

During baseflow periods in late summer and autumn, **pools** along the lower Little Snake River serve as refugia for native fishes, and are isolated by river reaches that are shallow, sandy, and constitute impassable barriers to dispersal (Hawkins et al. 2001a). The Little Snake's unusually high peak flow to baseflow ratio, large sediment load, and extremely low base flow have been cited as principal reasons that the Little Snake still harbors a largely native fish fauna, including humpback chub and Colorado pikeminnow (Hawkins et al. 2001a). BLM actions must maintain this natural disparity between peakflow and baseflow by providing a moratorium on the surface discharge of CBM wastewater.

The Yampa River watershed, which includes the Little Snake basin, is critically important for the survival of the Colorado River Endangered fishes. According to Holden and Stalnaker (1975b), "The Yampa River is very important to the preservation of rare and endangered fishes in the Colorado basin primarily because all these rare forms are at least present in small numbers and some are apparently reproducing" (p. 411). Karp and Tyus (1990:263) proclaimed:

"Existing flows of the Yampa River may be singularly responsible for enabling the persistence of chubs in the Yampa and Green Rivers. Alteration of Yampa River flows could reduce the availability or character of chub spawning habitat and presumably adversely affect their reproduction, aid in further proliferation of introduced competitors and predators, and reduce the quality and quantity of usable habitats. Dinosaur National Monument should be considered a refugium for native fishes, and efforts should be made to protect flows of the Yampa River.

According to the USFWS (2000), "The Yampa River, a tributary to the Green River, is essential for the maintenance and recovery of the Green River basin. The relatively unaltered flows of the Yampa River are responsible for providing a natural shape to the hydrograph of the Green River." The Little Snake River provides 28% of the Yampa River's flow (USFWS 2000), and

77% of the Yampa's sediment load (Hawkins and O'Brien 2001). The flow and sediment contribution of the Little Snake are important in maintaining nursery habitats for Colorado River Endangered fishes in the alluvial reaches of the Green River (Hawkins and O'Brien 2001). According to Hawkins and O'Brien (2001), "One of the most important resources of the Little Snake River to the habitat and recovery of endangered fish is the highly variable water discharge and sediment supply to the Green River system" (p. 9).

Scientists have also recommended protective measures for the Little Snake itself. Hawkins et al. (2001a) recommended, "Identify and maintain the discharge and physio-chemical conditions in the Little Snake River that support Colorado pikeminnow, humpback chub, and a mostly native fish community. These conditions might include the timing, magnitude, and pattern of runoff and baseflow and associated physico-chemical conditions such as turbidity, diel temperature fluctuations, or sediment load" (p. viii). Baseline hydrograph, chemical composition, and turbidity data for the lower Little Snake River are provided by Hawkins et al. (2001a). The BLM must maintain hydrograph and sediment load levels at these baseline levels through their management activities.

Actions which alter the sediment load, salinity, or water quantity in the Little Snake jeopardize the survival of the Colorado River Endangered fishes. According to the US Fish and Wildlife Service (1999b), "it is assumed that these endemic fishes [Colorado River Endangered Species] evolved under natural conditions of high turbidity; therefore, the retention of these highly turbid conditions is probably an important factor in maintaining the ability of these fish to compete with non-natives that may not have evolved under similar conditions" (p.7). The U.S. Fish and Wildlife Service (1999b) found that flow depletion inherent to the proposed High Savery Dam "is likely to jeopardize the continued existence of the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail, and is likely to destroy or adversely modify designated critical habitat" in the Yampa and Green Rivers (p. 34). Actions which significantly alter the turbidity of the Little Snake must be prohibited.

Total dissolved solids are one measure of chemical contaminants which may impact native fishes. Pimintel and Bulkley (1983) performed a study of the effects of Total Dissolved Solids (TDS) on the Endangered fishes of the Colorado River system in anticipation of oil shale development in western Colorado. This research revealed that for juveniles, Colorado pikeminnows preferred a TDS of 560-1150 mg/l and avoided levels greater than 4,400 mg/l; humpback chub preferred a TDS of 1000-2500 mg/l and avoided levels higher than 5100 mg/l; bonytail preferred TDS levels of 4100-4700 mg/l and avoided levels lower than 560mg/l and higher than 6600 mg/l. Tests were performed at 12°C for this study; TDS tolerances may have been higher if tested at a warmer temperature. These researchers concluded, "Nevertheless, problems could arise for fish in localized situations where saline oil-shale-processing waters enter tributaries of the main river system. Fox et al ...found that TDS concentrations of oil-shale-process waters ranged from 1,750 to 24,500 mg/liter and averaged 6,800 mg/liter. Tributaries polluted with such high TDS concentrations may be avoided by these species resulting in a loss of habitat" (p.599).

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According to Tyus (1990b), "Water degraded in temperature or chemical composition can displace, or limit growth in fish populations" p. 19. These species may use chemical signatures of their native waterways to guide their spawning migrations (Tyus 1990a, Muth et al. 2001). Wastewater discharge or surface runoff that enters the Little Snake system directly or via groundwater as a result of the Atlantic Rim project would alter the chemical signature of the water; this must not be allowed.

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Existing threats are dwarfed by the specter of coalbed methane development of the type proposed in the Atlantic Rim project, if wastewater were to be discharged at the surface which could eventually make its way into waterways. Coalbed methane wastewater is typically saline and full of trace elements toxic to fishes. These pollutants can not only kill fishes directly but also can fundamentally change the chemical signature of the water, impairing the homing ability of fishes and preventing them from successfully completing spawning migrations. The sediment load of the Little Snake is critically important to the viability of Sensitive and Endangered fishes; the addition of sediment-free groundwaters would dilute the natural turbidity of the system, with potentially disruptive effects. Temperature regimes also are critical to survival of these fishes; the pumping of millions of gallons of cold groundwater into the Muddy Creek system could have disastrous effects that cascade downstream into the Little Snake and Yampa Rivers. Finally, the low flows and wide disparity between spring flows and base flows are what keeps the Little Snake free of non-native fishes that threaten the survival of Sensitive and Endangered species, and an increase and steadying in flow amounts could lead to the invasion of this last bastion of native fishes by non-native competitors and predators. Thus, the surface discharge of coalbed methane wastewater (throughout the ARPA) must be strictly prohibited in the Little Snake watershed.

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#### VEGETATION

Across the ARPA, some 6% of the landscape will fall under the bulldozer blade. DEIS at 4-48. Assuming that vegetation in a 300-foot buffer around roads and wellpads would be impacted by dust from traffic, an additional 20-35% of the usable forage in the project area would be lost. Id at 4-48, 4-49. The direct impacts to sagebrush habitat types are obvious: The vegetation along roads and wellpads would be destroyed, and adjacent habitat fragmented, for the 30-50 year life of the project, and shrub cover would not return for at least 20-50 years for basin big sagebrush, 40-50 years for mountain big sagebrush; and 50-150 years for Wyoming big sagebrush. These figures represent minimum estimates because they are based on sagebrush recovery after fire, which does not disturb the soil and in fact fertilizes the soil with a flush of post-fire nutrients; by contrast, post-disturbance reclamation scarifies and then attempts to return the topsoil (after a long period of time, during which soil microflora often die, reducing the fertility of the topsoil).

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#### *Sand Dune Habitats*

The sand hills area of the ARPA falls within an ACEC established to protect this sensitive resource from degradation. Bury and Luckenback (1983) observed that "[d]unes often lack adjacent or nearby colonization sources and much of the biota may be endemic" (p.218). Maxell (1973) noted that kangaroo rats in the Red Desert are restricted to sand dune communities. According to the USGS (1996a), "The highest priority should be given to protecting vegetated dunes, active sand dunes, forest-dominated riparian, shrub-dominated riparian and grass-

671-66-1

dominated wetlands and riparian areas because their current protection is minimal and because they are potentially the most vulnerable to ongoing land management practices." These researchers examined lands protection from an ecological standpoint, but it is also important to protect treasured wildlands from a social and recreational standpoint, to save these outstanding landscapes for future generations. BLM admits that these sand dune areas, both stabilized by vegetation and not stabilized, are noted for "the difficulties they pose for development and reclamation," and that "[t]he potential to increase wind erosion and destabilize the loose sands is very high." DEIS at 4-50. For the Atlantic Rim project, this area should therefore be put under "No Surface Occupancy" restrictions as a Condition of Approval for the individual wells.

*Riparian Areas*

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Riparian areas are of critical importance in a biological sense, due to their high productivity and diversity of life forms. Riparian areas are important corridors for the movements of animals and dispersal of plants, and the high diversity of microsites and the complex, high-frequency disturbance related to flooding and channel movements leads to greater species diversity in riparian areas over upland sites (Gregory et al. 1991). Franzreb (1987) observed that riparian habitats are centers of bird diversity and abundance in ecosystems throughout the West. According to Bock et al. (1993b), "Migratory landbirds inhabiting riparian vegetation in western North America are particularly vulnerable to disturbance" (p. 299). In Wyoming, 19% of reptile species, 55% of amphibians, 21% of birds and 20% of mammals are dependent on riparian habitats (Gerhart and Olson 1982). Thus, riparian areas of high biological concern should receive special protection under the Atlantic Rim Project.

Riparian vegetation is an important source of nutrient inputs to aquatic ecosystems, provides shade, and filters sediment and debris from entering stream systems (Kauffman and Kreuger 1984). Riparian vegetation causes soil aggradation (buildup) and raises the water table, which can turn intermittent streams into permanently flowing streams (Elmore and Beschta 1987). Thus, the maintenance of riparian habitats is also key to maintaining fully functioning aquatic systems.

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The maintenance of natural hydrographic patterns and processes is crucial to maintaining riparian communities. According to Ohmart (1996), "Natural floods play a vital role in the functioning and health of riparian systems" (p. 249). How will project-related activities with the potential to alter streamflows or retard flooding impact riparian areas? How many miles of roads and how many wellpads will be sited on 100-year floodplains or in other areas that affect riparian function? These questions must be answered to satisfy NEPA "hard look" requirements.

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**WATER RESOURCES**

BLM notes that a series of "Best Management Practices" will be required under the Proposed Action and Alternative B to mitigate the impacts of the project to surface waters. See DEIS H-6. The Oxford English Dictionary defines "best" as "of the highest excellence; excelling all others in quality." The BMPs for the Proposed Action and Alternative B are, however, inferior in their effectiveness to mitigation measures presented in Alternative C. See DEIS at 4-42. Therefore, the Proposed Action mitigation measures cannot qualify as "Best Management Practices," but rather might more accurately be called "Mediocre Management Practices," "Minimal Management

Practices," or "Standard Management Practices." Calling such mitigation measures "BMPs" appears to be a deliberate attempt to pull a fast one over on the public and is dishonest; the public deserves better integrity from its public servants.

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BLM notes that Muddy Creek is listed as a 303(d) waterway by the state of Wyoming, and that the Proposed Action and Alternative B would result in impairment or threats of impairment to this waterway. DEIS at S-4. This stream is impaired under the Clean Water Act. A Total Maximum Daily Load (TMDL) must be established for this stream, and the BLM must then comply with the TMDL.

671-67-2

The EIS notes that in the Proposed Alternative, all CBM wastewater would be injected underground, except for a "closed system with limited use of livestock and watering systems" and "offsets for current artesian water sources." DEIS at 2-2; see also *Id.* at 2-8,9. It is unclear from the DEIS what either of these two exceptions would consist of in terms of additional infrastructure, where the water would end up, and how much water would be diverted from injection throughout the life of the project. The BLM must disclose how much (if any) of the water from these "closed systems" will end up in streams or groundwater in the ARPA

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The groundwater quality of the Mesa Verde formation (the primary coalbed methane target) has an SAR of over 47, well above the agricultural limit of 8. DEIS at 3-56. We would also expect water of this salinity to destroy warmwater fish populations (including BLM Sensitive Species) in Muddy Creek, Wild Cow Creek, and other waterways within the ARPA. Thus, it is absolutely imperative that no CBM wastewater or solutes therefrom be allowed to leak into the watersheds of the ARPA. Injection should be mandatory for all projects, including the Cow Creek POD (with some allowable exceptions for watering facilities that are engineered to a level that can be guaranteed to prevent leakage).

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BLM classifies stream waters in the ARPA as Class S2 for salinity purposes at present, meaning that these waters are sufficiently saline to cause clay particles to swell in irrigated soils, reducing water infiltration. DEIS 3-43. An exception is Separation Creek, which is classified as S1. DEIS at 3-45. Salinification would also apply to flood situations where these waterways spill over the banks, and could impact the topsoils of floodplain areas. What are the potential effects of wastewater (particularly from the Cow Creek Pod, where surface discharge will be increased under this project) on riparian vegetation? We are also concerned with increases in surface water salinity as a result of halogeton infestations. BLM notes that halogeton can increase salt loading into surface stream systems, because its foliage exudes salts. DEIS at B-11. How many tons per day of salt would be input into the stream systems of the ARPA as a result of increasing halogeton infestations?

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The wellpad for well 12-8 (presumably along Cow Creek) is located closer than 500 feet away from the Dry Cow Creek channel, in violation of mitigation measures. How many wells will be sited in violation of mitigation measures required under the Atlantic Rim project? What will the BLM do about these violations? Is there any hope at all to achieve compliance on a 2,000-well scale, when the BLM cannot achieve compliance with a small pilot project of several dozen wells? A list of enforcement resources that will be applied throughout the life of the project as

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well as a list of punitive/corrective actions that will be applied to violators is needed if the reader of the Atlantic Rim EIS is to have any idea how often the requirements of the Atlantic Rim project will be followed.

BLM has noted in the central PODS, "some of the well heads are leaking." DEIS at 3-49. What are the impacts of leaking wellheads? How many of the 2,000 wells can be expected to leak, based on the data gathered from the exploratory PODS? How will leaking wellheads be brought into compliance, and what resources are available (in terms of manpower) to ensure that these problems are monitored and corrected?

### ***Disposition of Produced Water, Cow Creek Pod***

The BLM notes that surface discharge at the Cow Creek Pod would be allowed to continue throughout the life of the project. DEIS at 3-49. This is unacceptable. BCA has brought the problems associated with surface discharge at the Cow Creek Pod to the BLM's attention several times prior to the issuance of the Atlantic Rim DEIS. I have personally visited this site not less than 10 times over the past three years, and despite the fact that BLM's EIS stated that the containment reservoir was sufficient to hold all CBM wastewater plus a 20-year flood event, the reservoir has been discharging salty wastewater into the stream channel below it in every single occasion I have visited the site. The result of this discharge is a buildup of salts and heavy metals on the streambed that is periodically flushed downstream, ultimately into Muddy Creek, a 303(d) impaired waterway under the Clean Water Act. Because the Atlantic Rim project will entail the construction of a wastewater gathering pipeline system linked to injection wells, Double Eagle must be required to hook up the Cow Creek Pod to this system and inject the wastewater from the exploratory project. Re-siting the Point of Compliance (POC) downstream to the confluence with Cow Creek is also unacceptable; the POC should remain ¼ mile downstream of the dam as originally permitted.

The BLM must prevent salt loading of the Colorado System under the Colorado River Compact. It is important to note that "[i]ncreased salt loading into the Colorado River System above background conditions" is a significance criterion for impacts to surface waters. DEIS at 4-24. This means that any increase in salinity is by definition a significant impact. Current discharges from the reservoir at the Cow Creek Pod are resulting in wet deposition of heavy metals and salts, which are then swept downstream into the Colorado River system by rainfall and snowmelt events. See photos, Attachment 11. These inputs of salt represent a net increase in salt loading, and therefore represent a significant impact. The BLM must consider in detail (and adopt) an alternative that requires the CBM wastewater from the Cow Creek Pod to be tied into the water gathering system and injected underground to prevent this unnecessary and undue impact.

In addition, the Colorado River interstate agreements impose strict limits on salt loading into the Colorado River system. The BLM has made no effort to measure and estimate the salt inputs downstream from the reservoir that serves the Cow Creek Pod. The agency must, as a part of the hard look process prescribed by NEPA, undertake such an analysis for the Cow Creek Pod, provide a scientifically defensible estimate of the annual salt loading from this source, and determine whether it is in compliance with interstate agreements regulating salt inputs into the

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671-68 Colorado River system. This analysis and findings should be published in the Final EIS for public review.

**Groundwater**

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671-69-2 We are concerned that the number of springs, seeps, and other surface water sources important to wildlife and aquatic ecosystems will be reduced by the dewatering of coal seams inherent to the project. BLM alludes to the fact that it will take approximately a thousand years to recharge (mostly) the aquifers of the ARPA following development. DEIS at 4-37. Indeed, discharges at impacted springs may not begin to increase until the year 3,000. *Id.* at 4-38. It is noted that supplementary water sources will compensate for water sources lost due to dewatering during the life of the project (estimated by BLM at 50 years at most). What springs, seeps, and surface streams will dry up or experience reduced flows after dewatering is complete and the project is shut down (i.e., during the 950 years of aquifer recharge)? What will be the surface water sources available to wildlife? What changes will occur in the distribution of wildlife habitat selection and changing habitat capabilities as a result of this project? What streams and wetlands will dry up, and what will be the impacts on the aquatic life and riparian systems that depended on them? These questions must be answered in detail in order to satisfy NEPA's 'hard look' requirements.

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671-69-4 BLM notes that the spatial distribution of coalbed methane wells changes the shape of predicted water drawdowns. DEIS at 4-25. Because the BLM has not undertaken to set the locations of the 1,800 CBM wells of the Atlantic Rim project, it cannot construct a valid model of the impacts to groundwater resources. The current model, which involves guesswork and assumptions about where the wells will be located, lacks scientific merit and cannot be relied upon as the "hard look" at impacts to groundwater resources. BLM itself notes that "[t]his model cannot be used to predict results at a localized scale and any attempts to do so would require additional data and additional modeling efforts." DEIS at 4-32. Because the magnitude of impacts to local streams, springs, and seeps fed by groundwater can only be evaluated on a localized scale, the groundwater model is useless. The BLM must acquire the additional data and undertake the additional modeling efforts so that NEPA's hard look requirements can be satisfied.

671-69-5 It is also surprising that the BLM has presented the groundwater model run on the old project boundaries, even as it explains that this model is no longer valid, and a new run of the model is needed based on the adjusted project boundary. DEIS at 4-25. The BLM has a responsibility to model the impacts of the alternatives at hand, and cannot rely on an impacts analysis for a discarded alternative to satisfy NEPA's requirements. The agency itself notes that the new model would likely show changes in impacts to springs and recharge periodicity. *Id.* This lack of current analysis betrays a sloppy EIS that was rushed out the door before it was ready for public distribution.

671-69-6 BLM notes that for many past oil and gas wells, casing failures have allowed pressurized groundwater to enter the wellbore and move around. DEIS at 4-32. How many of the wells drilled previously in the ARPA have had casings failures, as a proportion of total wells in the ARPA? We are not aware of such widespread casing failures in other parts of the state. Is there something unique about the geology/natural seismicity of the ARPA that leads to higher rates of casing failures? The DEIS assumes that the use of casings will prevent or minimize impacts of

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the Atlantic Rim Project to groundwater resources, and that no cross-contamination will occur. DEIS at 4-30. If the past performance of well casings (with the caveat that not all casing failures that lead to groundwater degradation will show up on the surface to be counted) is applied to the 2,000 wells of the Atlantic Rim project, how many casings failures can be expected from 2,000 wells? And what would be the resulting impact to groundwater aquifers? This information must be analyzed in order to satisfy NEPA's 'hard look' requirements.

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The BLM notes that there is an "Atlantic Rim EIS Ground-water Modeling Technical Support Document" as well as an "Atlantic Rim groundwater Technical Report." DEIS at 4-32. The BLM has the responsibility to append these documents to the EIS if they are to be relied upon to support the EIS analysis. NEPA does not allow an agency to take part of the analysis of the impacts of a major federal action and segregate it from an EA or EIS, where it cannot be scrutinized by members of the public (such as BCA) who wish to review and comment upon the analysis. It is particularly galling that the assumptions of this analysis are contained within the Technical Support Document; the public needs access to these assumptions in order to determine whether the assumptions are valid for the particular conditions found within the ARPA. If BLM fails to disclose these documents in the EIS, then it cannot legally be relied upon to support the agency's impacts analysis to groundwater resources.

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***Springs and Seeps***

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There is hardly any wonder that the BLM is unable to present any likelihood of impacts to particular springs and seeps, since impacts will be dependent on groundwater modeling, which is currently obsolete at best. More particularly, without knowing the location and pattern of CBM wells by alternative, the BLM is unable to even make an educated guess as to the magnitude of impacts to particular springs and seeps. It is important to note that springs and seeps are of the highest importance to wildlife. Sage grouse are drawn to springs and seeps for early and late brood rearing habitat. Other wildlife species rely on them as a source of water or for the important wetland and riparian habitat – more diverse and productive than surrounding lands – that accompany springs and seeps. For instance, how does the BLM know that CBM drilling will not occur in areas "updip to the coal seam subcrop" (See DEIS at 4-31) if the precise locations of wells have yet to be determined? This assumption is arbitrary and capricious. The BLM speciously concludes that impacts to springs and seeps are "unlikely," which hardly constitutes a quantification of impacts. The fact that BLM has left impacts to springs and seeps up to guesswork (relying on a groundwater model that is clearly inadequate, see DEIS at 4-31) is a particularly egregious violation of NEPA.

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***Wetlands***

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BLM acknowledges a "scarcity of wetland/riparian sites in the ARPA." DEIS at 4-47. Exactly where are these wetlands located, and how many would have wells or roads of the Atlantic Rim project built nearby? We are deeply concerned about the project's impacts to wetlands, and roads and wellpads should be sited at least a quarter mile from wetland areas. Additional measures should be applied to ensure that waste products or sediment are not discharged into wetlands from project-related facilities.

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**HISTORIC AND CULTURAL RESOURCES**

The BLM has failed to provide sufficient information on the impacts of the proposed project on historical and cultural resources. There are a total of 425 known cultural resource sites in the ARPA. DEIS at 4-108. According to the Draft EIS, there are 136 known sites that are eligible for the National Register of Historic Places (NRHP), and an additional 144 sites that are known but for which eligibility has yet to be determined. See DEIS at 3-97. In addition, other sites, heretofore unknown, may be uncovered and be determined to be eligible for the NRHP. Only 20% of the ARPA has received a Class III inventory as of 2003. DEIS at 4-108.

The BLM notes that the Proposed Action will likely result in direct disturbance by the bulldozers as well as indirect effects through erosion, removal of vegetation, and increased looting. DEIS at 4-110. But the agency makes not attempt to quantify how many of the known sites eligible or potentially eligible for NRHP designation will be impacted either directly or incur degradation of their settings as a result of the project. This despite the fact that their locations are known. If BLM has done its job and planned the layout and design of this project, the agency would be in a position to take the 'hard look' at impacts to these sites as required by NEPA. But the agency has failed in this obligation. In addition, the BLM makes no attempt even to estimate the number of as-yet-undiscovered sites likely to be impacted by this project. The agency has noted areas (sand deposits, areas near springs, certain valleys) likely to have the highest archaeological values and most sensitive resources. But once again, the agency has failed to map the project impacts against these sensitive areas, preventing it from making these estimates.

In addition, the Overland and Cherokee Trails are not only eligible for the NRHP, but they are also eligible and candidates for designation as National Historic Trails. There also may be old stage station ruins, such as the Washakie and Sulphur Springs stage stations, along the Overland Trail that fall within the ARPA. BLM has set aside a quarter-mile buffer around these trails to be excluded from surface disturbance. DEIS at 4-108. But BLM notes that the setting extends for two miles on either side of these trails, and notes that larger areas may be important to the setting. *Id.* The BLM notes that for hgistoric trails and associated sites, "actions resulting in the introduction of visual elements that diminish the integrity of the property's significant historic features would be a factor." DEIS at 4-110. Thus, this measure is insufficient to protect the settings of these trails. The viewshed of these trails would still be cluttered with industrial development, significantly degrading their settings in violation of the NHPA.

**PALEONTOLOGICAL RESOURCES**

The ARPA contains outcrops of the Paleocene Fort Union formation, representing the most important fossil record for the dawn of the age of mammals in the world. J. Lillegraven, pers. comm. We incorporate by reference the comments of Dr. Jason Lillegraven on the Atlantic Rim Draft EIS into these comments by reference. The Draft EIS contains insufficient information on the fossil resources present in the ARPA. What are the Probable Fossil Yield classifications for the ARPA? Which lands are in Paleontology Condition 1 or 2? These are important questions given that proposed mitigation measures in Alternative H are tied to these classifications. How many acres of surface disturbance will occur in sensitive outcrop areas? The BLM will need to map and plan the location of all project facilities to answer this question and thereby complete the "hard look" required by NEPA. Do Jurassic outcrops have the potential for important

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dinosaur finds? Certainly, Como Bluff has been an important repository for such fossils. Additional information, and a more detailed mitigation plan, are needed for this EIS.

**RECREATION AND SPECIAL MANAGEMENT AREAS**

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The BLM notes that the cumulative impacts of the Atlantic Rim project "are likely to affect at least two generations by making the area less desirable for hunters, wildlife viewers, and other recreationists." DEIS at 5-19. In addition, with regard to visual resources, "the CIA [Cumulative Impacts Area] is not likely to return to its predisturbance character for up to 80 years." DEIS at 5-19. The ARPA is home to a number of special landscapes that because of their scenery, wildlife attributes, or other unique features are important recreational resources. The three action alternatives proposed by BLM for this project fail to provide adequate protection for recreation resources.

***Sand Hills ACEC***

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The Sand Hills ACEC is designed "to protect the unique vegetation complex, maintain wildlife habitat values, minimize soil erosion, and promote recreational opportunities." Great Divide RMP. BLM also notes that sand deposits and sand sheets of the type found in the Sand Hills have a heightened archaeological sensitivity. DEIS at 4-108. The proposed action will accomplish none of these goals, and therefore may not be applied to the Sand Hills ACEC. Even Alternative C, with its "limitation" of road density to three miles per square mile (an insanely dense layout for a sensitive landscape) would fail to meet these criteria. The BLM must provide a thorough analysis disclosing how proposed mitigation measures would allow this project to become compatible with the ACEC's directives. The final decision must require much more stringent protections if it is to comply with the Great Divide RMP.

***Jep Canyon ACEC***

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Portions of the Jep Canyon ACEC fall within the ARPA. This is an established ACEC under the Great Divide RMP, and could reasonably be maintained as an ACEC in the new Rawlins RMP, yet Jep Canyon is not mentioned in the Special Management Areas section of the Draft EIS. See DEIS at 3-119. This ACEC was established to "maintain the integrity of crucial winter habitat for elk, to maintain the productivity of nesting raptor pairs, to allow for development of oil and gas and coal, and to seek the cooperation of owners of adjacent property in management of the habitat." Great Divide RMP. The proposed intensity of development in the Atlantic Rim project will neither maintain the integrity of elk crucial habitat nor maintain the productivity of nesting raptor pairs. The BLM must develop special mitigation measures for the Jep Canyon ACEC. These should include (at minimum) no surface disturbance within one mile of raptor nests and no surface disturbance on crucial winter range, for all BLM-administered lands and minerals.

***Wild Cow Creek Citizens' Proposed Wilderness***

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The Wild Cow Creek citizens' proposed wilderness is known for its rugged scenery, solitude, abundant wildlife, and outstanding opportunities for hiking, hunting, backpacking, and horseback riding in a primitive setting. Its visual resources are the most important visual resources in the ARPA, and its undeveloped state is unique among lands with public access along the Atlantic Rim uplift. BLM has recognized this area as one "of the most heavily hunted portions of the ARPA." DEIS at 4-98. We incorporate by reference into these comments *A Citizens' Wilderness*

Inventory of *Wild* Cow Creek, submitted to the Rawlins Field Office of the BLM in June 2002, which documents with numerous photographs the wilderness qualities and lack of disqualifying intrusions in this unit.

The area is dominated by two deep canyons incised into the sloping sagebrush steppes, Deep Gulch and the canyon of Wild Cow Creek. A sparse mantle of vegetation covers the canyon walls, through which reddish sedimentary strata protrude in the steeper areas. In the upper reaches of each watershed, the canyons branch out onto a maze of draws, basins, and ridges. Here, islands of aspen and serviceberry dot the sagebrush steppe, particularly on north-facing slopes. Wildflower displays in May and June are so outstanding that a neighboring drainage was named "Garden Gulch." Elevations within the proposed wilderness range from a low of 6,520 feet to a high of 7,929 feet atop Cow Creek Butte. Snowdrifts persist at the heads of north-facing draws into June even in dry years, recharging aquifers that feed numerous springs and permanently-flowing stretches of stream throughout the area.

Wildlife abound in the proposed wilderness, an astonishing diversity of mammals, birds, and fishes once common throughout Wyoming's sagebrush deserts but now largely absent from most landscapes. The area offers calving/fawning grounds for elk, mule deer, and pronghorn antelope, and most of the area is considered Crucial Winter Range by the Wyoming Game and Fish Department. The high ridges and draws form important migration corridors for game animals moving between parturition areas and winter ranges. Sage grouse are abundant on the uplands above the rims. Several active prairie dog colonies are found along the floodplains of both Deep Gulch and Wild Cow Creek. Permanent streams and springs provide habitat for native fish species that are growing increasingly scarce statewide. Raptors, including northern harriers, golden eagles, merlins, and ferruginous hawks, find ideal nesting opportunities along the canyon walls and atop the high rims. The eastern half of the unit falls within the Grizzly Habitat Management Unit, managed by the Wyoming Game and Fish Department for big game and sage grouse.

Mass movement (landslides) are likely on the steep slopes that typify the Wild Cow Creek citizens' proposed wilderness, and the BLM has itself documented a landslide on the slopes of Cow Creek Butte, at the north edge of the proposed wilderness. DEIS at 3-9. BLM notes that the valleys of Wild Cow Creek and Deep Creek are "sensitive areas" from the standpoint of archaeological resources. DEIS at 4-108. Thus, the sensitivity of this area goes beyond its wilderness, recreational, and wildlife values.

Maps of projected water drawdowns for the Atlantic Rim project appear to indicate that dewatering (and therefore production) activities will be concentrated to the west of the Wild Cow Creek proposed wilderness unit. DEIS at M-36, M-37. If it is truly the case that the citizens' proposed wilderness lies outside the fairway of CBM production, then there is no reason for the BLM to include this undeveloped area within the project boundaries.

The BLM's impact analysis on recreation fails to note the roadless values of the Wild Cow Creek citizens' proposed wilderness as well as its importance to primitive and unconfined recreation. See DEIS at 4-95. In fact, BLM's analysis of recreation focuses on motorized recreation, scenic

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driving, and hunting, with essentially no recognition of the importance of the primitive, essentially no analysis of impacts to the primitive recreation opportunities found in the Wild Cow Creek citizens' proposed wilderness. BLM's letter of May 15, 2003 in response to our Citizens' Wildemess Inventory of Wild Cow Creek failed to acknowledge the wilderness qualities of the proposed unit, but the map did confirm that it is in fact roadless under BLM definitions. See Attachment 12. We incorporate this letter into these comments by reference. BLM's map accompanying this letter shows clearly that there are only two-tracks in this proposed unit, with no improved roads. BLM has a formal "roadless" category in its official policies, which is defined as follows:

roadless: for the purpose of the wilderness review program, this refers to the absence of roads which have been improved and maintained by mechanical means to ensure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road

BLM Manual H-8550-1 at Glossary, page 3. The same document states that a route maintained solely by the passage of vehicles (e.g., a two-track) is considered a way under the BLM's roadless definition, and does not impair roadless qualities. *Id.* The Wild Cow Creek unit does in fact qualify as "roadless" under the BLM's official definition, and these roadless resources must be protected, and impacts to them should have been studied in detail in the Draft EIS. BLM's failure to do so constitutes a violation of NEPA.

This area is the best remaining example of the transitional uplands that form the ecotone between the Red Desert ecosystem and the forest ecosystem of the Sierra Madre Range. As such, it fills an important gap in ecosystem representation within the National Wildemess System. The BLM must protect this area from industrial development under the Atlantic Rim project, and the project area boundary should be amended to exclude this important area.

#### VISUAL RESOURCES

Although most of the ARPA is only listed as a Visual Resources Class III area under the Great Divide RMP, impacts to visual resources under both the Proposed Action and Alternative B would exceed the management objectives allowed under VRM Class III and result in significant impacts. DEIS at 2-17. The level of change to the landscape should be moderate, and management activities "may attract attention but *should not dominate the view of the casual observer.*" DEIS at 4-99, emphasis in original. It is clear that with the advent of 2,000 wells and 1,000 miles of new high-standard roads, the existing character of the landscape will not be even partially retained, and the view of the casual observer will be dominated by CBM developments in all developed areas. BLM states, "The appearance of gas development at 80-acre spacing would create unavoidable contrast with natural landscapes in the ARPA, especially in tracts of continuous vegetation." DEIS at 4-102. The level of change from the existing landscape would be extreme, not moderate. The end result of the implementation of this project will, in fact, be to completely industrialize the project area beyond all recognition. BLM further noted for the Proposed Action, "This level of contrast exceeds the maximum allowable in VRM Class III (96 percent of the ARPA)..." DEIS at 4-104. A similar level of impact is found under Alternative B. *Id.* While the BLM wisely recognizes this fact, fulfilling NEPA "hard look" requirements with

671-78-3 regard to VRM, the implementation of the Atlantic Rim project violates the provisions of the Great Divide RMP and is therefore non-compliant with FLPMA.

671-78-4 The Affected Environment section on Visual Resources focuses on visual resources as seen from county roads. See DEIS at 3-91, 4-102, 103. However, the most important visual resources from BCA’s perspective are the roadless and undeveloped landscapes of the Wild Cow Creek citizens' proposed wilderness. The presence of reliable water sources and absence of high-standard roads or wells in this area makes it one of the few places in the Red Desert where multi-day backpacking is feasible without carrying heavy water supplies. The visual resources in this quasi-backcountry area (penetrated by a number of jeep trails that are essentially unused except during the hunting season) are of paramount importance; impacts to them must be prevented, or at least analyzed in detail.

CONCLUSION

671-79-1 We appreciate the opportunity to comment on the 2,000-well project proposed by the BLM in the Atlantic Rim project area. The current Atlantic Rim Draft EIS fails to provide the hard look at direct, indirect, and cumulative environmental impacts, and fails to consider a range of reasonable alternative (conspicuously absent is an alternative that would minimize environmental impacts and provide for multiple use within the ARPA). In particular, we support the requirement for underground injection of wastewater, but the following mitigation measures are crucially absent from the Proposed Action:

- Reducing the well density through directional drilling or other means to minimize the footprint of the project;
- Preventing surface disturbance in sensitive wildlife habitats (within 1 mile of raptor nests, within 3 miles of sage grouse leks, within 1 mile of sharp-tailed grouse leks, on crucial winter ranges and prairie dog colonies)
- Removing the Wild Cow Creek citizens' proposed wilderness from surface disturbing activities;
- Providing greater protection for cultural and historical sites, including stronger protection for the settings of NRHP sites and historic trails; and
- Strengthening mitigation measures to minimize the impacts of CBM wastewater discharge from the Cow Creek Pod and minimize the impacts of surface runoff throughout the ARPA on water quality and aquatic ecosystems;

671-79-7 If CBM development is to go forward at all, we urge the BLM to make radical changes to the current Proposed Action so that the project is done right, limiting drilling to contexts where it is compatible with protecting wildlands, wildlife, and public recreation. All reports attached or referenced are incorporated by reference into these comments; please respond to these studies as part of your efforts to maintain the scientific integrity of the NEPA process in the forthcoming Final EIS. Please keep us informed of all future developments in regard to this project. But until further analysis is performed, the sole legal alternative available to the BLM for implementation is the "No Action" alternative.

Sincerely yours,



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*Signing on behalf of*

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2. Wight, D. 2004. Horizontal drilling adds value in CBG. American Oil & Gas Reporter.
3. Ghiselin, D. 2003. Unconventional vision frees gas reserves. Hart's E & P Natural Gas Quarterly.
4. Reservoir Management Services, Inc. 2004. Jonah Infill Drilling Project evaluation of directional drilling.
5. Comments on the use of directional drilling to minimize surface disturbance in the Jonah Infill Drilling Project and on the content of Jonah Infill Drilling Project evaluation of directional drilling.
6. Map of Double Eagle Petroleum full-field layout under the Atlantic Rim project.
7. Berger et al. 2006. Wildlife & energy development: Pronghorn of the upper Green River basin – Year 1 summary. Wildlife Conservation Society, 51 pp.
8. Comments of Wyoming Outdoor Council et al. on the Jonah Infill Drilling Project
9. Longwell, J., and G. Hertzler. 1997. Closed-loop system as a cost-effective alternative to reserve pits. Proceedings of the symposium Advances in drilling technologies in the North American Rockies, Denver, CO April 28, 1997.
10. Holloran, M.J. 2005. Greater sage-grouse (*Centrocercus urophasianus*) population response to natural gas field development in western Wyoming. PhD Dissertation, Univ. of Wyoming, 221 pp.
11. Photographs of CBM effluent from the Cow Creek Pod.
12. Map from BLM response to *Citizens' Wilderness Inventory of Wild Cow Creek*.

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