Drilling in the Rocky Mountains: How Much and at What Cost?

Pete Morton, Ph.D.
Senior Resource Economist
The Wilderness Society
Denver, CO

Chris Weller
GIS Specialist
The Wilderness Society
Seattle, WA

Janice Thomson, Ph.D.
Landscape Scientist
The Wilderness Society
Seattle, WA

Michelle Haefele, Ph.D.
Economic Research Associate
The Wilderness Society
Denver, CO

Nada Culver
BLM Legal Analyst
The Wilderness Society
Denver, CO

Introduction

The Wilderness Society is a 200,000-member national conservation group that focuses on public land management issues. Wilderness Society scientists conduct energy research and regularly present the results at congressional hearings and other forums. Our research is guided by the need to examine the explicit and implicit assumptions that underlie the National Energy Plan unveiled by the Bush administration in May 2001. Among other things, the plan called for the opening of additional public land in western states to gas and oil drilling and required a review of lease stipulations that protect fish and wildlife. Executive Order 13212 required federal land management agencies to expedite their review of gas and oil drilling permits, and a new White House task force was established to oversee agency efforts to speed up the permitting process.

In this paper, we first define terms to establish economically recoverable energy resources as the policy-relevant measure in evaluating the energy potential of public lands. Next, we provide estimates of the amount of gas and oil in western wildlands, focusing on roadless areas in national forests and in national monuments administered by the Bureau of Land Management (BLM). We then explore 1) the costs to wildlife from energy development, specifically, habitat fragmentation; 2) the failure to enforce lease stipulations; 3) the damage to water quality and aquatic species associated with development of coal bed methane gas; 4) the hidden costs to the regional economy; and 5) the high risks of accelerated large-scale energy development in the absence of sufficient data and cumulative impact analyses. We conclude with recommendations for federal agencies to heed the risks to wildlife, regional economies, and the public that are posed by the administration's plans for large-scale drilling of public land in the Rockies.

Terminology

The debate over energy development on western public lands centers on drilling for methane (natural) gas, also the primary focus of this paper. Scientists at the U.S.Geological Survey (USGS) classify natural gas as conventional or unconventional, partially based on the technology used during extraction. Unconventional gas typically has higher production costs because it requires a significant degree of stimulation — hydraulic fracturing, for example — to attain sufficient levels for economically profitable production (EIA 2001a).

The two main unconventional gases are coal bed methane and continuous-type gas, commonly called tight sands gas. Coal bed methane is a form of natural gas trapped within coal formations, while tight sands gas is trapped in low permeability sandstone. In the Rockies, 92 percent of the undiscovered technically recoverable gas on federal land is unconventional gas, primarily tight sands gas (USDOI and USDOE 2003). There is a clear distinction between discovered gas reserves — known to be both technically and economically recoverable — and undiscovered gas resources that are not yet proven to be either technically or economically recoverable. This distinction is important, given the current pressure to develop the higher risk, undiscovered resources on public wildlands.

To estimate quantities of undiscovered resources, USGS makes a distinction between gas in place, technically recoverable gas, and economically recoverable gas (Figure 1). Gas in place that is estimated to exist in sufficient quantities for recovery with current technology, but without regard to profit or extraction costs, is called technically recoverable gas. Technically recoverable gas that is estimated to be profitable to extract is called economically recoverable gas. The costs that USGS uses to assess economically recoverable gas and oil include the direct costs of exploration, development, and production at the wellhead, plus a profit margin (Root et al. 1997, Attanasi 1998). To account for the uncertainty inherent in price forecasts, USGS uses a range of prices, rather than a single-point estimate. USGS estimates do not include infrastructure costs, the costs of transporting the gas to market, non-market costs such as loss of local economic benefits from lower quality hunting, fishing, and camping experiences, or off-site mitigation costs like increased water treatment costs. If USGS included these hidden costs, the estimated amount of economically recoverable gas in the Rockies would be lower.

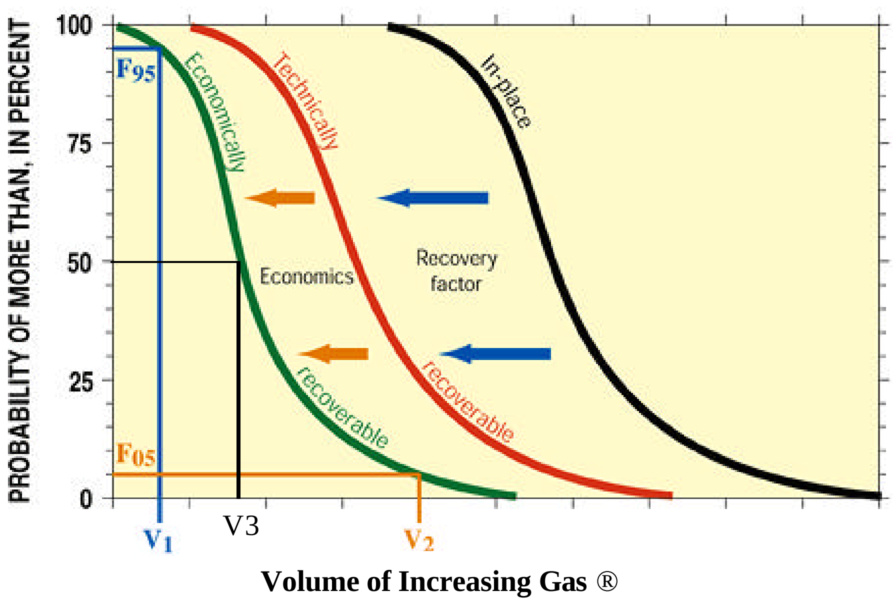

Figure 1. Gas volumes and probabilities for estimating undiscovered quantities. There is a 95% chance of at least V1 of economically recoverable gas, and a 5% chance of at least V2 of economically recoverable gas. Adapted from the U.S. Geological Survey 2001.

Estimating the Opportunity Costs of Protecting Wildlife Habitat.

The opportunity cost of a policy or action that protects wildlife habitat equals the net benefits that are foregone as a consequence of that policy or action. With respect to energy policy, the opportunity cost to protect critical wildlife habitat or native fisheries is the amount of economically recoverable gas that is foregone as a result of such actions — *not* the amount of gas that is technically recoverable. As recommended by the Congressional Research Service (Corn et al. 2001), economically recoverable resources should be the basis of policy analysis. If economic constraints on gas production are ignored, resource assessments will overestimate the quantity of gas that is potentially off limits because of its location in a migratory corridor or roadless area.

USGS estimates that less than 20 percent of technically recoverable gas in the Rockies is economically recoverable when prices (adjusted to 2001 dollars) are between $2.30 and $3.90 per thousand cubic feet (mcf) (Table 1). Before recent price spikes, $2.00 per mcf was viewed as the long-term price for natural gas (EIA 2001b). Current projections suggest that natural gas wellhead prices will decline from the high levels of 2003 (around $5 per mcf) to $3.40 per mcf (2002 dollars) in 2010, then rise to $4.40 per mcf in 2025 (EIA 2004). The price projected in 2010 is slightly lower, while the price projected in 2025 is slightly higher, than the USGS high price scenario. As with any long-term price forecast, uncertainty is large. If actual prices are higher (lower) than the USGS high price scenario, the amount of gas economically recoverable is likely to increase (decrease) from our estimates cited here.

Table 1. Economic recovery rates for technically recoverable gas in the United States based on prices of $2.30 and $3.90 (2001$) per thousand cubic feet (mcf).

Region	USGS Economic recovery rates[a]
United States	38 – 46%
Rockies and Northern Plains	13 – 18%
Southwestern Wyoming	1 – 5%

[a] Percent of technically recoverable gas in reserves and gas left undiscovered that is profitable to extract (before accounting for environmental-related costs). Excludes recovery rates for offshore gas.
Sources: Root et al. 1997, Attanasi 1998, and LaTourrette et al. 2002.

Drilling the Rocky Mountains: How Much Gas?

In January 2001, The Wilderness Society assessed the energy potential on western federal lands (Morton 2002a). We used government data (USGS 1996a, Attanasi et al. 1998) to complete a geographic information system (GIS) analysis of the overlap between the boundaries of 200 gas and oil plays and the boundaries of western wildlands (Figure 2). We focused our analysis on national forest roadless areas in six Rocky Mountain states (Montana, North Dakota, Wyoming, Utah, Colorado, and New Mexico) and in 15 national monuments managed by the BLM in Oregon, California, Idaho, Utah, Montana, Colorado, New Mexico, and Arizona. We used USGS (1996a) mean estimates of technically recoverable gas and oil because we believe that USGS estimates represent the best, unbiased estimate available. We developed economic recovery rates based on cost functions for gas-oil provinces (Root et al. 1997, Attanasi 1998) and reported our results using both a high and low price scenario. For details, see Morton et al. (2002a).

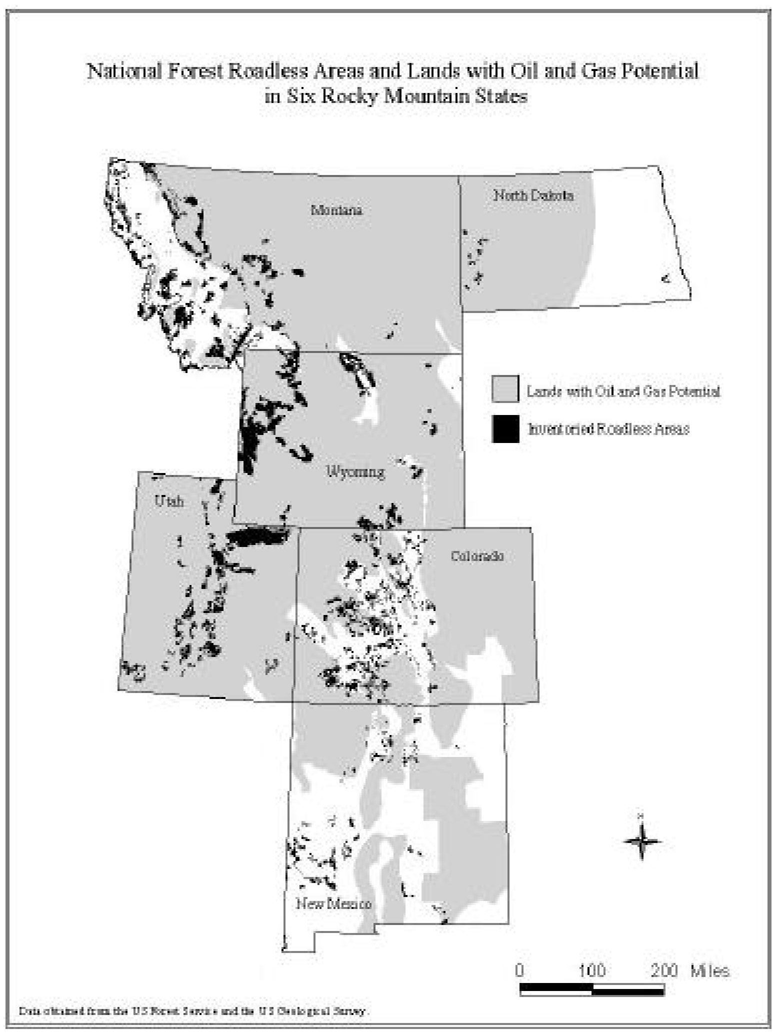

Figure 2. Potential gas and oil resources and roadless areas in six Rocky Mountain states. National forest roadless areas account for less than 4 percent of the land that has gas and oil potential.

Using the USGS low-end and high-end prices, we found that national forest roadless areas in the Rockies contain approximately 3.9 trillion cubic feet to 4.9 trillion cubic feet of economically recoverable gas (Table 2), or 48 percent to 59 percent of the technically recoverable gas in the roadless areas.

Table 2. Estimates of gas and oil in national forest roadless areas in six Rocky Mountain states[a]

Resource	Economically recoverable Quantity	Economically recoverable as % of technically recoverable	Economically recoverable in relation to total U.S. consumption
Conventional gas	3,223 – 3,665 billion cubic feet	74% – 84%	52 – 59 days
Tight sands gas	199 – 285 billion cubic feet	8% – 11%	3 – 5 days
Coal bed methane gas	500 – 943 billion cubic feet	41% – 77%	8 – 15 days
Total Gas	3,922 – 4,893 billion cubic feet	48% – 59%	63 – 79 days
Oil and natural gas liquids	410 – 478 million barrels	69% – 81%	21 – 24 days

[a] Montana, North Dakota, Wyoming, Utah, Colorado, and New Mexico

The roadless areas contain approximately 410 million to 478 million barrels of economically recoverable oil, or 69 percent to 81 percent of the technically recoverable oil. National forest roadless areas in Wyoming and Colorado contain the majority of economically recoverable gas and oil, much of which is located in Bridger-Teton National Forest south of Jackson Hole, Wyoming, and San Juan National Forest near Durango, Colorado. Based on total demand for gas and oil in the United States and on current energy consumption rates, economically recoverable gas in the roadless areas would meet total U.S. gas consumption for 2-2.5 months. Economically recoverable oil in the roadless areas would meet total U.S. oil consumption for 21-24 days. Obviously, the gas would be produced over a much longer period of time, but these estimates provide an indication of the relatively small amount of economically recoverable gas and oil in national forest roadless areas.

The 15 national monuments contain less than 15 days of oil and 6 days of gas. Even this small amount is overestimated, however, because spatial inaccuracies in the GIS layer make it impossible to separate energy resources under ocean waters adjacent to the California Coastal National Monument. If a more accurate boundary were used, the amount of gas and oil in the California Coastal National Monument as well as the total for all monuments would drop dramatically.

Additional analysis of government data indicate that across the country, development of undiscovered gas and oil resources on federal lands — national parks, national forests, lands managed by BLM, and national wildlife refuges (including the Arctic National Wildlife Refuge) — would satisfy U.S. demand for gas and oil for less than 2 years (Attanasi 1998, Minerals Management Service 2001, Morton et al. 2002a). In contrast, the gas and oil supply already discovered in proven reserves, along with the expected growth of those reserves, is projected to meet U.S. demand for oil for 15 years and gas demand for 21 years (Attanasi 1998, MMS 2000). If we make strategic investments in energy conservation, energy efficiency, and alternative energy sources, the gas and oil in our proven reserves will last even longer.

Drilling the Rocky Mountains: At What Cost?

An economic analysis of recoverable gas must include a full accounting of the non-market costs in addition to those more readily observed and measured in market prices (Loomis 1993). Non-market costs include erosion, loss of wildlife and fish habitat, decline in quality of recreational experiences, proliferation of noxious weeds, and increased air and water pollution. While difficult to value in traditional monetary terms through standard cost-benefit analyses, these costs are nonetheless very real. Here we will focus on the costs associated with the loss and fragmentation of habitat associated with energy development.

Habitat Fragmentation from Drilling: The View from Above

Amos (2003) used historical Landsat satellite imagery to show the temporal development of the ecological footprint from gas drilling in the Jonah Field in Wyoming. Figure 3 shows undisturbed sagebrush and grassland habitat prior to drilling in 1986. In 1998, the BLM approved full field development of 497 wells to be drilled over 10 to 15 years, with a maximum drilling density of one well per 80 acres (8 pads per square mile). Figure 4 shows the same area in 1999 with 100 gas wells drilled and embedded in a web of access roads, waste pits, and pipelines that were clearly visible from space. In 2000, two years after the management plan was completed, BLM approved spacing of one well per 40 acres (16 pads per square mile). By 2002, nearly 400 wells had been drilled (Figure 5), approaching the maximum number projected in the 1998 management plan. By 2003 more than 500 wells had been drilled, and industry requested a plan revision allowing 1,250 additional wells from 850 new well pads, with well spacing of just 16 acres and a drilling density of 40 wells pads per square mile (Amos 2003).

Habitat Fragmentation from Drilling: Quantifying the Landscape Impacts

The satellite images illustrate the loss and fragmentation of habitat associated with drilling. Fragmentation of habitat is widely acknowledged as detrimental to many plant and wildlife species, including birds, but there are few studies that examine the exact size and extent of the ecological footprint of energy development. Spatial analysis can help fill this information gap.

In 2002, scientists at The Wilderness Society completed a habitat fragmentation analysis of the Big Piney-LaBarge oil and gas field in the Upper Green River Valley of Wyoming (Weller et al. 2002). The valley is home to at least 25 species listed as threatened or endangered, including the Bald Eagle (Haliaeetus leucocephalus), Mountain Plover (Charadrius montanus), Northern Goshawk (Accipiter gentilis) and Peregrine Falcon (Falco peregrinus), and it is wintering ground for elk (Cervus elaphus), pronghorn antelope (Antilocapra americano), and mule deer (Odocoileus hemionus) (BLM 2001).

As of 1990, the Big Piney-LaBarge gas field had a total of 1,864 drilled wells, of which 1,080 were still active (BLM 1990). The field has produced oil and gas in the past, but current production is primarily

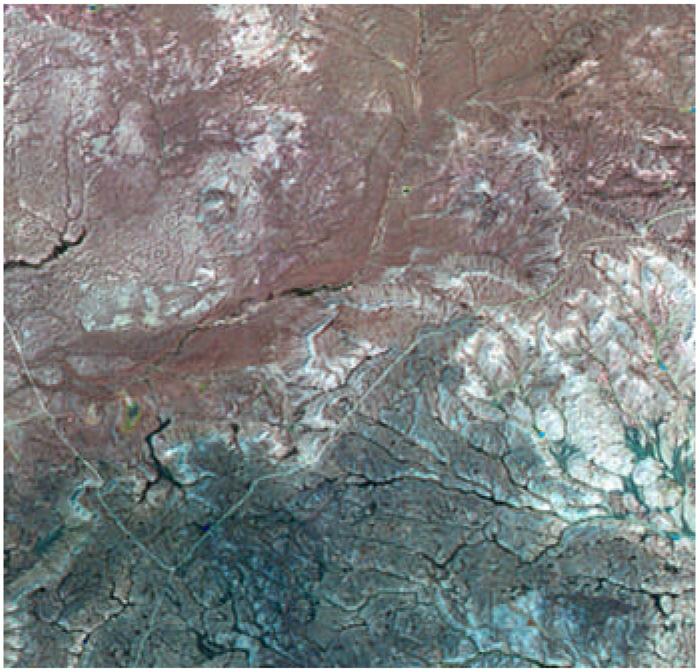

Figure 3. The area of the Jonah Gas Field in Wyoming, showing the undisturbed sagebrush and grassland habitat prior to drilling in 1986 (Credit: Amos 2003).

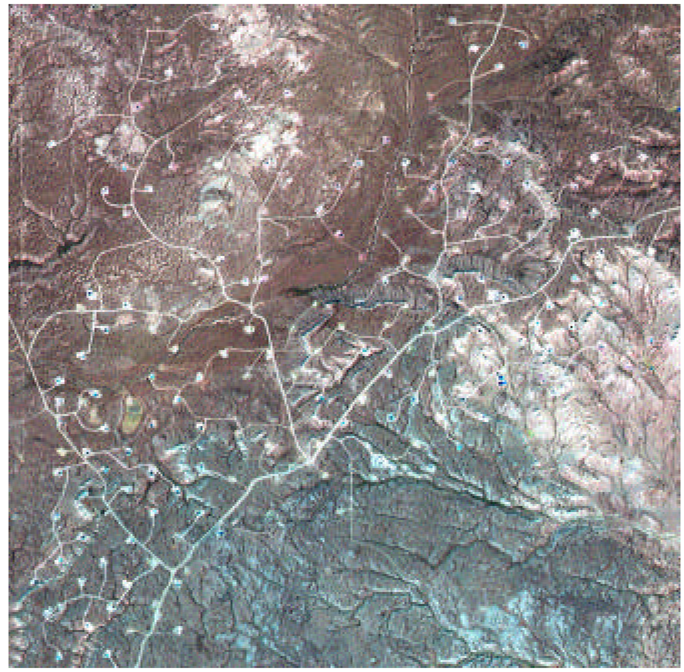

Figure 4. The Jonah Gas Field in 1999 after one year o full-field development at 80-acre spacing (8 well pads per square mile) using state-of-the-art drilling technology. The web of wells pads, access roads, compressor stations and waste pits is clearly visible. (Credit: Amos 2003).

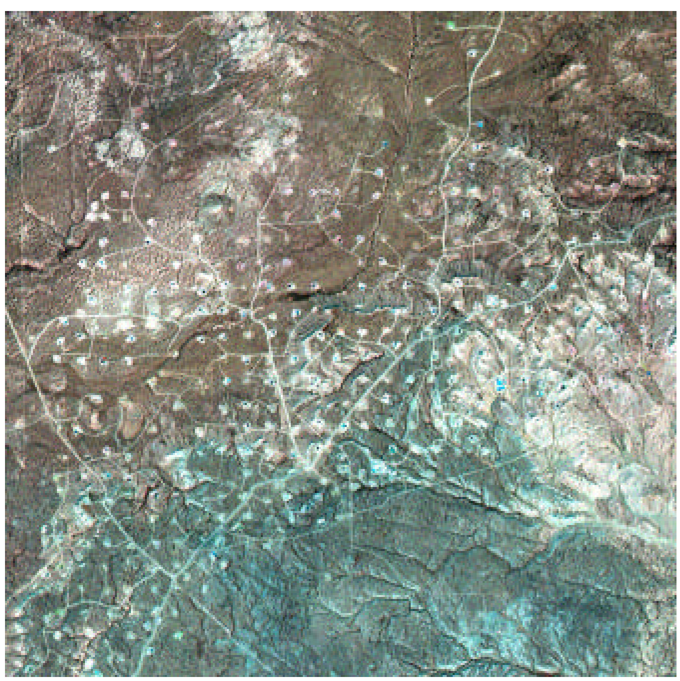

Figure 5. The Jonah Gas Field in 2002, after nearly 400 wells have been drilled at 40-acre spacing (16 well pads per square mile), approaching the maximum number allowed by the 1998 management plan. Industry is now asking for 1,250 additional wells from 850 new well pads, resulting in 16-acre well spacing (40 well pads per square mile) (Credit: Amos 2003).

tight sands gas. To complete our study, we generated infrastructure data through on-screen digitizing of 12 digital orthophoto quads, then quantified the degree of habitat fragmentation using three landscape metrics: linear feature density (primarily roads and pipelines), habitat in the infrastructure effect zone, and the amount of habitat in core areas (interior habitat that is remote from infrastructure). (See Weller et al. 2002 for more detail.)

Linear feature density

Linear feature density was calculated both as an average for the entire study area and as a series of one- $mile^2$ and four- $mile^2$ sampling windows across the landscape. Measuring density in sampling windows of different sizes provides an understanding of the variability of density across scales, which is important to gauge the effects on different species (Urban et al. 1987, Wiens and Milne 1989, Turner et al. 1994). For example, differences in dispersal distances among species cause them to respond to habitat features at different scales.

The overall area of oil and gas infrastructure (roads, pipelines, pads, waste pits, etc.) at Big Piney-LaBarge covers 7 $miles^2$ of habitat, or 4 percent of the study area (Figure 6). Our results indicate a direct physical footprint of 1,400 miles of linear features and 3.8 square miles of polygon features, resulting in an overall density of 8.43 miles of roads and pipelines per $mile^2$. This density is at least three times greater than road densities on national forests in Wyoming, South Dakota, and Colorado and is “extremely high” based on ratings in the Interior Columbia Basin Ecosystem Management Plan (Forest Service 1996).

Linear feature density estimates are scale dependent and vary across the study area, ranging from 17.1 miles per $mile^2$ to 0.9 miles per $mile^2$ (Figure 7). At all scales analyzed, most grid cells have a density between 3 and 6 miles per $mile^2$. Twenty-nine percent of the landscape in the one- $mile^2$ scenario, and 24 percent of the landscape in the four-$mile^2$ scenario, have linear densities of more than 6 miles per $mile^2$.

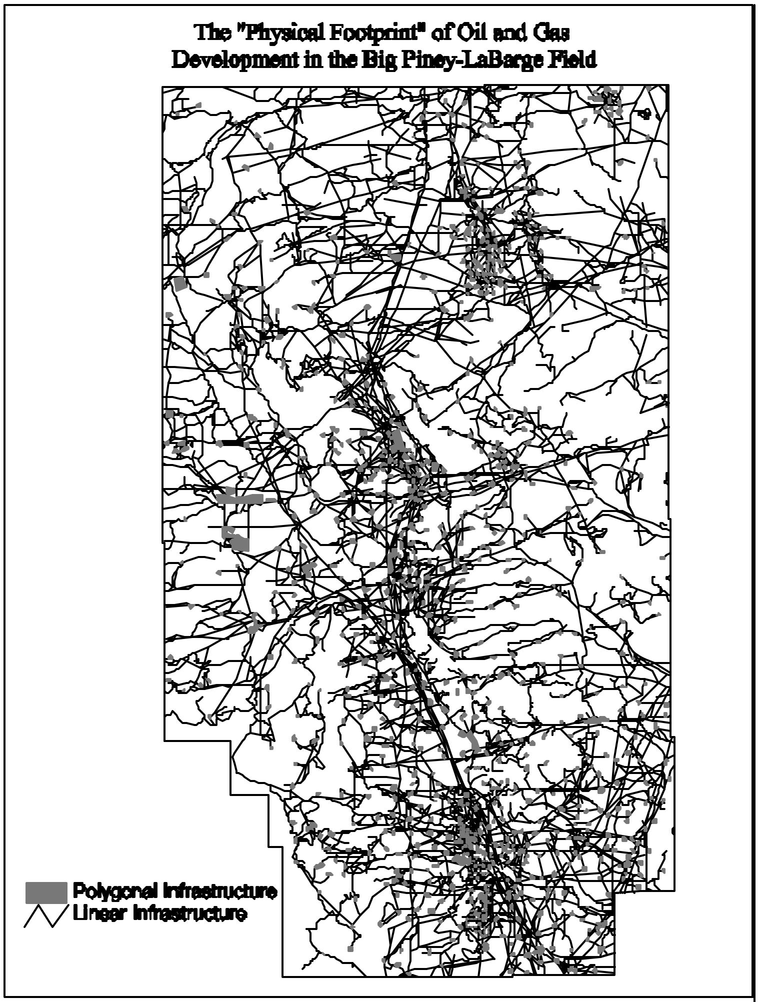

Figure 6. The digitized physical footprint from oil and gas development in the Big Piney-LaBarge field, Wyoming. The footprint includes both linear infrastructure features such as roads and pipelines, and polygonal features such as well pads, pumping stations and waste pits.

Infrastructure effect zone

The ecological effects of infrastructure features extend across the landscape beyond physical structures of the oil or gas field. Forman (1999) calls the influence on edge environments parallel to roads the “road effect zone.” We extended this zone of influence to all forms of infrastructure and completed the effect zone analyses using widths of one mile, one-half mile, one-quarter mile, 500 feet, 250 feet, and 100 feet. Results of the infrastructure effect zone analyses show that the entire 166-mile^2 study area is within one-half mile of a road, well head, pipeline, compressor station, waste pit, or other component of the infrastructure involved in oil and gas drilling. One hundred and sixty miles^2 — 97 percent of the landscape — fall within one-quarter mile of the infrastructure.

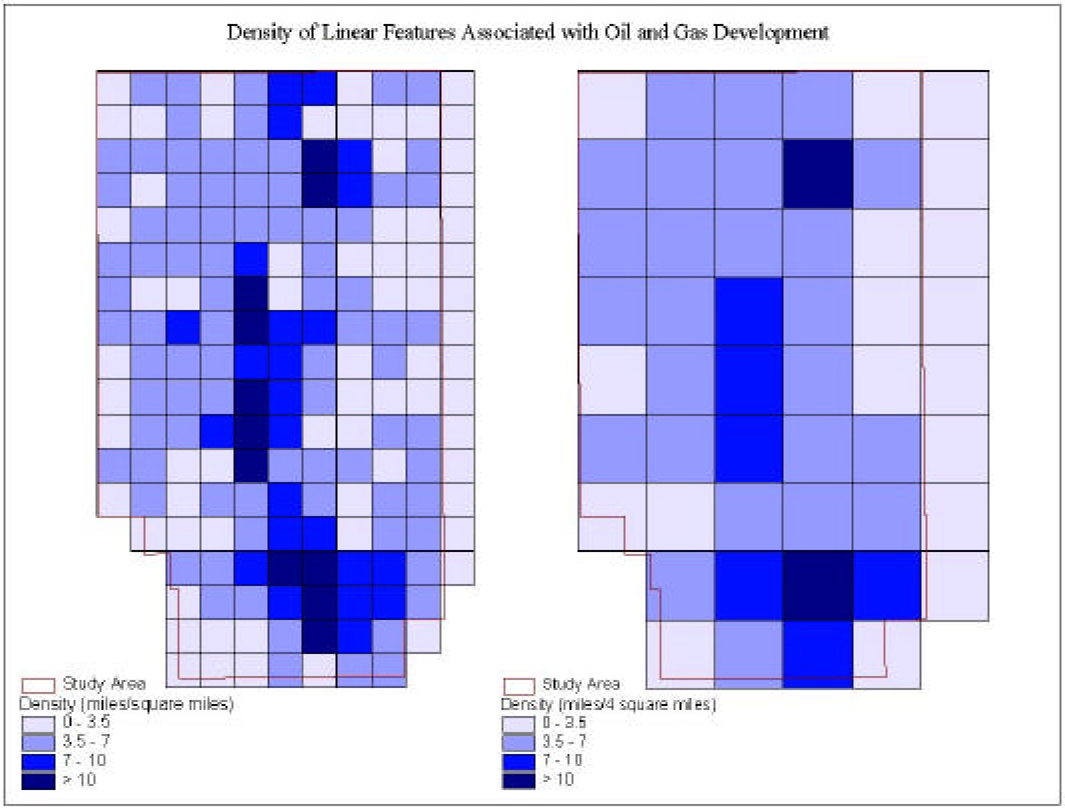

Figure 7. Density of linear features, Big Piney-LaBarge oil-gas field, Wyoming. The density of linear infrastructure features was calculated using both a 1-square mile grid and a 4-square mile grid. Linear feature density ranges from 17.1 – 0.9 miles per square mile. The darker the shading, the higher the linear feature density.

Core area analysis

Another commonly used measure for landscape fragmentation is core area, sometimes referred to as interior habitat. Core areas exist in natural landscapes as contiguous blocks of uniform habitat types away from natural breaks or habitat edges. For our analysis, we examined habitat patches on the landscape outside of the infrastructure effect zones. Our results show that for the entire study area, no core areas exist farther than one mile from the infrastructure. Only 27 percent of the study area is more than 500 feet from infrastructure, and only 3 percent is more than one-quarter mile away (Figure 8).

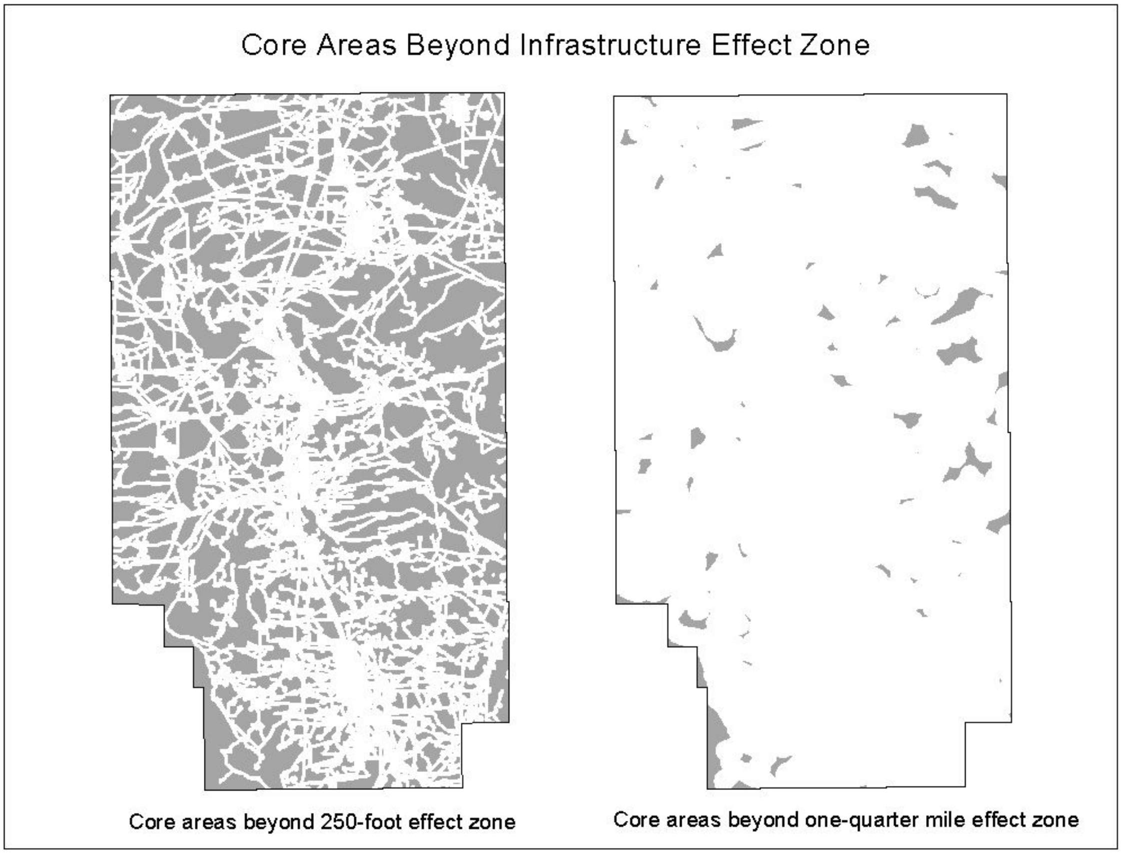

Figure 8. Core areas beyond infrastructure effect zone, Big Piney-LaBarge oil-gas field, Wyoming. Two examples of core area maps based on 250-foot and one-quarter mile infrastructure effect zones. Only 3 percent of the study area is more than one-quarter mile away from gas-oil infrastructure. Shading represents the areas beyond relatively narrow and wide infrastructure effect zones.

Habitat Fragmentation from Drilling: The Hidden Costs to Wildlife

Without access to population or habitat data, we examined the habitat costs to wildlife from oil and gas development by connecting the results of our spatial analysis to spatial metrics found in the scientific literature. Numerous studies document that elk avoid roads. Lyon (1983) found that when road densities are two miles per mile^2, elk can be displaced from up to 50 percent of their habitat. When road densities exceed five to six miles per mile^2, elk can be displaced from 75 percent of the habitat. Roughly a quarter of our study area falls within the latter category.

Road avoidance by wildlife is evident in open landscapes with little surrounding vegetation (Perry and Overly 1976, Morgantini and Hudson 1979, Rost and Bailey 1979). In areas with little cover, habitat is compromised at a road density of only 0.8 miles of road per mile^2 (Lyon 1979). A study on elk habitat effectiveness in north central Wyoming found that fewer elk used areas with road densities higher than 0.5 miles per mile^2 (Sawyer et al. 1997). Our results indicate that most of our study area has linear feature densities much higher than 0.5 or 0.8 miles per mile^2. Another study in western Wyoming indicates that elk avoid a relatively high-density oil and gas field in open habitat (Bock and Lindzey 1999). The lack of physical barriers to screen drilling activities has displaced elk up to three miles.

Wyoming has the greatest concentration of pronghorn antelope in any state or provincial authority in North America, and the Green River Valley holds the highest concentration of this animal in Wyoming (BLM 2000). With respect to potential impacts, antelope in the nearby Whitney Canyon-Carter Lease fields felt the impacts of oil and gas projects with "nearly one mile of road per every square mile of occupied habitat" (BLM 1999). Our study area has average linear feature densities more than eight times greater than one mile per square mile.

The bulk of the study area is designated as winter habitat for mule deer (BLM 1990), an animal that also avoids oil and gas development in their habitat. A study conducted in North Dakota found that mule deer avoided areas within 300 feet of well sites for feeding and bedding, resulting in a 28 percent reduction in secure bedding areas, and that this behavior continued for more than 7 years (Jensen 1991).

Wildlife species other than big game animals also face the impacts of infrastructure. Wyoming is home to the largest and most robust North American population of the Greater Sage-grouse (<u>Centrocercus urophasianus</u>), a bird that is facing severe declines in populations because of habitat loss (Christiansen 2000). Approximately two-thirds of the 150 leks (breeding grounds) for this species in Wyoming are located in Upper Green River Valley (BLM 1999). A study in Wyoming found that the negative effects of oil and gas development on nest-initiation rates of Greater Sage-grouse can extend for 2 miles beyond the infrastructure (Lyon 2000). Given our results, there is no place in Big Piney-LaBarge gas field where the Greater Sage-grouse would not be affected by natural gas development.

Lease Stipulations Help Protect Wildlife: But Only if they are Enforced

As part of the oil and gas leasing process, BLM or Forest Service officials may subject the leases to environmental stipulations that are meant to protect birds and wildlife by stating where, how, and when drilling activities may occur. Lease stipulations, designed by agency professionals, may include seasonal closures of critical habitat to benefit wildlife such as elk, antelope, and sage grouse; no surface occupancy provisions to protect sensitive habitats, campgrounds and recreation areas; and controlled use provisions to protect endangered species, archaeological and other important cultural sites. Lease stipulations may offset the habitat fragmentation impacts from drilling, but only if the stipulations are enforced.

A review of BLM stipulation exception data for the agency's Pinedale District in Wyoming indicates that seasonal wildlife stipulations are waived quite frequently. Between 2001 and 2004, 86 percent of the raptor stipulations, 90 percent of the sage grouse stipulations, and 88 percent of the wildlife stipulations protecting winter range were waived (BLM 2004a). An analysis in southwestern Wyoming indicates that the gas industry's requests to waive wildlife and fish stipulations were granted 97 percent of the time (Trout Unlimited 2003). Many waivers were issued during crucial winter months with no understanding or assessment of the impacts, owing to inadequate data and monitoring by the BLM.

Of equal concern are lease stipulations that only apply during the drilling phase, not during the production phase, providing at most a short-term positive effect. According to Noon (2002a):

> …the nature of the proposed mitigation efforts have only short-term positive effects because they represent "timing limitations" only…. For example, elk calving areas potentially disturbed by CBM projects have a seasonal closure from 5/1 – 6/30 in a given year. After that time period, development activities at a site near calving habitat may be re-initiated. The end result is that next year there is a high likelihood this site will no longer be suitable. . This is not meaningful mitigation. This policy simple delays an inevitable loss of habitat…. In my opinion, it is misleading to refer to these policies as mitigation actions (emphasis added).

In addition, a recent BLM policy (Instruction Memorandum #2003-233, July 28, 2003) discourages the use of stipulations at all to protect wildlife resources and will likely mean that even fewer leases will contain special stipulations to protect wildlife and wildlife habitats

Drilling for Coal Bed Methane: The Hidden Costs to Fish

While we focus here on wildlife impacts the potential negative impacts to water quality and aquatic species from drilling for coal bed methane may be significant. The Powder River Basin in the semi-arid Great Plains region of Wyoming and Montana is a case in point. The river itself, without a major dam, is in relatively healthy shape. With its four tributaries, it supports a rare invertebrate fauna and 25 native fish species that are much less common now than in years past (Allan 2002). According to Hubert (1993), "The fish community of the Powder River is unique… and… probably represents the kind of community that was found in free-flowing Great Plains rivers." Since similar rivers in the region have been altered, there is a special responsibility to ensure that drilling for coal bed methane (CBM) does not eliminate a critical remnant on a once vast and unspoiled ecosystem (Allan 2002).

The Powder River Basin is currently being targeted for tens of thousands of coal bed methane wells connected by a network of roads. Roads are the major source of sediment into streams. Clements (2002) has the following concerns about the scale of CBM development proposed in the Draft Environmental Impact Statement (DEIS) for the Powder River Basin in Wyoming:

> [T]he DEIS has not given sufficient attention to the impacts of increased sedimentation on aquatic ecosystems in the project area. Increased sedimentation resulting from erosion of stream banks, overland flow, and road construction will likely impact aquatic organisms. …Input of sediments to aquatic ecosystems is widely regarded as a major source of stream degradation in North America (Waters 1995). In particular, fine sediments fill interstitial spaces and reduce available habitat for fish and macroinvertebrates.

Water is the central issue surrounding development of coal bed methane. To "release" methane gas from coal beds, enormous amounts of saline-sodic water from shallow and deep aquifers must be pumped to the surface. While water quality and quantity vary by region, CBM wells in Wyoming have discharged between 20,000 to 40,000 gallons per day per well. The dewatering phase typically lasts 2-5 years. Schlesinger (2002) after reviewing the Montana Statewide DEIS concludes that "Clearly water from CBM wells is likely to reach major regional rivers" – raising concerns about pumping too much produced water into streams. 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.

The water discharged by CBM production in the Powder River Basin is characterized with very high levels of salinity and total dissolved solids (TDS). Many of the constituents that comprise total dissolved solids are toxic to aquatic organisms and have the potential to negatively impact aquatic resources. In particular, discharge of high salinity and TDS effluents into receiving systems may result in physiologically stressful conditions for some species due to alterations in osmotic conditions (Clements, 2002). It is well established that elevated concentrations of major ions can reduce water quality and significantly impact fish and wildlife populations (Goetsch and Palmer 1997, Dickerson and Vinyard 1999, Pillard et al. 1999, Chapman et al. 2000). Unfortunately, the Draft Environmental Impact Statement made no attempt to evaluate potential toxicological impacts of coal bed methane-produced effluents on fish and macroinvertebrates (Clements 2002). Dr. Clements concludes his critique with the following opinion:

> In summary, the Montana DEIS does not provide sufficient information to evaluate the potential risk… Based on my analysis of information presented in the DEIS and my best professional judgement, I expect that CBM produced effluents and associated sediments released into watersheds in the project area will have deleterious impacts on benthic macroinvertebrates and fish.

Drilling the Rocky Mountains: The Hidden Costs to the Regional Economy.

The results of our fragmentation analysis, when combined with scientific concerns over water quantity and quality, indicate that large-scale drilling as currently proposed on public lands will generate substantial costs to fish and wildlife. This will, in turn, result in lost economic benefits for Americans who enjoy viewing wildlife, hunting, and fishing in a pristine environment. Nationally, more than 82 million Americans participate in some form of wildlife-related recreation (Fish and Wildlife Service (FWS) 2003). In the Rocky Mountain states of Colorado, Wyoming, Montana, Utah, and New Mexico alone, an estimated that 3.5 million residents, or 49 percent of the region's entire population, hunt, fish, or watch wildlife (FWS 2003). Thus, loss and fragmentation of wildlife habitat resulting from proposed, large-scale drilling could negatively effect nearly half of the region's residents.

Development of oil and gas resources can also have negative impacts on communities where revenues from hunters, anglers, and wildlife watchers are a significant part of the economy. In the Rockies during 2001, participants in wildlife-viewing activities spent nearly $2.3 billion for license fees, equipment, and other related purchases, while hunters and anglers spent $3.6 billion (FWS 2002). If fragmentation of habitat from proposed oil and gas projects results in, say, declining elk populations and the declining elk populations result in a lower-quality hunting experience, fewer hunters, and a drop in related spending, the overall negative economic effect for rural businesses and communities could be substantial.

The hidden costs associated with development of oil and gas resources can negatively impact other sectors of the economy. Air pollution arising from gas compressors contributes to regional ozone problems and, when combined with dust from roads, creates regional haze and a corresponding decline in visibility (Yuhnke 2002). Loss of, or decline in, the quality of scenic landscapes and viewsheds could hurt the region's billion dollar tourism industry as well as potential economic growth stemming from engineering firms, business consultants, and retirees if they chose to locate somewhere else where the air is cleaner. A growing body of literature suggests that future diversification of rural western economies depends to a large extent on "amenity services" such as watershed protection, wildlife habitat, and scenic vistas that public lands provide (Rasker 1995, Power 1996, Haynes and Horne 1997, Morton 1999). Public lands improve the quality of life for retirees and a trained and educated workforce capable of attracting new businesses and capital to communities. Expediting large-scale oil and gas drilling on public land threatens the comparative economic advantage that amenities on public lands provide for nearby communities (Morton et al. 2002b).

Drilling the Rocky Mountains: The Environmental Risks are High

In order to protect the West's greatest asset – our environment, we must improve the science behind adaptively managing our public lands, especially our oil and gas resources. Improving the science is vital as expert assessments (Allan 2002, Braun 2002, Clements 2002, Gore 2002, Noon 2002, Schlesinger

2002, Western EcoSystems Technology 2002) reveal that the impacts from proposed oil and gas drilling in the Rockies will be widespread and negative, posing high risks for the environment, wildlife, local economies, and our quality of life. We expect the risks to be large due to the speed and the large scale of the proposed drilling, the poor state of scientific knowledge about the environmental impacts from drilling, and the fact that the BLM has inadequate staffing levels, poor baseline data, and insufficient budgets to inventory, analyze and monitor resource conditions.

The Environmental Risks Increase with Scale.

As the scale and speed of drilling increase, so does the environmental risk, particularly when baseline data are limited or non-existent. The administration is currently expediting drilling plans for tens of millions of acres in the West, despite the fact that drilling for oil and especially natural gas is already at a pretty large scale. In the Rockies, public land managed by the BLM has more than 53,000 producing oil and gas wells (BLM 2003a). Nationally the BLM has about 33 million acres of federal minerals (public and split estate) under lease to industry (BLM 2002). The BLM oversees 54,000 oil and gas leases, with only 40% of the leases currently producing gas or oil (BLM 2002, BLM 2004b). In Wyoming there are over 21,000 federal oil and gas leases, covering approximately 15 million acres of federal land (Bennett 2003). In 2002, only 3.6 million acres of federal land in Wyoming were in production (BLM 2003) – illustrating the large scale drilling potential (i.e. drilling opportunities) currently available to industry. If leaseholders place the current inventory of non-producing leases into oil or gas production, the scale of drilling on public lands will increase dramatically – even without any additional leasing. Between 2000 and 2003, more than 46,000 drilling permits were issued for public and private lands in the five Rocky Mountain States (Rig Data 2004). It is difficult to understand why, with the large scale drilling currently occurring, there is a need to speed up the process of approving drilling permits at the expense of a careful examination of the impacts on wildlife and local economies. Note, too, that it appears likely that a substantial backlog exists of surplus permits that have already been approved but where industry has chosen not to begin drilling.

Environmental Risks Increase when Data are Limited.

The National Environmental Policy Act requires federal agencies to disclose in their Environmental Impact Statements the risks of proposed action and to respond to the adverse opinions held by respected scientists. (See, e.g., *Seattle Audubon Society v. Moseley,* 798 F.Supp. 1473, 1482 (W.D.Wash. 1992).) The Data Quality Act of 2000 (Pub. L. No. 106-554) requires agencies to incorporate high quality, usable, verifiable, and objective information. Fulfilling these obligations is especially critical to reduce the risks from large-scale, accelerated drilling plans.

BLM has adopted an adaptive management approach to assess the impacts from oil and gas drilling. A major implication of adaptive management is that acquisition of useful data becomes one of the primary goals of management (West 2002). Acquiring data is sorely needed as very little wildlife or fish data were used to support the preferred alternatives and conclusions of the fast tracked energy plans. As noted by Dr Schlesinger (2002) when reviewing the Montana Statewide DEIS:

> In general, I am struck by the lack of data obtained from the existing coal bed methane (CBM) gas wells in Wyoming and Montana. These existing wells, with their associated reservoirs and outflows, represent a large, replicated experiment that should have provided ample opportunity to answer some of the questions that I will pose below.

Schlesinger (2002) concludes: "My expert opinion is that the water quality data presented are completely inadequate to assess the impact of waters from additional coal bed methane wells on the regional environment." Allan (2002) with respect to the Powder River echoes these concerns:

> The DEIS lacks critical information about the basic ecology of the Powder River Ecosystem, and it lacks critical information about the amount and quality of water that will be discharged onto the land and into surface drainages. Without this information it is an inadequate document on which to assess impacts on aquatic ecosystems.

And by Noon (2002a) with respect to the Powder River Basin, Wyoming DEIS:

> In the DEIS there is a pattern of first asserting a lack of data as a rationale for no quantitative analysis and then concluding no adverse effects. Within the last 10 years a large number of publications have documented adverse effects to wildlife and their habitats as a consequence of habitat fragmentation, human disturbance, roads, and changes in land cover. In the absence of data and high uncertainty, logic would suggest a slow and incremental approach to CBM development coupled with close monitoring to detect possible adverse impacts. The public expects responsible resource managers to implement monitoring and adaptive management in an incremental fashion when irrevocable or irreversible outcomes are possible.

And by Braun (2002) with respect to sage-grouse:

> A major deficit is the lack of knowledge about sage-grouse in the areas to be impacted. This includes adequate baseline data on current population levels and trends as well as amount and quality of present habitat… The present baseline data are totally inadequate to allow an adequate evaluation of the potential impacts on sage-grouse in the area.

And by Noon (2002b) with respect to wildlife data in the Farmington DEIS:

> To infer an effect, or lack of an effect, resulting from oil and gas development requires pre-project baseline information. I could find no evidence in the DEIS that baseline data exist for individual species populations or their habitats. In fact, the DEIS openly admits the lack of data. For example, here are some statements from the DEIS: "There have been few surveys for non-game species in the planning area" (P. 3-40); "Few non-game mammal studies have been conducted" (p. 3-41); [there is] "…incomplete data on mule deer and elk populations in the planning area" (p. 4-30), and [there is] "…lack of site-specific data on the effects of roads on mule deer and elk" (p. 4-30)….In the absence of baseline information, the environmentally responsible course of action would be to collect such information prior to development

The problem of poor data is not new (Loomis 1993). In 1986, a former BLM planning official stated one of the key ailments in BLM planning: "Lack of solid economic, analytical procedures and hard data continually handicaps planning by failing to portray objectively trade-off values to be gained or lost through managerial decisions" (Crawford 1986). Nearly 20 years later the problems, questions and challenges are much more complex, but the data are arguably in worse shape. We can and must do better. A recent survey of BLM staff (BLM 2003c) affirms our concerns over a "data crisis". The issue of inadequate data for fish, wildlife, botany and special status species is particularly critical for the fast tracked energy plans. The authors conclude: "The accelerated time frame for completing time sensitive plans may not provide sufficient time to address FWBSS species conservation issues" (BLM 2003c).

Recommendations

<u>The Economic Analysis must be Improved</u>

As this paper shows, public wildlands in the Rocky Mountains contain undiscovered gas and oil resources, the majority of which are not economical to recover. Where economically recoverable gas and oil does exist on those lands, the amount produced would supply U.S. demand at current rates for only a very short time. Unconventional gas resources, like tight sands gas and coal bed methane in the Rockies, are subject to higher production costs and substantial uncertainty (LaTourrette et al. 2002). Tight sands gas, for example, are expensive to develop because the gas is often deeply buried, wells have low flow rates, reservoir pathways may be obstructed, concentrations often are more diffuse, and costly recovery techniques such as fracturing are needed (Cleveland 2003). Failure to recognize these essential elements of low-permeability sandstone reservoirs has led to a misunderstanding of the risks associated with basin-centered gas plays and a significant over-estimation of available resource levels (Shanley et al. 2003). Sixty percent of exploratory wells drilled in the U.S. are either dry or have too little gas to make development economical (Morton 2003), underscoring the high risk and poor economics associated with drilling for undiscovered resources. USGS (Attanasi 1998) estimates that only about 18 percent of the technically recoverable tight sands gas is economic to recover.

Focus on economically recoverable gas

Instruction Memorandum #2003-233 of July 28, 2003, requires BLM planners to use estimates of technically recoverable gas in management plans, thus ensuring that the plans will exaggerate the energy potential, jobs, and revenues from proposed drilling projects, as well as the opportunity costs of protecting wildlife habitat or enforcing wildlife stipulations in leases. For reasons documented in this paper, planning documents should *not* rely on estimates of technically recoverable resources or other measures that ignore economics.

USGS is currently updating its estimates of economically recoverable gas in the Rockies using a range of prices that addresses concerns over price uncertainty and the accuracy of economic forecasting. Until the updates are ready, we recommend that BLM rescind Instruction Memorandum #2003-233 and that the agency and Forest Service use the USGS high and low price mean estimates of economically viable gas (Attanasi 1998) as a starting point to evaluate various land management alternatives in upcoming plan revisions.

Include a full accounting of environmental costs

In addition to market costs, economic analyses of recoverable gas must include a full accounting of non-market costs. Because they exclude non-market costs, USGS estimates are just the starting point to determine whether undiscovered gas is economically viable to extract. After 35 years of research by

Table 3. The Hidden Economic Costs of Gas and Oil Extraction

Cost category	Description of potential cost	Methods for estimating costs
Direct use	Decline in quality of recreation, including hunting, fishing, hiking, biking, horseback riding. Loss of productive land for grazing and farming.	Travel cost and contingent valuation surveys
Community	Air, water, and noise pollution negatively impacts quality of life for area residents with potential decline in the number of retirees and households with non-labor income, loss of educated workforce, and negative impacts on non-recreation businesses. Decline in recreation visits and return visits negatively impact recreation businesses. Socio-economic costs of boom-bust cycles.	Surveys of residents and businesses. Averting expenditure methods for estimating costs of mitigating health and noise impacts. Changes in recreation visitation, expenditures and business income. Documented migration patterns.
Science	Oil and gas extraction in roadless areas reduces value of area for study of natural ecosystems and as an experimental control for adaptive ecosystem management.	Change in management costs, loss of information from natural studies foregone.
Off site	Air, water, and noise pollution decrease quality of life for local residents and decrease quality of recreation experiences for downstream and downwind visitors. Haze and drilling rigs in viewsheds reduce quality of scenic landscapes, driving for pleasure, and other recreation activities and negatively impact adjacent property values. Groundwater discharge can negatively impact adjacent habitat, property, and crop yields, while depleting aquifers and wells.	Contingent valuation surveys, hedonic pricing analysis of property values, preventive expenditures, well replacement costs, restoration and environmental mitigation costs, direct impact analysis of the change in crop yields and revenues.
Biodiversity	Air, water, and noise pollution can negatively impact fish and wildlife species. Groundwater discharge changes hydrological regimes with negative impacts on riparian areas and species. Road and drill site construction displaces and fragments wildlife habitat.	Replacement costs, restoration and environmental mitigation costs.
Ecosystem services	Discharging ground water negatively impacts aquifer recharge and wetland water filtration services. Road and drill site construction increases erosion, causing a decline in watershed protection services.	Change in productivity, replacement costs, increased water treatment costs, preventive expenditures.
Passive use	Roads, drilling rigs, and pipelines in roadless areas result in fewer passive use benefits for natural environments.	Contingent valuation surveys, opportunity costs of not utilizing future information about the health, safety, and environmental impacts of oil and gas drilling.

academic and federal agency economists (Krutilla 1967, Krutilla and Fisher 1985, Peterson and Sorg 1987, Loomis and Richardson 2001), it is now possible to quantify non-market environmental costs that arise from development of natural resources (see Table 3). The BLM and the Forest Service should include a full accounting of non-market costs in the effects analysis required by the National Environmental Policy Act (NEPA) for leasing and drilling decisions.

Account for the negative impacts on local economies

The BLM and the Forest Service should assess the potential impacts on the regional economy that may flow from environmental degradation brought about by proposed large-scale oil and gas drilling in the Rockies. Considerations should include the negative impacts on hunting, fishing, ranching, recreation and service jobs, plus the negative impacts on our retirement and investment income, and our overall quality-of-life-based economy. This recommendation is consistent with that of more than 100 economists, who, in a 2003 letter to President Bush, stated, "The West's natural environment is, arguably, its greatest, long-run economic strength" (Niemi et al. 2003). The economists agreed that protecting the West's natural environment would strengthen the ability of western communities to generate more jobs and more income.

Invest in Baseline Data Collection, Spatial Analysis and BLM Field Staff

Improve baseline data collection.

Data collection and monitoring are prerequisites to cost-effective, science-based adaptive management of public land, but data collection and monitoring generally take a back seat in BLM and Forest Service budgets and planning processes. A quick review of the Forest Service proposed budget for Fiscal Year 2005 shows that Inventory and Monitoring, much of which is devoted to the monitoring of visitor use and not resource conditions, represents just 3.7 percent of the total agency budget (Forest Service 2004). The BLM's Fiscal Year 2005 budget request is more difficult to decipher, but it appears that funding for monitoring accounts for just 1.6 percent of the total request (BLM 2004c). In a recent review of the BLM budget, the Office of Management and Budget identified several weaknesses, including gaps in monitoring resource conditions to support management decisions and insufficient data. This is consistent with opinions of the scientists cited in this paper; the lack of credible data is a fatal flaw with recent BLM decision documents examining the environmental impacts from drilling in the Rockies. The BLM (2003c) acknowledges the pressing need for data collection and monitoring:

> The lack of a coordinated, national program for inventory of (wildlife and fish) resources on BLM-managed land is problematic, because it is difficult to manage resources without full knowledge of their status on public land. When inventory is performed, coverage of resources may be inconsistent, and in some instances, current office staff may be unaware of inventory efforts by previous employees.

While the agency is starting to recognize the data crisis, we believe recently developed energy plans fail to comply with the Data Quality Act of 2000, which requires the agency to use data of sufficient quality to make a reasoned analysis. In order to decrease environmental costs and risks, the BLM (and the Forest Service) should accelerate efforts to collect baseline data, analyze the data, and monitor resource conditions. This information is required to adaptively manage ecosystems and is vital if the public is to fully understand the potentially irreversible, cumulative environmental impacts from large-scale energy development in the Rocky Mountains. To their credit, both the Forest Service and the BLM have increased the budgets for monitoring in the FY 2005 budget. This is a step in the right direction, but a much greater long-term budget commitment to data collection, analysis and monitoring is required to bring the agencies in compliance with the Data Quality Act of 2000. Scientists at Western EcoSystems Technology (2002) summarize the risks, uncertainties, and data challenges faced by BLM:

> …there is a paucity of well designed studies that assess the impacts of oil and gas activity on ungulate populations. The Upper Green River Basin contains a variety of ungulate habitats and contains winter ranges for some of the longest migrating ungulate herds in the west. Thus the most effective means for assessing impacts from oil and gas projects on ungulate populations within the area is the implementation of well designed studies of the effects of oil and gas development on ungulate ecology and habitat. Long term monitoring should also be used to verify the efficacy of approved mitigation measures within important big game habitats. The revision of the Pinedale RMP should include requirements for monitoring of ungulate use and movements through radio telemetry to verify the accuracy of existing range designations. Ideally, these studies should be of sufficient duration (e.g., 5-10 years) in order to capture a fairly wide range of winter severity. The studies should be conducted so that inferences can be made to all herd segments within the Pinedale Resource Area potentially impacted by resource

> development. Additionally, habitat mapping is needed to help identify key areas for ungulates.

Incorporate spatial analysis into evaluation of proposed drilling and monitoring of actual drilling.

Despite the documented impacts that habitat fragmentation has on wildlife proposed oil and gas projects are moving forward without adequate evaluation of the impacts that they have on wildlife, especially their role in habitat fragmentation. The DEIS for the coal bed methane projects in the Powder River Basin led to the following comments on the document's shortcomings by Noon (2002a):

> The relevance of the fragmentation process affecting wildlife populations rests on the understanding that information on habitat amount alone may be insufficient to predict the status of a species. When habitat is potentially limiting, then information on the spatial pattern of the habitat may be equally or more relevant than information on habitat amount. The importance of incorporating spatial data into effects analysis cannot be overemphasized (emphasis added). Knowledge of where on the landscape habitat loss will occur and in what spatial pattern is essential before one can conclude no significant adverse effects.

The BLM is currently developing best management practices (BMPs) for reducing fragmentation of wildlife habitat. While certainly a step in the right direction, developing BMPs is a necessary but not sufficient condition for addressing habitat fragmentation. In addition to developing and enforcing BMPs for existing energy development, spatial analysis should be incorporated into the evaluation of the ecological impacts of proposed oil and gas projects -- in addition to monitoring existing energy projects. The significant increase in availability of GIS data and software technology in recent years makes this possible. Prior to exploration and development of new oil and gas fields and before new drilling in existing fields, BLM and the Forest Service should, at a minimum, complete the same kind of spatial analysis that we used in our study. In addition, information on habitat quantity and quality, species populations and birth rates, and the frequency of vehicle use of roads should be considered in the analysis. See Weller et al. (2002) and Hartley et al. (2003) for more recommendations.

Invest in additional BLM and Forest Service Field Staff

In order to collect and analyze baseline data, complete spatial analysis, and monitor cumulative impacts from the proposed drilling, Congress must allocate funds to add field staff to the BLM and Forest Service ranks. Over the past 10 years the number of BLM wildlife biologists decreased nearly 20 percent, while fishery biologists and botany positions increased slightly. Based on an analysis of BLM data (BLM 2003a, 2003c) the agency has only 12 ecologists, 6 botanists, 9 fishery biologists and 91 wildlife biologist to oversee stewardship of 7 million acres of public land in the Rockies. While the current BLM staff is inadequate to provide oversight of wildlife, fish and plant resources in the Rockies, New Mexico provides a striking case. In 2002, the BLM apparently did not have a single ecologist, botanist or fisheries biologist on field staff in New Mexico (BLM 2003c). Additional staff is especially needed to address the added workload placed on Forest Service and BLM employees from the executive order requiring fast tracked energy plans. As noted from a survey of BLM employees in Utah (BLM 2003c):

> In areas with high demand for energy development there is insufficient time for existing staff to keep up with the workload it creates. In all cases, staffing and funding are insufficient to establish and implement a proactive FWBSSS program…. The increased workload generated by energy development, land and realty actions, minerals development and grazing are creating a workforce that is stressed, over-worked, and facing potential burnout.

Obviously more field ecologists and biologists are needed for stewardship to be successful.

The BLM must complete a Cumulative Impact Analysis

As part of its energy policy, the current administration has essentially directed agencies with jurisdiction over energy development on public lands to prioritize drilling over all other concerns, including protection of wildlife. As one example, in a recent Final Environmental Impact Statement, BLM revoked significant protections for wildlife and habitat that were included in the draft, stating that "BLM is required to impose the least restrictive constraints needed to provide adequate protection while allowing fluid minerals leasing and development"(BLM 2003b).

This nationally mandated approach requires a corresponding national analysis of the potential cumulative impacts to wildlife and other resources. As the National Environmental Policy Act requires, federal agencies must assess the environmental impact of a proposed action, taking a "hard look" at environmental consequences [see 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)], and the scope of the analysis "must be appropriate to the action in question."

In determining the appropriate scope of environmental analysis for an action, federal agencies must consider not only the single proposed action, but also three types of related actions: 1) connected actions, 2) cumulative actions, and 3) similar actions (see 40 C.F.R. § 1508.25). Under any of the three classifications, the coordinated actions that federal agencies are directed to take in compliance with the current energy policy, trigger a broad assessment of cumulative impacts. Since the government is mandating a program of prioritizing oil and gas development, the resulting agency actions are <u>connected</u> as "interdependent parts of a larger action," all of which "depend on the larger action [the government policy] for their justification." Further, the many actions taken by different federal agencies to accelerate drilling will have a compounding impact on species and habitat, so adding together each of the areas of habitat lost to or fragmented by development will have a "<u>cumulatively significant</u>" impact on species. Finally, because the administration's energy policy extends to all agencies with responsibilities for oil and gas development, and will be concentrated in the Rocky Mountains, the reasonably foreseeable actions will have "common timing and geography," and will be <u>similar</u> in terms of opening more areas for development and approving more development activities.

The cumulative impact analysis required to accurately evaluate the potential environmental consequences of this policy would necessarily include the entire area that is potentially affected. We interpret this to include the 100 million acres identified in the administration's recent energy assessment (DOI and DOE 2003) as well as the areas targeted by the administration for expedited energy plans including the Rocky Mountain Front, the Powder River Basin, the Upper Green River Valley, the Roan Plateau, the HD Mountains, the Book Cliffs, and Otero Mesa.

Conclusions

Our fragmentation analysis showed the significant fragmentation of wildlife habitat associated with large-scale energy development. Based on our GIS analysis of gas and oil, it is clear that drilling public wildlands in the West will do little to affect the nation's energy future. Therefore, one should not assume that extracting energy resources is always the highest and best use of public lands. As roadless wildlands and critical wildlife habitat become scarce, their economic and ecological values increase. As a result, the marginal benefits from wildland conservation are, in many cases, much greater than the marginal costs in the form of foregone undiscovered, economically recoverable energy resources.

With this in mind, we urge BLM to reduce the environmental risks by slowing down and reducing the scale of proposed drilling while taking a more conservative approach that is consistent with adaptive management principles. Stewardship of public lands requires no less.

We urge Congress and the states to reduce the environmental risks by investing in applied research by agency and university scientists to improve the science behind adaptive management decisions. Applied research begets stewardship.

We urge the agencies to address the "data crisis" by investing in spatially explicit baseline data, based on ground-truthing resource conditions. Investing in accurate baseline data and scientific analysis and monitoring of the data collected is a prerequisite for good stewardship. To accomplish this, we recommend that the agencies add staff while also increasing the budgets for agency biologists, botanists and ecologists in district and regional offices.

We also urge the agencies to stop or slow the outsourcing of environmental analyses to private firms, especially those with consulting connections to the energy industry. The quality of the analysis suffers, the costs to taxpayers are greater, and the conflict of interest is obvious. As a result of Enron, we no longer allow accounting firms to be both accountants and consultants to the same clients. We should follow suit with public land management. Rather than outsourcing jobs from rural communities, we recommend increasing the number of BLM field. Investing in field staff will help promote economic development, because in many western communities, BLM employees provide an important source of basic income that supports local jobs

We urge the BLM and the Forest Service to consider wilderness a vital component of stewardship. Wilderness epitomizes multiple-use public land in a pure but rugged sense. Wilderness areas protect watersheds and wildlife habitat. Wilderness provides pristine settings for high-quality backcountry hunting, fishing, hiking, bird watching, skiing, horseback riding, climbing, and camping. Westerners and visitors alike are not interested in pursuing these activities near drilling rigs, noisy gas compressors, or smelly waste pits.

While demand for natural gas has been flat, consumers have suffered from two prices spikes. The government has concluded that price manipulation occurred and the current spike in natural gas prices is under investigation for market manipulation (GAO 2002, FERC 2002, Morton 2003). Rather than using taxpayer dollars to subsidize risky and potentially low productivity gas wells, federal energy policy should stretch proven gas reserves by reducing waste through investments in low cost, low risk, no regret solutions like energy conservation and efficiency. We can also reduce our risks by diversifying our energy portfolio with renewable energy sources such as solar, wind and biofuels – at the appropriate locations and scale. Conservation combined with competition from renewable energy will reduce the demand for natural gas and result in lower prices for consumers. Simple efficiency measures can permanently reduce utility bills, while drilling marginal gas wells results in, at most, a temporary cost savings for consumers.

With a ten-year supply of gas in proven reserves, 53,000 producing wells on public land in the Rockies, 46,000 drilling permits issued since 2000, and 32 million acres of federal minerals already under lease, there is no need to expedite drilling in pristine areas. The public deserves a better understanding of the cumulative environmental impacts that the current drilling boom has on air, water, and western landscapes. The public deserves an honest assessment of the economics, including the negative impacts of reducing environmental protection, on local tourism, ranching, recreation, hunting, fishing and quality of life. These are not unreasonable requests or concerns.

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