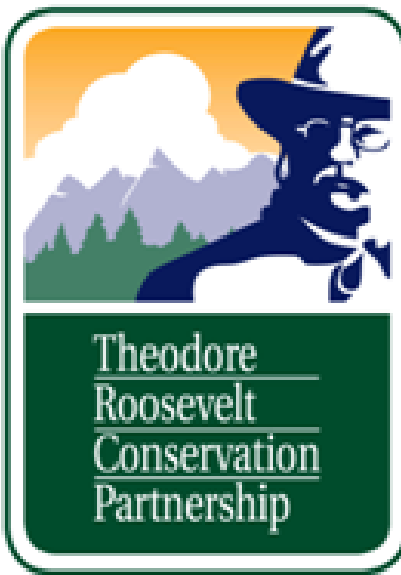


# Mule Deer and Energy

*Federal Policy and Planning in the Greater Green River Basin*



**Theodore Roosevelt Conservation Partnership**

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## Introduction

The American West is home to a vast array of wildlife and is a sportsmen's paradise. One of the most iconic species for sportsmen is the mule deer (*Odocoileus hemionus*). Not only do mule deer represent an important piece of the region's cultural and ecological history, it is also one of the most significant species to sportsman, generating millions of dollars annually in local communities. Yet as the contextual nature of the West has rapidly changed in the last century as a result of growing population pressures, unique challenges have emerged for the future management of mule deer. Chief among those is that posed by energy development.

Mule deer are struggling across the West. They are declining in population in many places<sup>i</sup>, mule deer have been decreasing in number since the latter third of the 20<sup>th</sup> century.<sup>ii</sup> Deer face a number of stressors, but most significant is that their habitat is changing and disappearing. These include but are not limited to suburban and rural sprawl, livestock management, fire suppression, traditional and renewable energy development, and invasive species.<sup>iii</sup> While all of these factors are important, this analysis looks specifically at energy development, which presents the most significant threat to mule deer in the Intermountain West.

**Figure 1. Geographic distribution map of mule deer in North America<sup>iv</sup>**



During the last decade, energy production has become one of the top management priorities on the nation's public lands, often dominating other uses such as the management of wildlife habitat. During the same period, scientific understanding about the impacts of energy production on wildlife populations expanded, with much being learned about impacts to mule deer. A series of studies on the Pinedale Anticline show that drilling and production of natural gas on crucial winter range significantly affect mule deer, with dramatic decreases in wintering populations within the developed area. In 2007, Sawyer et al. published research that attributed 27 percent of the decline in mule deer on the Pinedale Anticline to energy development<sup>v</sup>. In 2010, monitoring reports show a 60-percent loss in mule deer since development began in 2001. In the early part of the decade, experts were stating that the dramatic increase in energy production on public lands represents the most significant threat to mule deer populations as a result of direct loss of crucial habitat and disruption.<sup>vi</sup>

While the shift in presidential administration (in 2008) has arguably affected the priorities within the federal agencies in regard to energy and wildlife, its press for the development of large-scale renewable energy projects will pose a significant new threat to mule deer habitat in the West. In the coming years, wind and solar development on public lands will present challenges for managers attempting to balance the interests of mule deer with a new national energy policy.

In an attempt to enrich understanding about federal and state governments' policy approach to promoting and protecting the West's populations of mule deer, this project analyzes the extent of collaboration between the federal land agencies' planning processes and the state wildlife agencies' population management strategies. We examined the federal land use planning guidance and documents for the two agencies who manage most of the public land within the project area – the U.S. Bureau of Land Management and the U.S. Forest Service. We also briefly examined major energy projects that have been recently approved and any existing guidance or policy within or between federal and state agencies as it relates to the management of mule deer and mule deer habitat.

The overarching goal is to construct a basic policy assessment that describes the approaches of agencies to conserve mule deer and their habitat in the face of energy development, assesses the current level of coordination between state and federal agencies, and makes recommendations to improve policy and/or coordination for mule deer management. We are specifically concerned with the region known as the Greater Green River Basin, a geographic area home to some of the most significant mule deer herds in North America. The region also hosts some of the United States' largest energy reserves, creating the potential for substantial conflict.

Mule deer are a critical piece of the cultural and ecological fabric of the American West. Long associated with the wild expanses of sagebrush hills and high alpine ridges, mule deer often are recognized as the symbol of the frontier. The species depends on large, unbroken tracts of intact and diverse shrub communities, the landscapes that dominated the early West. To the extent that these habitats are fragmented by human development, mule deer struggle. Preserving the habitat of the mule deer serves in turn to protect the contextual nature of the American West.

Properly managing mule deer dramatically benefits local rural communities. The Western Association of Fish and Wildlife Agencies' Mule Deer Working Group explains why mule deer are important to sportsman and small towns (from a pending report on energy development guidelines for mule deer):

In a 2006 survey of outdoor activities, the U.S. Fish and Wildlife Service (USFWS) reported that nearly 3 million people hunted in the 19 western states (USFWS 2007). In 2006 alone, hunters were afield for almost 50 million days and spent more than \$7 billion in local communities across the West on lodging, gas and hunting-related equipment. Although this included hunters that pursued other species, mule deer have traditionally been one of the most important game animals in the West. According to the same 2006 survey, 25.6 million residents in 19 western states spent more than \$15.5 billion that year "watching wildlife." <sup>vii</sup>(Lutz *et al.* 2011)

The conflict intensifies by the fact that energy development is increasingly viewed as necessary for economic development and a priority in public land policy. The Green River Basin, the region central to this study, is home to nearly every significant source of energy found in the continental United States. Here on the high plains, abundant plays of natural gas and oil, rich seams of coal, oil shale formations, geothermal, and abundant wind and solar opportunities can be found. The result is a complex web of energy resource availability and extraction policies – a situation resulting in complicated and difficult

land management decisions that balance values while minimizing consequences for landscapes and wildlife habitats.

The management of the federal lands is central to the management of mule deer. The BLM and USFS are charged with managing a significant acreage of lands within the study area, meaning that they are tasked with administering wildlife habitat and vegetation on these landscapes. Their land use decisions greatly affect the viability of mule deer herds within the basin. While the National Park Service and the U.S. Fish and Wildlife Service hold some lands within the area, their consequence for mule deer is minimal. They are not included in this project analysis.

The BLM manages 256 million surface acres of land within the United States, most of which falls within the 12 Western states. The agency plays a prominent role in the debate over federal land policy and politics, specifically regarding the mounting pressures of energy development on public lands, primarily because it administers all federally owned energy resources.

The USFS is responsible for managing more than 193 million acres of public land in 155 national forests and 20 national grasslands, primarily in the West. Recognized for its importance in offering resources for important wildlife habitat and the nation as a whole, the agency plays a central role in the management of the Green River Basin's mule deer herds, as it provides key seasonal and year-round habitats.

Both agencies are charged with managing the lands under their jurisdiction by the principles of multiple use and sustained yield. The BLM's organic act, the Federal Land and Policy Management Act of 1976, or FLPMA, declares that management decisions should balance the uses of "recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values."<sup>viii</sup> The USFS, guided by the Multiple Use and Sustained Yield Act of 1960, declares that national forests shall be managed "for outdoor recreation, range, timber, watershed, and wildlife and fish purposes."<sup>ix</sup> Under both standards, the management of fish and wildlife habitat is supposed to be considered an equal use and value with other uses and values of the federal lands.

With exceptions for migratory birds and endangered species, the authority to manage fish and wildlife populations rests with the states.\* While the land agencies are charged with managing the habitat, state wildlife agencies are responsible for managing populations of fish and wildlife within their states (and some habitat management of agency-owned lands primarily designated as habitat management areas or wildlife management areas). The states largely manage game populations through harvest with a "management by objective" framework, meaning population objectives are set for specific areas or "units" and harvest strategies are based on meeting those set objectives. Unlike the BLM and USFS, state wildlife agencies are not bound by a multiple-use paradigm. Rather, these agencies are driven to meet state policies and agency mandates to manage fish and wildlife, particularly game species, for the benefit of the people of the state. Three state agencies are included within the study area: Wyoming Game and Fish Department, Colorado Division of Wildlife, and Utah Division of Wildlife. Mule deer is one of the most important species to these agencies, both economically and administratively, with license sales contributing significantly to agency budgets.<sup>x</sup>

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\* The management of species rests with the states, except where expressly delegated to the federal government, namely those listed as threatened or endangered under the Endangered Species Act of 1973 and the management of migratory birds, both of which are managed by the USFWS (see Nie, p. 60).

**Table 1. Total hunting and fishing sales and revenue for 2010 in project area<sup>xi</sup>**

	<b>Hunting</b>	<b>Fishing</b>	<b>Total</b>
	<u>Licenses/Revenue</u>	<u>Licenses/Revenue</u>	<u>Licenses/Revenue</u>
<b>Colorado</b>	538,734/\$56,200,410	1,039,177/\$15,112,929	1,577,911/\$71,313,339
<b>Utah</b>	292,695/\$12,005,639	466,098/\$10,084,698	758,793/\$22,090,337
<b>Wyoming</b>	278,632/\$25,267,335	370,313/\$5,366,360	648,945/\$30,633,695
		<b>Total Sales/Revenue</b>	<b>2,228,407/\$1,240,373,371</b>

States play an increasingly large role in advocating for habitat protection even though they have very little habitat jurisdiction or authority. The Wyoming Game and Fish Department has shifted toward habitat management in the last 10 years, hiring a number of habitat biologists to complement the existing population biologists.<sup>xii</sup> Primarily, these habitat biologists interface with federal land managers in the land use planning process and, more recently, energy projects.

The ability of wildlife populations to persist is directly related to the quality and quantity of habitat. Landowners make management decisions regarding habitat, and in the West this is predominately the BLM and USFS or private landowners. Therefore, these agencies' policies on the management of mule deer and coordination with state fish and wildlife agencies are critical to the continued persistence of robust wildlife populations. Identifying that effectiveness policy and coordination is central to this study.

As energy pressures – both renewable and non-renewable – continue to mount on the nation's public lands, the ability of federal land managers to match the management of mule deer habitat with the state agencies population management strategies will be key to the conservation of the West's iconic species.

### **Organization of study**

This study is broken into categories that represent major thematic elements of the issues facing the conservation of mule deer in the West. First is a discussion and assessment of the status of the key mule deer herds within the study area. It provides a description of the Green River Basin, detailing essential components of mule deer habitats and behavior patterns that make the area's herds unique in the West. This section also overviews the current population estimates for key herds, distributions and population objectives set by the respective state wildlife agencies. We seek to explore and describe the current threats posed by the development of energy resources on the federal lands. The core of the project's analysis is in the documentation and evaluation of the state wildlife agencies, BLM and USFS to incorporate mule deer management into their land use planning documents, major project decisions and agency policy as it relates to energy development.

At the end of the report we make some specific recommendations based on the analysis for the more complete integration and coordination of state and federal policies and actions for mule deer.

### **Current status of mule deer populations within the Greater Green River Basin**

*"A combination of fire suppression, oil-gas-mineral exploration and mining, predation, habitat fragmentation, spread of invasive species, drought, competition between species, livestock management and other human factors such as urban development have affected the habitats of mule deer."*

– Western Association of Fish and Wildlife Agencies' Mule Deer Working Group

As the Western landscape continues to change, mule deer habitat is dramatically changing, as well. Growing pressure for the exploration and extraction of energy resources is increasingly affecting the habitats on which mule deer depend. Healthy populations of mule deer rely on widespread intact habitat with abundant available forage. Across the study area, mule deer herds are generally at or below population objectives, which are set by the state agencies. Many herds in the Greater Green River Basin are trending downward (see tables 2-1, 2-2 and 2-3 for population trends), increasing the concern for the future of mule deer throughout the Green River Basin.

This section presents a broad overview of the state of mule deer on the public lands across the Greater Green River Basin. First, it offers a complete description of the study area being used for the analysis found in this project. In doing so, it describes some unique realities that make management within this area particularly challenging. Foremost among those is the migratory nature of deer within the basin. Second, it lays out the current population estimates for all deer herds found within the GRB, including the population objectives for each herd identified by the corresponding state wildlife agency.

Finally, this section briefly summarizes the varied threats from energy development found within the study area. While the primary focus of this analysis is on traditional fluid mineral development, the more recent interest in wind and solar development and oil shale extraction also is included. To the extent to which these pressures continue to increase without adjustments in management and mitigation of habitats, mule deer habitat will be in danger of further decline.

### **Description of the study area**

This project analyzes the collaboration of mule deer management strategies of the federal land agencies and state wildlife agencies within the Greater Green River Basin watershed. Figure 1 illustrates the physical boundaries of the study area. The GRB stretches across the heart of the Intermountain West, covering portions of Wyoming, Colorado and Utah. It includes the Upper Green River Valley in Wyoming, the Yampa and White River drainages in Colorado, and the Uinta Basins that stretch westward towards the Wasatch Range in Utah.

The region represents a unique assemblage of ecological biomes, from the high sub-tundra of the Uintas and Wind River mountain ranges to the rich desert systems in the Red Desert, the high sage steppe found across the Upper Green River Basin in Wyoming, and the juniper shrublands of Colorado's Piceance Basin, and the unique plateaus and canyons in the Book Cliffs of Utah. These systems provide key habitat for some of the most significant mule deer herds in North America. The region also holds some of the largest energy reserves in the United States.



**Figure 2. Watershed map of the Greater Green River Basin project area**

Mule deer within the region are unique in a number of ways. Foremost is the herds' dependence on migration and seasonal habitats. The highly dynamic topography of the GRB creates the need for animals to move across large distances by season. Deer take advantage of the rich vegetative communities found within higher elevations during the summer months. Because of the extreme snow and cold, the animals are forced to move down in elevation during winter months, surviving in the relatively low sagebrush hills where relief from snow depth and temperatures can be achieved. Some of these migratory paths can stretch to more than 100 miles. The transitional ranges that connect these ranges are also important habitats, providing the necessary forage to compensate for the migratory stress, and they often serve as parturition, or fawning areas.

The migratory nature of the mule deer herds presents additional management challenges. Most of the winter range lies on lands administered by the BLM or on private lands, while most summer range is managed by the USFS. Deer depend on access to quality habitat on both ranges for survival, but winter range is determined by most deer biologists to be the limiting factor – the habitat in least supply relative to others and therefore the determinant of population levels – for deer herds.

Due to these circumstances, this project's analysis of habitat management by federal land agencies, this project limits its analysis primarily to the BLM; however, units administered by the USFS also are

included due to the presence of summer range. Due to their relatively minimal importance, no other federal agencies are included (i.e. USFWS, NPS, Bureau of Reclamation, etc).

Management complexity arises when one agency manages habitat in ways that are incongruent with the goals and objectives of another agency. This problem is complicated by jurisdictional fragmentation among agencies. BLM and USFS management boundaries, as well as state lines, are largely arbitrary and do not correspond with the boundaries of a mule deer herd unit or habitat boundaries. The GRB is unique in its relative large amount of jurisdictional complexity, a product of the fact that the region stretches across three states. Deer readily move across these jurisdictions in their seasonal migrations; therefore, one deer herd can be managed under a fundamentally different framework depending on the season, agency or habitat. In many ways, this serves to further complicate mule deer habitat management and coordination with state fish and wildlife agencies.

### **Current deer distributions**

Populations of mule deer stretch across the American West, from the Missouri River to the Pacific coast, from Canada to Mexico. They occupy a diverse set of habitats types but are most commonly associated with sagebrush communities. Within the GRB, deer are highly dependent on the vast expanses of intact sagebrush and other shrub communities.

According to the Western Association of Fish and Wildlife Agencies' Mule Deer Working Group:

Mule and black-tailed deer are distributed throughout western North America from the coastal islands of Alaska, down the Pacific Coast of California to southern Baja Mexico and from the extreme northern portion of the Mexican state of Zacatecas, northward through the Great Plains to the Canadian provinces of Saskatchewan, Alberta, British Columbia and the southern Yukon Territory. Consequently, mule deer occupy a wide diversity of climatic regimes and vegetation associations including coastal rain forests, icy mountains, prairie grasslands, Yukon River valleys, and deserts. By occupying this diversity of habitats, mule deer have developed an incredibly diverse array of behavioral and ecological adaptations that allow this species to persist in an ever-changing West.<sup>xiii</sup>

As the WAFWA description points out, mule deer are highly adaptable to unique conditions. Therefore, depending on the location, mule deer can behave in fundamentally different ways. The herd units within the GRB rely on migration to survive the unique climatic conditions found in the region. Not only are shrub communities important, but the connection of these seasonal habitats is central to the persistence of these populations.

### **Current deer populations and objectives**

As habitat stresses continue to increase, mule deer populations are at greater risk. As habitat decisions are made, it is important to recognize existing populations and population trends of deer within the area. Tables 2- 1, 2-2 and 2-3 offer mule deer population estimates, by herd unit, for the herds found within the GRB. The data spans 2003-2008 and displays both post-hunt population estimates and herd unit population objectives. It is collected from the respective state wildlife agency.

“Herd units” are defined as a population of animals that occupy a given geographic area and have less than a ten-percent population exchange with neighboring units.<sup>xiv</sup> The herd units included in the following tables are formally established and identified by the state wildlife agencies. The herds in the GRB are some of the largest and most important to sportsmen within the Intermountain West.

Each state wildlife agency is responsible for the management of wildlife within its state’s boundaries. A significant portion of their responsibilities lie in creating population objectives for mule deer herds within their jurisdictions. Population objectives are meant to establish a balance between populations of mule deer and the available habitat, but they also are intended to designate populations of animals that support adequate hunting opportunities.

As a senior biologist with the Wyoming Game and Fish Department observed, population objectives do not always correspond to carrying capacity, defined strictly in an ecological sense. They often are a number that is socially and politically acceptable. First, objectives depend on maintaining huntable populations of wildlife. They also depend on available forage within the habitat; for units that depend heavily on private lands for forage, landowners are an important determinant of how many deer are acceptable within that herd.

Because the majority of the habitat for mule deer is located outside the state wildlife agencies’ discretion, population objectives and current population estimates matter to federal agencies and private landowners. It is imperative that population objectives are coordinated with habitat managers, particularly on public lands in order to meet population objectives established by the state wildlife agency. Therefore, mule deer herd unit population objectives set by the state should be included in shaping habitat management direction and other land use policy decisions by the federal agencies.

**Table 2. Wyoming mule deer herds within the GRB** (Post-hunt population estimates and population objectives for 2003-2008 are included. Numbers are aggregated from job completion reports prepared by regional offices of the Wyoming Game and Fish Department).

<u>HERD</u>	2003	2004	2005	2006	2007	2008
<u>Wyoming Range Herd</u>						
Population	31,367	27,590	27,169	26,967	37,074	31,079
Objective	50,000	50,000	50,000	50,000	50,000	50,000
<u>Sublette Herd</u>						
Population	34,022	26,633	28,044	26,474	31,241	28,412
Objective	32,000	32,000	32,000	32,000	32,000	32,000
<u>Uinta Herd</u>						
Population	19,200	20,000	18,536	18,563	20,000	NA
Objective	20,000	20,000	20,000	20,000	20,000	20,000
<u>South Rock Springs Herd</u>						
Population	4,900	6,900	7,300	7,400	7,100	7,400
Objective	11,750	11,750	11,750	11,750	11,750	11,750

<u>Steamboat Herd</u>						
Population	4,100	4,300	4,700	4,600	4,500	4,770
Objective	4,000	4,000	4,000	4,000	4,000	4,000
<u>Baggs Herd</u>						
Population	20,300	22,500	23,000	23,000	23,600	17,500
Objective	18,700	18,700	18,700	18,700	18,700	18,700

**Table 3. Colorado mule deer herds within the GRB** (Post-hunt population estimates and population objectives from 2003-2008 are included (Data Analysis Unit abbreviated DAU)).

<u>HERD</u>	2003	2004	2005	2006	2007	2008
<u>DAU 1 Little Snake Herd</u>						
Population	NA	2,260	2,950	2,450	1,440	1,800
Objective	13,500	13,500	13,500	13,500	13,500	13,500
<u>DAU 2 Bear's Ear Herd</u>						
Population	NA	47,490	40,740	43,030	40,360	36,600
Objective	37,800	37,800	37,800	37,800	37,800	37,800
<u>DAU 6 Rangely Herd</u>						
Population	NA	7,870	7,680	7,190	5,650	4,160
Objective	7,000	7,000	7,000	7,000	7,000	7,000
<u>DAU 7 White River Herd</u>						
Population	NA	93,670	105,860	95,980	71,380	56,340
Objective	67,500	67,500	67,500	67,500	67,500	67,500
<u>DAU 11 Bookcliffs Herd</u>						
Population	7,945	8,770	9,800	9,910	11,670	12,390
Objective	20,000	20,000	20,000	20,000	20,000	20,000

**Table 4. Utah mule deer herds within the GRB** (Post-hunt population estimates and population objectives from 2003-2008 are included.)

<u>HERD</u>	2003	2004	2005	2006	2007	2008
<u>8 North Slope Herd</u>						
Population	4,400	4,700	4,900	500	5,100	NA
Objective	5,300	5,300	5,300	6,200	6,200	6,200
<u>9 South Slope Herd</u>						
Population	20,300	20,500	21,200	21,300	21,800	NA
Objective	25,000	25,000	25,000	26,000	26,000	26,000
<u>10 Book Cliffs Herd</u>						
Population	7,350	8,000	9,700	7,200	7,350	NA
Objective	15,000	15,000	15,000	15,000	15,000	15,000
<u>11 Nine Mile Herd</u>						
Population	3,500	3,400	2,950	2,950	4,150	NA
Objective	8,500	8,500	8,500	8,500	8,500	8,500
<u>12 San Rafael Herd</u>						
Population	-	-	-	-	-	-
Objective	1,000	1,000	1,000	1,000	1,000	1,000
<u>13 La Sal Herd</u>						
Population	8,700	9,200	9,625	10,850	11,100	NA
Objective	19,400	19,400	19,400	18,100	18,100	18,100
<u>16 Central Mountains Herd</u>						
Population	43,000	45,500	49,775	48,179	35,300	NA
Objective	60,600	60,600	60,600	60,600	60,600	60,600
<u>17 Wasatch Mountains Herd</u>						
Population	31,400	31,200	31,750	38,817	33,100	NA
Objective	40,800	40,800	40,800	40,800	40,800	40,800

Deer populations within the study area generally have been trending downward. While pinpointing the exact stressor responsible is impossible, the agency consistently states that the loss and degradation of

habitat has been an important detriment to mule deer populations within the GRB. A number of key herds to sportsman are significantly below population objectives, including the Wyoming Range (WY), Baggs (WY), Sublette (WY), Bookcliffs (CO-UT), and Central Mountains (UT) herds. Again, population objectives are set at a level to ensure populations of wildlife that are huntable. The degree to which populations slip below those levels jeopardizes hunting opportunities.

Increased oil and gas development has heightened the importance of coordinating federal actions that impact mule deer habitats and state management objectives. Recent federal project approvals have resulted in thousands of wells in important mule deer habitat, exacerbating impacts to mule deer populations and hunting opportunities. Indeed, some herd units have lost hunting opportunities as a result. For example, in the Baggs herd in Wyoming, the population decline has necessitated a reduction of five days from the hunting season, and it has lost a general hunting area, which was especially important for family and out-of-state hunting opportunities. From 2001-2006, 3,154 hunters pursued deer in this herd, but in 2008 the number was down by almost half, to 1,900.

These deer herds are critical to supporting local communities dependent on tourism, hunting and other outdoor activities. These diversified economic opportunities are critical to the rural West and are threatened by the effects of oil and gas and other energy development, which can destroy or degrade important mule deer habitat.<sup>xv</sup> Furthermore, the decline in hunting opportunities affects state wildlife agencies that have traditionally depended on license sales from deer to support the agency. Without these levels of revenue, states will have to turn to their legislatures for funding to support their work (see Table 1).

Mule deer in the GRB are dependent on access to seasonal habitats in adequate condition and large enough areas to sustain populations. This includes crucial winter range, migration corridors, transitional range and summer range. Without proper coordination amongst the land (habitat) managers and wildlife (population) managers, ensuring enough habitat will be available to meet state populations objectives is very difficult. The GRB has some of the best, albeit declining, mule deer herds in the West, important to sportsmen and rural economies and dependent on coordinated resource management actions.

### **Current threats from energy development**

As has been noted, the Greater Green River Basin is home to some of the United States' most significant reserves of energy resources. The study area has both significant reserves of traditional fluid minerals, like oil and natural gas, and burgeoning opportunities for renewable sources, such as wind, geothermal and solar. Additionally, significant opportunity for large-scale commercial oil shale development lies in the Basin's Green River Formation.

Energy exploration and development has expanded rapidly on the federal lands in the GRB in the last decade. An analysis done in 2008 of available statistics from the BLM, the federal agency charged with leasing federal lands for oil and gas development, shows that nearly 27 million acres of wildlife habitat in Colorado, New Mexico, Wyoming, Montana and Utah have been leased for oil and gas development. From 2001-2007, 15,376 new wells were drilled in Wyoming, Colorado and Utah.<sup>xvi</sup> From 1996-2000, only 4,366 wells were started.<sup>xvii</sup>

In the project area of the GRB in Colorado, Utah and Wyoming – the BLM has currently leased drilling rights on an estimated 7 million acres of public land and 2.4 million acres of crucial winter range mule deer habitat – 15,748 wells have been developed in crucial winter range within the project area.<sup>xviii</sup>

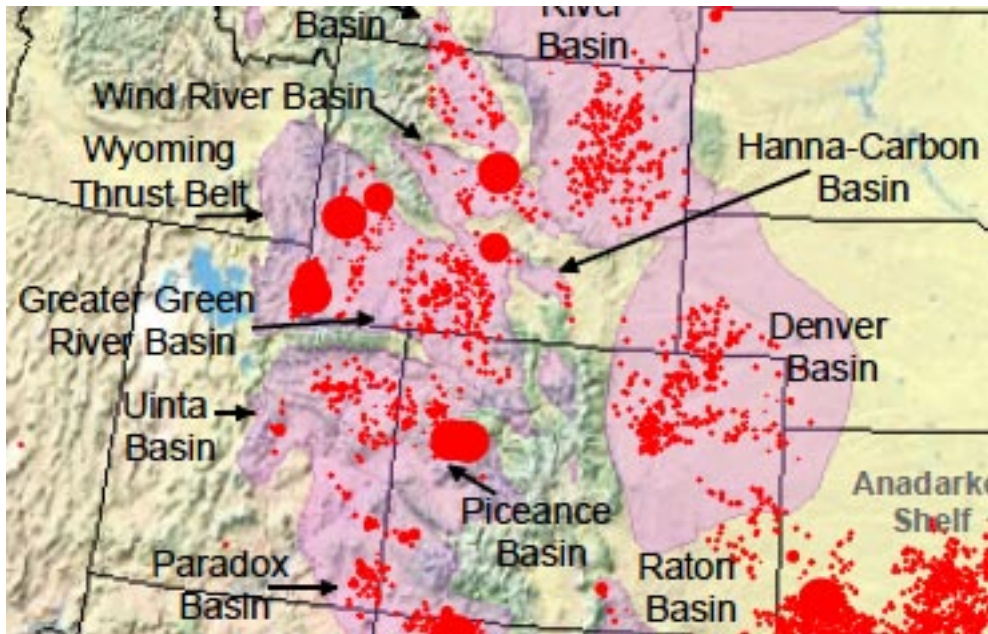
**Leases and wells in the Greater Green River Basin project area (CWR = Crucial Winter Range)**

Total Acres of Project Area	44,194,180
FS/BLM Acres within Project Area	22,293,043
Acres of Mule Deer CWR	10,429,656
Acres of CWR on FS/BLM	10,251,449
Leased Acres	7,008,246
CWR Acres leased on FS/BLM	2,431,911
Total Wells	53,005
UT	23,158
CO	9,471
WY	20,376
Total Wells in CWR	15,748
UT	2,786
CO	7,889
WY	5,073

Combined, the states of Wyoming, Colorado and Utah represent a significant portion of the nation’s traditional domestic energy production industry. The reserves found under these landscapes attract companies from across the country and around the world. The availability of vast acreages of available federal public lands, the high reward for finding profitable energy resources, and energy development friendly policies all combine to incentivize companies to search for new sources of energy within the region.

Wyoming makes the most significant contributions to the nation’s energy production of the three states. According to the Energy Information Administration, to date Wyoming currently produces 10.84 percent of the nation’s onshore natural gas.<sup>xxix</sup> In 2007 alone, Wyoming produced 1.92 trillion cubic feet (Tcf) of the total domestic 24.8 Tcf of natural gas<sup>xxx</sup> (a Tcf is enough gas to supply 15 million homes for one year). Taken together, Wyoming produces more fossil fuels than any other state.<sup>xxxi</sup>

Utah and Colorado also deliver substantial fossil fuel products to the market. Utah produced more than 306 billion cubic feet (Bcf) of natural gas in 2007, and in March of 2009 alone the state produced 1,973 thousand barrels of oil.<sup>xxii</sup> Colorado produced nearly identical amount of oil during the same month.<sup>xxiii</sup> As the EIA notes, “Utah also has substantial renewable energy potential; areas with geothermal, wind and solar power potential throughout much of the State.”<sup>xxiv</sup> Colorado produces another 1.24 trillion Tcf of natural gas, approximately 6 percent of the total domestic production for 2007.<sup>xxv</sup> Figure 2-2 illustrates the major natural gas basins found within the study area.



**Figure 3. Major natural gas production basins in tri-state area** (Size of red dot corresponds to relative amount of gas in billion cubic feet.)<sup>xxvi</sup> The Greater Green River, Uinta and Piceance Basins all are within the study area.

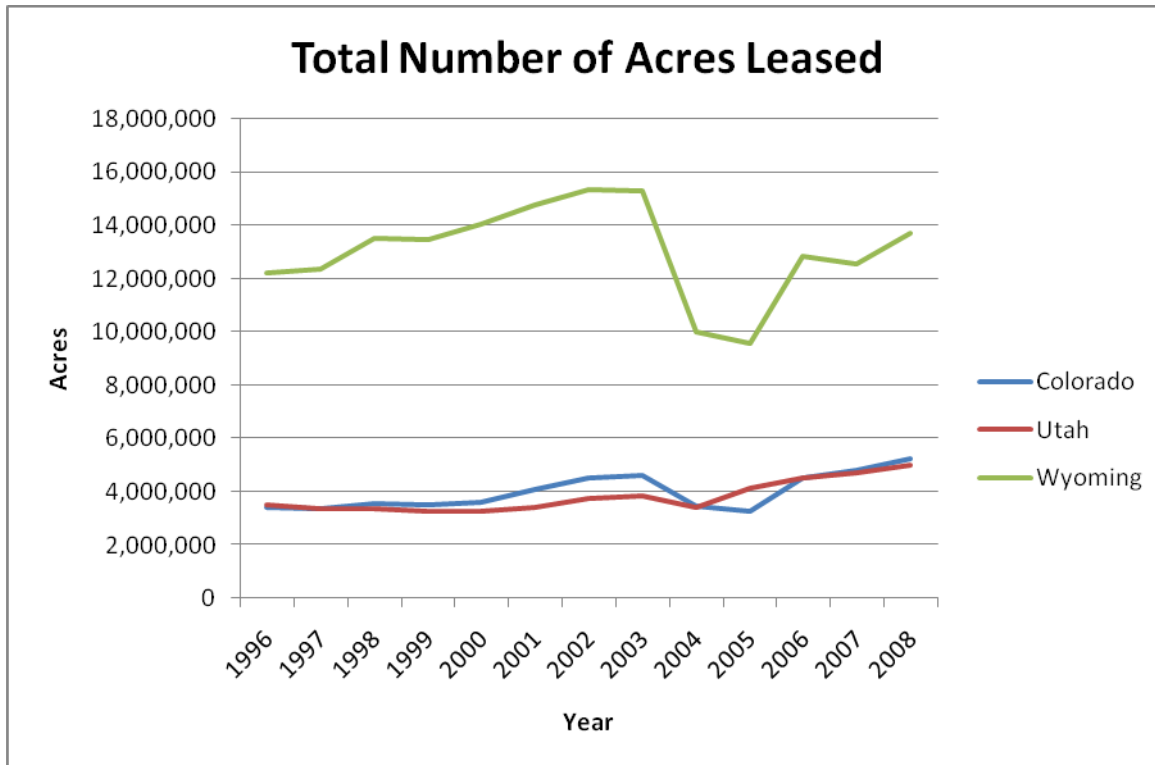
The BLM is the agency with authority to grant leases on all federal lands, including those managed by other federal agencies such as the USFS. The agency uses its land use planning system, as directed by FLPMA, to provide guidance on how the federal lands and minerals within a geographical planning region (district, Field Office) along with policy direction from the national and state offices determine which lands are available for mineral leasing. The overall direction for energy development is done during the land use planning process or development of resource management plans. Two other important decision points in development of mineral resources are the leasing process, where specific parcels of land are nominated and leased, and the permitting process, where wells and other infrastructure are approved.

Summaries of the amount of leasing and permitting (wells) are found in figures 4 through 7. The data was collected from the BLM concerning leases and drilling in Wyoming, Colorado and Utah. The figures demonstrate a clear trend toward increasing domestic production of oil and natural gas. As exploration and development continue to increase at these rates, wildlife habitat is at risk of loss or degradation. In fact, a significant number of the acres leased are found in critical habitats used by wildlife.

An analysis done in 2001 showed that within the five Rocky Mountain States, 63.1 million acres of crucial winter range are used by mule deer, 51 percent of which is on federal lands. Overall, 5.5 million acres of crucial winter range already has been leased, and 10.6 percent of the federally managed crucial winter range has been leased for oil and gas development, with 19,445 wells drilled in those ranges.

The consequences of development on these crucial winter ranges have significant impacts to mule deer populations. In the Sublette mule deer study, use of crucial winter range on the Pinedale Anticline declined by more than 60 percent with less than 3 percent surface disturbance of the project area. Research has confirmed that a significant portion of the loss was directly due to energy development.<sup>xxvii</sup>

**Figure 4. Total number of acres leased on federal lands<sup>xxviii</sup>** (This number does not represent the total number of acres leased per year but rather the total acreage under lease during that year.)



**Figure 5. Number of applications for permit to drill approved on federal lands<sup>xxix</sup>**

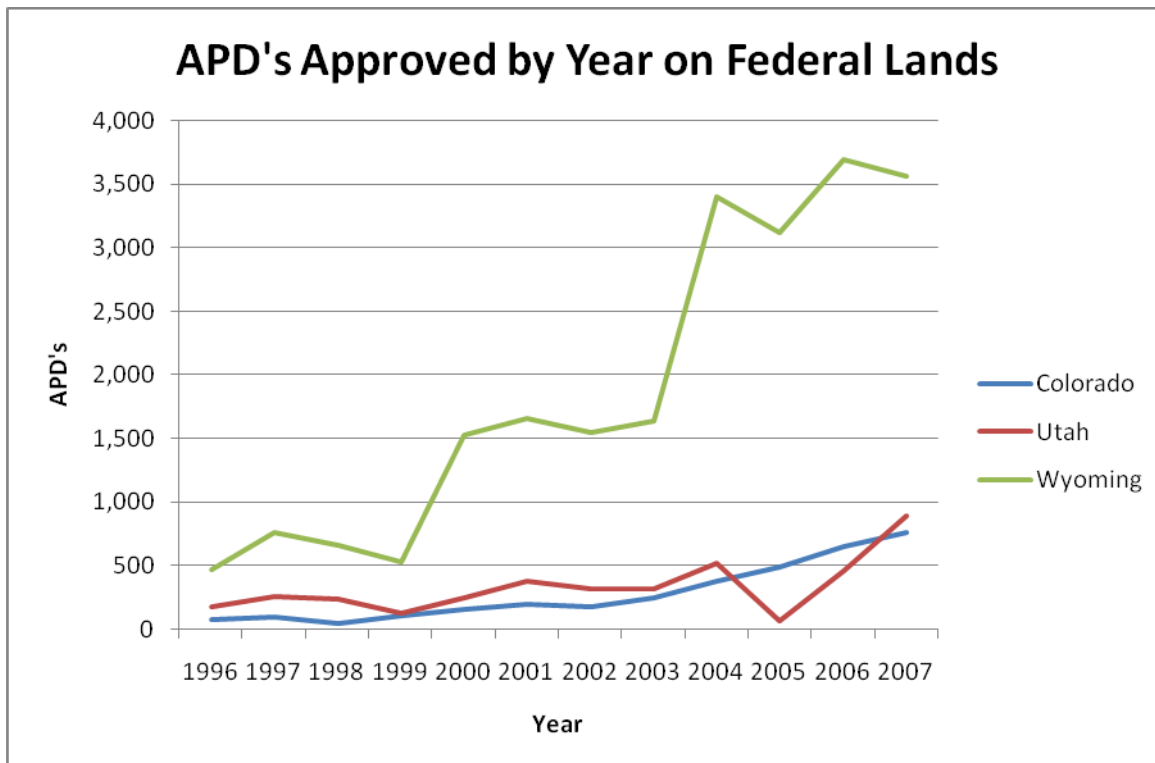


Figure 6. Number of wells drilled (spuds) on federal lands<sup>xxx</sup>

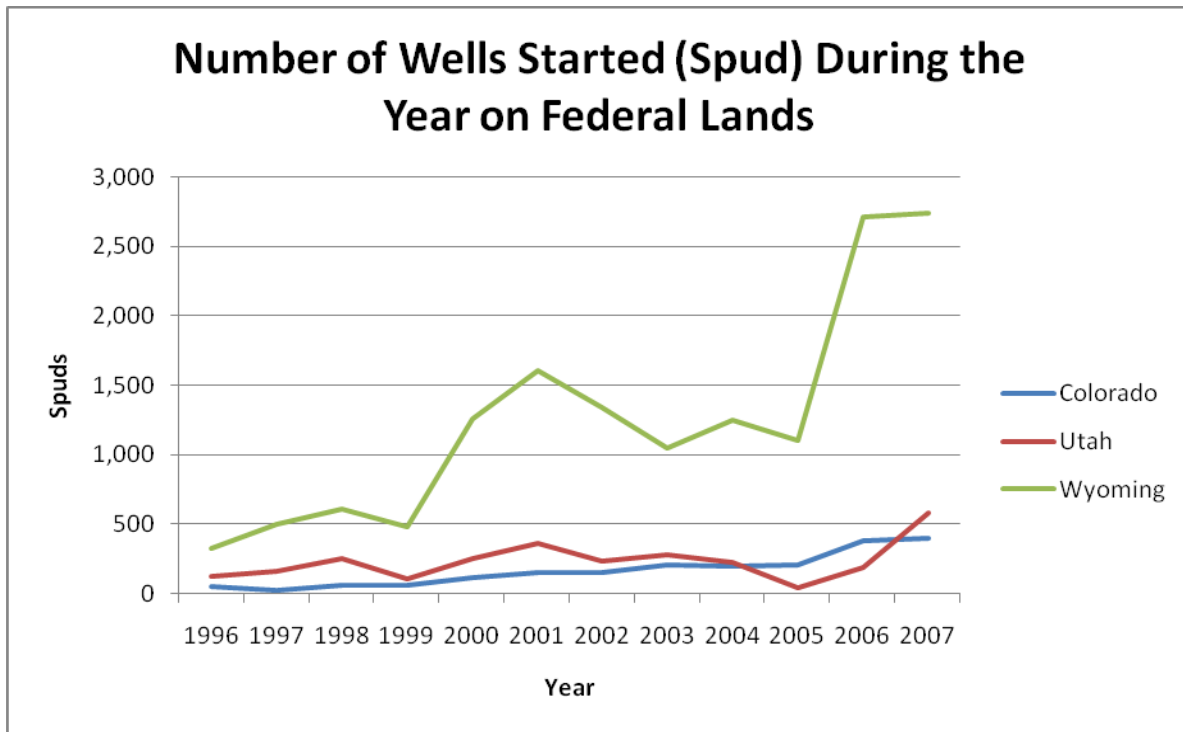
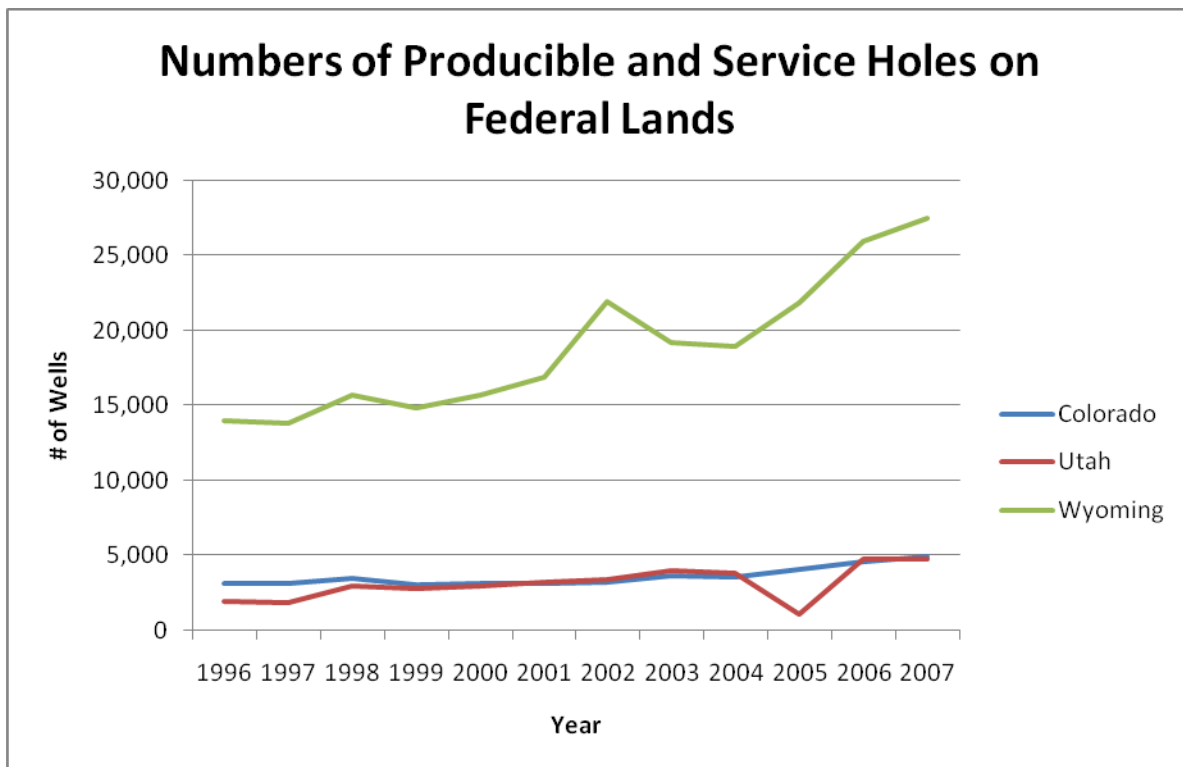


Figure 7. Number of wells producing oil and gas on federal lands<sup>xxxi</sup>



These figures demonstrate the marked increase in the number of wells being drilled across the three states. The increase is a direct product of the recent push to increase domestic production of fossil fuels on public lands. In May of 2001, President Bush issued Executive Order 13212. In it, he established that

In general, it is the policy of this Administration that executive departments and agencies shall take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy. For energy-related projects, agencies shall expedite their review of permits or take other actions as necessary to accelerate the completion of such projects.<sup>xxxii</sup>

Across the BLM's Field Offices, there was a directive to prioritize lease nominations and permitting of wells over other duties. In Utah, a policy memo from the Utah state director stated, "Utah needs to ensure that existing staff understand that when an oil and gas lease parcel or when an application for permission to drill comes in the door, that this work is their No. 1 priority."<sup>xxxiii</sup> In addition to numerous BLM and DOI policy shifts, Congress passed the Energy Policy Act of 2005, which also elevated the priority of energy production on federal lands. The push to increased production in the Interior West was very successful. For example, the Rocky Mountain region pushed past the Gulf of Mexico in 2005 in the production of natural gas.<sup>xxxiv</sup>

The sale of an oil or gas lease represents the conveyance of the right to explore and produce energy resources. Once a lease is issued, BLM has limited discretion to change lease terms and development if future conditions warrant additional restrictions or protections for fish and wildlife. A federal mineral lease is good for 10 years unless it's producing, at which point it remains valid as long as minerals are produced in quantities to provide a royalty payment.

Resource extraction activity is highly dependent on energy markets, and exploration increases when the price per unit is high and decreases when it is low. Because of the shift in priority to production of energy resources and meeting the needs of the lessee, the BLM has in effect, turned the key to controlling the rate of development on public land leases (and therefore fish and wildlife habitats) over to the business-driven model of lease holders. Mitigation actions such as phased development in timing or location or consolidated development therefore are not available. Industry has recently pressured the BLM to allow development during sensitive time periods such as during winter range closures or parturition closures, resulting in year-round development in sensitive wildlife habitats.

The BLM appreciates the conflict between energy and wildlife. The Pinedale, Wyo., BLM Field Office states in the 2008 Final Supplemental EIS for the Pinedale Anticline, "Because of the large amount of oil and gas reserves and existing leases in the planning area, loss of important habitat could occur throughout the planning area, depending on the economic feasibility of development and fluctuations in market price."<sup>xxxv</sup> Despite this acknowledgment, additional development was authorized within crucial winter range for a deer herd that already has experienced significant declines.

The demand for energy is not expected to decrease at any point in the near future, and energy companies are getting new wells approved at a rapid pace, particularly because of the implementation of "pilot offices" for permitting established by the Energy Policy Act of 2005. Additional pressure are expected because natural gas has been recognized as a cleaner burning fossil fuel with lower carbon emissions, meaning that development of gas resources in the Rocky Mountain region is predicted to grow.

The study area has garnered increased interest in renewable energy opportunities, particularly the development of wind resources. The interest is partly a product of President Obama's national policy

encouraging the production of renewable sources of energy. The development of renewable energy and the necessary infrastructure to deliver energy to the national energy grid will require the commitment of vast landscapes and much mule deer habitat.

Former Wyoming Governor Dave Freudenthal argued,

With some of the nation's largest natural gas fields, massive amounts of coal, ... not to mention ... world-class wildlife habitats and populations – Wyoming seems to be at the confluence of the great natural resource issues of our time. Add about 50 percent of the best winds in the United States in southern Wyoming and, according to some, a top 10 solar energy portfolio along with the transmission infrastructure that necessarily must attend these new industries, and Wyoming also stands at the headwaters of two entirely divergent courses: one that leads to promise and the other that threatens our way of life.<sup>xxxvi</sup>

Both Utah and Colorado are in similar situations. Former Utah Governor Jon Huntsman asserted, “Utah should position itself as a leader in renewable energy technologies and not lose opportunities to other western states ...”<sup>xxxvii</sup> Colorado’s push for wind energy production has been focused largely on the eastern plains, a region with significantly less conflict with wildlife values; however, a majority of solar potential is found on the Western Slope and in the San Luis Basin, putting development at significant odds with mule deer habitat.

The Western Governors’ Association identifies wind power as the region’s largest renewable energy opportunity and has worked with industry and other stakeholders to identify “western renewable energy zones” and transmission corridors to facilitate renewable energy development. The development of these renewable resources stands to significantly affect wildlife habitats, particularly mule deer.

The BLM has recently released a draft Programmatic EIS (PEIS) for solar power in six states, identifying 24 “solar energy zones” and 22 million acres of public lands that could be available for solar development. The PEIS coincides with BLM policy memorandum to field staff on processes to expedite and streamline the permitting of solar energy on public lands. Although outside our project area, it is expected to be the model for future solar development across the West.

Finally, the region is important in terms of oil shale. The Green River Formation, stretching underneath the three states, contains as many as 1 trillion barrels of oil, more than the currently known world oil reserves.<sup>xxxviii</sup> Production of oil shale thus far has proven to be technically and economically infeasible. If it becomes feasible, it will consume vast quantities of energy and water, both of which will affect wildlife.

### **State agency mule deer planning**

This report’s state wildlife agency analysis includes the three state agencies within the Green River Basin:

1. Wyoming Game and Fish Department (WGFD)
2. Colorado Division of Wildlife (CDOW)
3. Utah Department of Natural Resources, Division of Wildlife Resources (UDWR)

This research sought to identify the documents from each agency that guided management actions for mule deer within the state. While little consistency exists between offices, all states had strategic state wildlife action plans. These were included in the analysis. Both Wyoming and Utah have compiled mule-

deer-specific management plans. Wyoming also has developed a specific document offering suggestions for energy development and wildlife. Again, these agencies are charged with managing populations of mule deer and largely are able to coordinate with land management agencies only on the management of habitat.

The subsequent pages are separated into the significant categories and themes that emerged following analysis of these documents. They also are sorted by state. In no designed to be representative of all the ways these agencies have dealt with mule deer, it does provide a general sense of the approach.

To reiterate, this project aims to identify the responses of federal land managers and state wildlife officials to the stress of energy development on mule deer populations in the Greater Green River Basin. The analyses of the state documents, which are quite large, were narrowly focused around the issue of energy development. Other habitat stressors were not considered.

### **Overview of planning strategy used by the states**

Across the three states in this analysis, the strategy used by the respective wildlife agencies is as diverse as the political environments in which they operate. Unlike the plans regarding land management that have been reviewed for this project, the state wildlife agency portion of this analysis relies on the amalgamation of a diverse set of documents within each agency to distill lessons and perspectives on mule deer management.

Wyoming has been one of the most complete in its planning efforts for the management of mule deer in the presence of energy development. Certainly, this is most likely by necessity, as Wyoming has experienced more energy development than other states in the region. This analysis includes *Strategic Habitat Plan*, *The Wyoming Mule Deer Initiative* and *Recommendations for the Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats*. Herd-unit-specific strategies appear to be largely an effort to evaluate the existing habitat and prescribe population objectives.

The Utah effort is centered in one document, *Statewide Management Plan for Mule Deer*. For completeness, this analysis included *Utah Comprehensive Wildlife Conservation Strategy*. This document identifies key habitats within the state, two habitat types, mountain shrub and shrub-steppe habitats, are important for mule deer in Utah. These two documents were included in the analysis. Utah's herd-specific efforts, addressed in the statewide plan, were not included in this analysis. It appears that these strategies focus largely on developing specific herd population objectives.

Colorado offered the least comprehensive of the strategies for the conservation of mule deer. *Colorado Comprehensive Wildlife Conservation Strategy and Wildlife Action Plans* was incorporated into the analysis but includes virtually no mention of mule deer. The most significant planning for mule deer occurs within the district analysis unit level, where individual management plans for mule deer are being developed. Of the DAUs within the study area, only one plan, the Book Cliffs, has been completed. Another, State Bridge, is in draft form currently.

### **Interactions with federal land agencies**

The dominant method of interaction with the federal agencies identified by the states is through the land use planning process. For the BLM that is the development of resource management plans, and for the Forest Service it is the development of forest plans. State wildlife agencies are generally granted cooperating agency status under the revision process of these plans.

The definition of "cooperating agency status" comes from the National Environmental Policy Act of 1969, which the Council on Environmental Quality is tasked with implementing. Since RMPs and forest

plans are considered major federal actions, they must include a NEPA analysis. “CEQ regulations ... mandate that Federal agencies responsible for preparing NEPA analyses and documentation do so ‘in cooperation with State and local governments’ and other agencies with jurisdiction by law or special expertise.”<sup>xxxix</sup> State wildlife agencies fall under both.

For example, in Wyoming, the WGFD “serves its mission under this ‘cooperating agency’ umbrella by recommending measures to maintain and improve habitat conditions for mule deer and other wildlife.”<sup>xi</sup> This is done through individual BLM office land use plan revision processes. All three state agencies are considered “cooperating agencies” within the land use plans reviewed for this study. In this role, the state agency interacts actively with federal land managers during development and review of the plans.

These interactions can be unique depending on the state. The WGFD’s *Strategic Habitat Plan* places special importance on working through the governor’s office in collaborating with the land agencies on resource planning. State agencies also participate in ways other than the formal land use revision process. In the Wyoming Mule Deer Initiative, the WGFD proposes meeting more often with land agencies:

Wyoming Game and Fish personnel meet annually with BLM, USFS, NRCS, and other land management agencies to discuss habitat conditions, vegetation treatment projects, and recommend future management activities.<sup>xli</sup>

Agencies also review proposed lease sales, interacting with federal agencies at that point as well. A number of land use plans promulgate land managers’ coordination with state wildlife agencies to identify the necessary protective stipulations to protect wildlife resources. Occasionally, state agencies protest lease parcels due to the potential damage and loss of wildlife habitat.

A number of the interactions between the two entities will be described in the sections that outline the findings from the BLM and USFS. Most of these relationships are described in the process of monitoring and implementation of the land use plans.

### **Western Association of Fish and Wildlife Agencies**

To address the multitude of issues impacting recovery of mule deer populations, the Western Association of Fish and Wildlife Agencies chartered the Mule Deer Working Group. Comprised of representatives of all WAFWA member agencies (the 23 Western states and Canadian provinces), the MDWG was established to address three specific tasks, including

1. Developing solutions to common mule deer management problems
2. Identifying and prioritizing cooperative research and management activities in the Western states and provinces
3. Increasing communications between agencies and the public that are interested in mule deer and among agencies, universities and nongovernmental organizations interested in mule deer management.

Toward this end, the MDWG has developed strategies to improve mule deer management throughout the West and increased communication among mule deer managers, researchers, administrators and the public. Increased communication among agency biologists will allow managers to face new resource challenges with the best available science. This eco-regional and West-wide approach to mule deer conservation will allow natural resource administrators to make science-based decisions and provide up-to-date and accurate information to stakeholders.

The MDWG summarized these issues in a book, *Mule Deer Conservation: Issues and Management Strategies*, published in 2003. The conservation plan assembled by the working group provides a road map for improving management of mule deer populations and mule deer habitat. The MDWG has developed eco-regional habitat guidelines for mule deer management, created a region-wide habitat map and GIS database, published numerous books and articles on mule deer management, and maintains a website as a clearinghouse for mule deer issues. The working group also acts as “experts,” providing testimony on mule deer and other issues warranting specific expertise in mule deer management. The MDWG organizes the biennial WAFWA Deer and Elk Workshop where the latest research, information and issues are discussed. The BLM and Forest Service, along with some NGOs, are part of this working group, one of WAFWA’s most active.

WAFWA has entered into agreements on big-game management and energy development with federal agencies. Intended to foster better coordination between the states and the federal agencies, at least at the policy level, the agreements have resulted in specific evaluations of how energy development is treated within wildlife habitat and facilitate coordination on common issues. While these agreements are not intended to remove or transfer any rights or responsibilities for each party, they are not often referenced or discussed in federal land management planning or energy project development even though the federal agencies have signed the agreements.

### **Mule deer habitat management**

The distinction between the responsibilities of federal land managers and state wildlife agencies has been continually highlighted by this process. The heart of the conflict is that the state wildlife agencies, responsible for the management of mule deer populations, can be only as successful in their tasks as the federal land managers allow them to be. As the UDWR states, “the size and condition of mule deer populations are primarily determined by the quantity and quality of their habitat.”<sup>xlii</sup> This necessitates a strong working relationship between the two agencies.

The states are effective at identifying and mapping key mule deer habitats. Often, these maps are used by the land agencies in their land use planning process. In Utah, the UDWR has identified mule deer as a member of key ecosystems, particularly mountain shrub and shrub-steppe communities. The CDOW’s approach is to recommend habitat management strategies through their data analysis units’ mule deer management plans.

Most importantly, the process of habitat management presents an opportunity to resolve jurisdictional fragmentation of habitat. Indeed, the relationship with a state wildlife agency can become a sort of boundary spanning institution. Since wildlife move readily across political boundaries throughout the Green River Basin, a good relationship between the states and federal agencies surrounding habitat management could be extremely valuable. Take for example the Sublette mule deer herd in western Wyoming. This population summers in the Bridger-Teton National Forest then spends the winter across the BLM lands administered by the Pinedale Field Office, and small parts of the Rock Springs Field Office, in addition to various private land holdings. The WGFD has led in developing an initiative to deal with the Wyoming Range portion of this herd, thereby facilitating cross-boundary coordination among agencies and habitat managers.

In its strategic habitat plan for Wyoming, the WGFD frequently mentions collaborating across political and legal boundaries.<sup>xliii</sup> Substantial opportunities for achieving these goals exist in the mule deer habitat management. Unfortunately, the ideas don’t receive significant consideration in the land management

agencies' dialogue. Nowhere in the land use plans do the federal land managers mention using any sort of boundary-spanning management strategy.

Ultimately, state wildlife agencies largely play an advisory role in the management of mule deer on the large landscapes of the West. While they are active in the development of the actions of the federal land management agencies, it is ultimately up to federal managers to make decisions regarding habitat. Internalizing this relationship and extending a more rigorous obligation to the states will create a collaborative atmosphere, benefiting mule deer in the process.

### **Identification of crucial habitat**

A cornerstone of the strategy used by federal agencies to address the conflicting resource uses of wildlife and energy development has been the handling of crucial habitat. Within those land use plans, the federal agencies resoundingly recognized that crucial habitat – particularly winter range, in the case of mule deer – is the most significant limiting factor for populations throughout the study area. Crucial winter ranges are different than general winter ranges, and although this distinction is often discounted by many in the planning process, it is extremely important to mule deer management. Crucial winter range is where deer survive the harshest winters, usually when significant portions of the herd already have died. It is a place that assures survival of a population, not a place where deer typically spend the most time. For this project, we evaluated crucial winter range but identify that general winter range should be considered in proper mule deer habitat management. Mule deer are negatively affected by the development and degradation of crucial winter range, as been demonstrated by the Sawyer, et al. (2006 and 2009) work.

In the land use plans examined for this project, these areas were offered varying degrees of protection from the degradation caused by energy development. Most commonly, protection was offered through seasonal timing limitations, which prohibits drilling-associated activity to occur during the most critical periods of winter. The agencies, however, have been fairly consistent in granting relief from this restriction through waiving or modifying these stipulations. Occasionally, crucial winter ranges are offered “no surface occupancy,” or NSO, stipulations, and rarely, crucial winter ranges are withdrawn from leasing.

State wildlife agencies often play a critical role in helping federal land agencies identify these crucial winter ranges within the land use planning and lease nomination processes. Yet the state agencies, in strategic documents, think much more broadly about the term “crucial habitat” instead of limiting it to crucial winter range as defined here. For example, the WGFD is more intentional about what crucial habitat means, not just in a narrow winter range sense but rather in a broader perspective of how each of these habitats are necessary for wildlife.<sup>xliv</sup> The WGFD Strategic Habitat Plan offers some perspective:

Some values used to identify crucial habitats include: big game crucial winter range, sage grouse core habitats, SGCN [species of greatest conservation need] diversity and uniqueness, quality and condition of vegetative communities, movement corridors, quality of watershed hydrologic function, quantity of stream flow, quality and condition of riparian vegetative communities, lateral and longitudinal hydrologic connectivity and physical access by fish populations to all habitats necessary to persist.<sup>xlv</sup>

The reality is that winter range, while it may be the most limiting, is not the only habitat important to mule deer. The UDWR recognizes that a “lack in quality and quantity of available winter range is often the most substantial factor limiting the growth of deer herds; however, summer and transitional ranges can also have significant affects on fawn production and overwinter survival.”<sup>xlvi</sup>

Together, the agencies are vocal in recognizing the need to protect these crucial habitats and identify the linkages between crucial habitats and other habitats needed by mule deer throughout the year. The WGA recently funded numerous pilot projects concerning data and mapping inconsistencies across state borders – a paper exercise, but one which identifies and manages existing linkages on the ground. This more resoundingly asserts their value than standards applied by federal land managers. Some state agencies seek to take action to address this heightened value. Specifically, the WGFD has asked the BLM to withdraw important mule deer habitats from lease sales.

### **Impacts of energy development on mule deer**

As previously mentioned, the crux of this analysis is identifying the shared management responses of agencies regarding energy development of mule deer habitat. A significant first step is recognizing how energy development impacts mule deer habitat within the study area. The state agencies included in this analysis do so to varying degrees.

Arguably, the Wyoming Game and Fish Department is the most intentional about offering advice on the issue. The WGFD has been direct about the impacts of energy development on wildlife. To help encourage better planning and mitigation, the agency developed *Recommendations for the Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats*. This document was intended to provide guidance to WGFD employees during energy development planning and offer federal agencies and industry an upfront look at how WGFD evaluates different levels of development on mule deer. Unfortunately, this guidance often is ignored or discounted during land use planning or project development activities, resulting in failure to implement many of the recommendations.

The WGFD also has completed its statewide Mule Deer Initiative, which presents broad guidance on how the department intends to manage mule deer across the state and identifies how the agency plans to incorporate the mitigation guidelines:

Become involved at the earliest possible stage in federal planning processes that relate to exploration and development of mineral and energy resources. Put together alternatives, including operational practices that least impact mule deer and their habitat (e.g., Best Management Practices) and develop mitigation plans to offset habitat losses and other impacts. Consult the Department’s “recommendations for the development of oil and gas resources in crucial and important wildlife habitats: Version 2.0” and the Commission’s Mitigation Policy.<sup>xlvii</sup>

According to the Wyoming Mule Deer Initiative, the Game and Fish Department identified the objective of “mitigat[ing] impacts of large-scale oil and gas developments. Field development and operations plans should include both onsite and offsite mitigation as appropriate to offset habitat losses and maintain mule deer populations.”<sup>xlviii</sup>

To accomplish this objective, the WGFD Mule Deer Working Group has identified three strategies:

- (1) Use the Wyoming Game and Fish Commission’s Mitigation Policy and the Department’s “Recommendations for Development of Oil and Gas Resources within Crucial and Important Habitats” to develop mitigation plans for every oil/gas field impacting crucial mule deer habitats.
- (2) Engage individual energy companies and appropriate state and federal agencies to develop and implement effective reclamation and mitigation strategies.
- (3) Develop improved technological capabilities to mitigate energy development impacts.<sup>xlix</sup>

The Colorado Comprehensive Wildlife Strategy identifies resource extraction as a significant stress to wildlife habitat throughout Colorado, particularly in the northwest corner of the state.<sup>1</sup> This area is home

to some of the most significant and economically vital mule deer populations in the state. It also hosts significant energy resources. One area bound to be at the center of the energy/wildlife debate is the Piceance Basin, a huge area encompassing large expanses of mule deer habitat and experiencing a recent boom in energy development.

In Utah's statewide mule deer management plan, the UDWR acknowledges, "Crucial mule deer habitat is continuously being lost in many parts of Utah and severely fragmented in others due to ... development ...[, and] ... energy development ... [has] resulted in loss or degradation of mule deer habitat."<sup>ii</sup> Indeed, the region considered by this project has experienced a boom in traditional energy exploration in the last ten years. This trend can be expected to continue.

The UDWR recognizes the potential large-scale consequences of energy development within the state:

A boom in energy development in portions of Utah has already claimed and fragmented thousands of acres of mule deer habitat. Small, isolated disturbances within non-limiting habitats are of minor consequence within most ecosystems. However, larger-scale developments within limited habitat types are a major concern to managers because such impacts cannot be relieved or absorbed by surrounding, unaltered habitats (Watkins et al. 2007). Direct and indirect impacts associated with energy and mineral development have the potential to affect mule deer population dynamics, especially when impacts are concentrated on winter ranges or other limited habitats (Sawyer et al. 2002).<sup>iii</sup>

This project also has been interested in the impact of renewable energy on mule deer populations. Largely, little mention is made of these stresses in the documents reviewed. The Wyoming Mule Deer Initiative includes the development of wind and solar in its recommendations. The relative absence of these issues within the documents, however, is explained by the fact that wildlife managers simply do not know the extent to which these factors affect mule deer. As understanding increases, these issues should play a larger role in the discussions.

As previously mentioned, the WAFWA mule deer working group has developed the North American Mule Deer Conservation Plan, specific habitat guidelines and other key mule deer documents intended to provide the best available information and recommendations for mule deer management. These materials often are neither found nor referenced in most land use and energy planning efforts, although state wildlife agencies use them in coordinating mule deer management within their jurisdictions.

### **Summary**

The state wildlife agencies' responses to the challenges facing mule deer across the American West are greatly varied. In general, these approaches are disorganized. Rather than the standard approach taken by federal land agencies, the states each face these questions in unique ways. The relationship between these two entities is particularly interesting. Clearly, the relationship between the federal land managers and state wildlife agencies does not provide adequate opportunity to achieve effective management of mule deer in the West.

These documents demonstrate that the state wildlife agencies are concerned about the pace and intensity of energy development throughout the Greater Green River Basin. They acknowledge the potential consequences for mule deer. Some have attempted to synthesize knowledge and offer recommendations for responsible development.

Also clear is that the agencies are concerned about viability of mule deer populations across the study area. Each of the agencies is working to address the stresses to populations. Wyoming has published a

brochure conveying the importance of conservation for mule deer. Utah has completed similar documents. The agencies are taking proactive steps to address these challenges, but it is increasingly apparent that to be effective cooperation with the land management agencies will be necessary.

Taken together, a need emerges for states to take a more direct approach toward building a proactive framework for dealing with energy development in the presence of wildlife resources. The current haphazard strategies are not providing opportunity for the agencies to participate in the habitat planning process. In order to ensure that the population objectives can be attained, the state agencies must be meaningful partners in these processes.

### **BLM land use planning analysis**

The Greater Green River Basin is home to a number of the most significant mule deer herds in the American West. Its diverse ecology, topography and create prime mule deer habitat, where populations thrive on the rich expanses of sagebrush. Due to the climate, these populations are some of the most migratory, summering in the high mountain country and travelling as much as 100 miles to suitable winter habitat. These realities present unique management challenges.

The area is also rich in minerals. Underneath those sagebrush plains lie tremendous reservoirs of natural gas, coal, oil and oil shale. At the surface, the region is a draw for wind and solar energy production. Yet the presence of world-class wildlife and energy reserves foment considerable conflict.

This analysis explores the current status of mule deer management, paralleling the strategies employed by the land management agencies and those state agencies charged with managing wildlife populations. It summarizes BLM approaches to incorporating mule deer management into its resource management planning in the Greater Green River Basin.

For each BLM Field Office (FO) the most current resource management plan, accompanying final environmental impact statement, and the most recent RMP were analyzed to identify policies, strategies and actions that the BLM was taking to conserve mule deer habitat in the face of energy development.

The following pages review the significant categories and themes that emerge from the analysis of these documents. In no way designed to present a comprehensive picture of the BLM's approaches to mule deer habitat, they do provide a general sense of its strategy.

### **Wyoming**

The Wyoming analysis includes four BLM Field Offices:

1. Pinedale Field Office
2. Kemmerer Field Office
3. Rock Springs Field Office
4. Rawlins/Great Divide Field Office

### **Fluid mineral decisions**

Most importantly, the RMP planning process outlines the policy of the Field Office, or FO, in regard to leasing fluid minerals. Fluid minerals include oil, natural gas and coal-bed methane. Within the RMP, the BLM outlines the specific areas that will be open and available for leasing under the Mineral Leasing Act of 1920, as amended. The process assesses which areas will be unavailable for leasing, primarily through congressional or administrative designations like Wilderness Areas, Wilderness Study Areas or Special Management Areas. The agency also can determine that leasing certain landscapes will be unsuitable

due to significant conflicts with other resources, thereby foreclosing the agency’s obligation to uphold the principles of multiple use and sustained yield that are promulgated by the Federal Land Policy Management Act of 1976. Typical categories of leasing decisions made during an RMP include unavailable for leasing, no surface occupancy, lease under standard stipulations, and lease with special stipulations.

Within the RMP process, the BLM decides which stipulations will be attached to leases at the point of sale. The BLM defines a stipulation as “a provision that modifies standard lease rights and is attached to and made a part of the lease.”<sup>liii</sup> These lease stipulations often are used to protect wildlife values. Most often they are described as “surface activity buffers” or “seasonal timing limitations.” The industry can submit an application for relief from protective stipulations through waivers, modifications or exception to the stipulation. The local FO is in charge of the decision made for an exception, and the state director decides about waivers and modifications.

Table 4 highlights the acreage managed by each FO within the Wyoming portion of the study area. It also shows the percentage of the planning area that the most current RMP opens to leasing for fluid minerals.

**Table 5. Acreage by Wyoming Field Office,** including percentage of planning area open for leasing.

State Office	Field Office	Total Surface Acres	Total Sub-surface Acres	% Open for Fluid Mineral Leasing
Wyoming	Rawlins/Great Divide FO	3,500,000	4,500,000	97.9
	Rock Springs FO	3,600,000	3,500,000	95.9
	Kemmerer FO	1,423,816	1,600,000	87.18
	Pinedale FO	922,880	1,199,280	86.6

Within the Wyoming portion of the study area, the BLM has significantly opened most of the entire planning areas of the FOs to fluid minerals leasing, essentially leaving only municipalities and formal designations like WSAs unavailable. It demonstrates the BLM’s firm commitment to making lands available for mineral resource development to meet national domestic energy demand.

At the same time, the agency recognizes the sacrifice of wildlife these decisions entail. In its analysis of the 2008 proposed RMP, the Kemmerer FO said, “Although lumped for discussion purposes under surface disturbance, energy development is anticipated to be the greatest single contributor to disturbance of wildlife habitat in the planning area.”<sup>liv</sup>

Since stipulations are the most-often used tool to protect wildlife values, their effectiveness is essential. As highlighted in the winter range section, seasonal timing limitations are the most common form of lease stipulation used to protect mule deer. Timing limitations, often restricting drilling activity during winter periods (typically Nov. 15 through April 30), are applied to most crucial winter ranges throughout the study area. As previously noted, the leaseholder can apply to the BLM for an exception, modification or waiver of the stipulation. These often are granted if mule deer are not present on the range due to a number of factors, including mild winters, minimal snow depths, etc. Evidence to how any evaluation is

executed to approve these relief actions is frequently not available to the public, nor is the public given much notification for involvement in these important decisions affecting shared natural resources. The BLM has a very high approval rate for granting exceptions, modifications and waivers in recent winters. Table 2 shows approval rates for the selected field offices for relief from wildlife protective measures, including relief from mule deer winter timing restrictions.

**Table 6. Exception, modifications and waivers for Wyoming, by Field Office (2007-2008)**

	<u>Rock Springs</u>	<u>Pinedale</u>	<u>Kemmerer</u>	<u>Rawlins</u>
Requests	63	784	61	166
Approved	52	607	53	139
Denied	9	177	8	27
Modified	0	0	0	0
Unknown/No documentation	0	0	0	0
Approval Rate	83%	77%	87%	84%
Denial Rate	14%	23%	13%	16%

Some offices have tried to address real problems between leasing, development and wildlife management during recent RMP planning. The Pinedale FO was successful in making mineral leasing administratively unavailable on some lands valuable for wildlife in return for reducing protective measures in areas more appropriate for intense development.

**Oil shale decisions**

This project’s study area lies at the heart of the national oil shale conversation, necessitating a brief review of how oil shale decisions will affect mule deer. Largely, the answer at this point is that it is hard to determine the extent to which development will occur. Previous RMPs reviewed, written in the mid 1990s, did not address oil shale directly, largely a product of national energy markets.

The BLM prepared a programmatic EIS for oil shale leasing and development, but it was litigated and not implemented. Developments in 2011, through settlement with plaintiffs, will direct the BLM to revise the PEIS, which will amend affected RMPs. The additional impacts to mule deer are expected to compound habitat loss and degradation and further complicate habitat management. How competing leases will be handled is unknown, but direct, indirect and cumulative impacts to mule deer will certainly increase with oil shale development.

**Renewable energy decisions**

The BLM completed a programmatic EIS for wind development in 2005, and it effectively amended all RMPs included in the decision. It appears across the FOs considered in this study that the agency has overwhelmingly endorsed a site-specific National Environmental Policy Act approach to wind development. This requires the agency to conduct an in-depth environmental analysis for each proposal. In some cases the BLM recognizes that potentially serious wildlife consequences exist in wind development within the sage steppe communities. In the Kemmerer draft RMP dealing with wind energy, however, no mention is made of the impact of wind infrastructure on wildlife. It does acknowledge the fact that often in the ROW process there may be conflicting resources, including

wildlife. The Kemmerer draft RMP mentions that wind may conflict with wildlife, particularly through infrastructure, and that those conflicts would be considered during the ROW review process and associated NEPA.

The Rawlins/Great Divide RMP ROD prescribes the following standard:

Proposals for alternative energy development will be considered on a case-by-case basis. No proposals for alternative energy development, other than wind power, are anticipated to occur in the foreseeable future; therefore, only wind energy potential is considered. Proposals for location of wind energy development will be considered on a case-by-case basis and subject to a site-specific NEPA analysis. Areas with important or sensitive resource values will be excluded or avoided.<sup>iv</sup>

The BLM is following the site-specific model for projects in southern Wyoming. Large-scale solar energy projects receive little mention in the RMP documents. The Rock Springs FO references geothermal resources in its 1997 RMP, stating that areas off limits to fluid mineral leasing also are closed to geothermal development.

### **Mule deer crucial winter ranges**

Overwhelmingly, the BLM has endorsed the premise that mule deer populations are limited by the presence of intact crucial winter range, the habitat component in generally in least supply. They recognize that mule deer herds across this portion of the basin depend heavily on the availability of winter range browse to survive the harsh weather and deep snow of western Wyoming.

Recognizing this, a number of FOs call for the improvement of crucial winter ranges through various treatment strategies. They recognize the diverse stressors that compromise the integrity of these important habitats. A number of projects are prescribed to affect succession, particularly habitat diversity, water availability and grazing. They also acknowledge that winter habitat loss and degradation have increased the importance of the remaining, intact winter range habitats.

The Rock Springs FO states, “High value wildlife habitats will be maintained or improved by reducing habitat loss or alteration and by applying appropriate distance and seasonal restrictions and rehabilitation standards to all appropriate activities. These habitats include crucial winter habitat, [and] parturition areas.”<sup>lvi</sup>

In the Rawlins FO, harsh winters in the early 1980s affected decisions about crucial range for mule deer. The FO is home to one of the most important mule deer herds for sportsman in south-central Wyoming. In the 1990 RMP, the Rawlins BLM declared, “Crucial winter ranges for all species [would] be protected. Surface disturbance will be mitigated to restore or replace habitat.”<sup>lvii</sup> This was in direct relation to the Sand Hills Area of Critical Environmental Concern, recognized as important for migration routes and winter range habitats.

Nonetheless, in action, attempts to protect these “high value habitats” have been compromised. In the Wyoming Field Offices, the standard approach to resolving conflicts between big game and energy development on crucial winter ranges is to apply seasonal timing stipulations. Every FO within the study area applies this stipulation to development within crucial big game ranges. For the most part they stretch from Nov. 15 to April 30. While they prevent drilling activity during high-stress winter periods, they do not protect the actual habitat nor address fragmentation, degradation or loss of habitat; nor do they address behavior avoidance that development and activity elicit from deer. The only place where crucial winter range habitat protection occurs is within areas that are unavailable for leasing for some

other reason (e.g., WSAs). The BLM does not recognize that crucial winter ranges present sufficient justification for making areas unavailable for leasing and development, even though the agency admits that development significantly affects mule deer habitat.

Furthermore, all four FOs state that seasonal stipulations can easily be modified or waived at industry's request. Through these actions, the agency demonstrates that identification of these crucial ranges does not equate to habitat protection. The BLM makes clear that its policy for seasonal restrictions on development within crucial winter ranges is adequate for NEPA evaluation purposes and for assigning lease stipulations but addresses neither impacts to habitat nor future habitat management, whether or not development would adversely affect deer. Furthermore, the application of mule deer winter timing restrictions to energy development leases or permits does not mean that no development will occur within these areas; rather, development usually proceeds, often with relief from restrictions.

In some areas, seasonal protections are not even afforded winter range. In Pinedale, where the wildlife management zones were created under the 2008 RMP, the agency allows year-round development within the "intensely developed zones." Some of these areas lie in crucial winter range, including the mesa, where mule deer populations have been significantly impacted since development, with 60-percent declines in wintering deer.

Some crucial winter ranges are designated as areas of critical environmental concern, or ACECs, in the study area but not because they are crucial winter range alone. The BLM has argued that simply the presence of crucial winter ranges is insufficient to meet the ACEC standard, which is "relevance" and "importance".<sup>lviii</sup> A number of the ACECs designated in the Rawlins FO have wildlife objectives included but were designated for other resource values. In the 1990 RMP, the BLM designates the Sand Hills ACEC, and within the wildlife habitat management section it calls for an inventory of mule deer avoidance areas (where disturbance is high). It also presses for creation of action plans to mitigate the effects of identified mule deer behavioral avoidance zones. Clearly the RMP recognizes these areas' importance to the survival of the mule deer herds. It is unknown whether these action plans were ever created, because they could not be located. The 2010 RMP revision for the Rawlins FO neither mentions nor includes these action plans.

The ACECs designated in the 1997 RMP in the Rock Springs FO generally mention the value of big game habitat as a central tenet of their designation, but a combination of values resulted in their being established. Most areas are still open to leasing, however, and an ACEC prevents neither existing uses nor future development. Most include the seasonal stipulations for winter surface disturbance but fail to address the loss and degradation of habitats that is central to maintaining mule deer populations.

The BLM recognizes that habitat conditions on the winter ranges are inadequate to sustain optimal mule deer herds. "Loss of crucial winter range along valley bottoms and movement being restricted ... are limiting factors to growth in mule deer herds. In some locations, such as the Little Snake and North Platte River valleys, conditions of crucial winter range are generally fair to poor."<sup>lix</sup> Furthermore, the agency acknowledges, "Oil and gas development would [further] reduce usable habitat and disrupt wildlife movement."<sup>lx</sup>

In the Rawlins FO, the BLM identifies that "there are approximately ... 235,019 (21 percent of total, 61 percent of BLM controlled) acres of mule deer crucial winter range ... that would be directly impacted by areas that are identified for oil and gas and CBNG development."<sup>lxi</sup> "Displacement would result in animals being displaced to poorer (lower) quality habitat or habitat that is currently at carrying capacity."<sup>lxii</sup>

None of the Wyoming FOs identifies disturbance thresholds within the crucial winter ranges. A notable exception to this is the recent energy project approvals for the Atlantic Rim CBNG (5 percent surface disturbance cap within the project area) and the coordinated activity plan for the Jack Morrow Hills Planning Area (5 percent). In theory, it appears that development could occur on tremendously large scales across these crucial winter ranges, disturbing as much as 50 percent of the landscape, as long as drilling did not take place during seasonal closures. This should not be considered a solution to the problem, since the only way to ensure this happens is if aggressive monitoring strategies accompany the mandate. More importantly, recent research from the Pinedale Anticline show that 60-percent losses of mule deer happened with less than 3 percent surface disturbance (WEST, Inc. 2010)<sup>lxiii</sup>. Irreplaceable losses could occur with surface disturbance caps as low as 5 percent.

The BLM infers the most significant stressor on winter ranges to be noise and human presence, if that is so, seasonal restrictions seem logical. If the most significant stressor to mule deer on winter ranges is loss of habitat and displacement due to surface disturbance, however, the BLM is compromising the ability of mule deer populations to remain viable within developed areas.

The Rawlins FEIS for the 2010 RMP seems to acknowledge this fact:

Restricting surface disturbing and other disruptive activities within crucial winter range during the winter months would reduce the stress to big game during these critical times. However, loss or alteration of this habitat outside these periods would not be restricted. This prohibits disturbance to the big game during critical time periods but affords no protection to the habitat.<sup>lxiv</sup> (p 4-470).

Loss of the crucial ranges, even on a small scale, has significant consequences for mule deer. In the 2008 FEIS, the Pinedale FO quotes Sawyer (2006): “Sawyer et al. (2006) report a 46-percent reduction in wintering mule deer on the mesa portion of the Pinedale Anticline associated with a 2-percent direct habitat disturbance during 5 years of development”<sup>lxv</sup> (p 3-129). Protecting these habitats appears to be secondary to energy development, given the recent expansion of the project and removal of winter range protections. The Pinedale FO acknowledges, “Wildlife habitat would generally be protected only if a mineral commodity is not present for extraction”<sup>lxvi</sup> (p 4-247).

An argument can be made that, despite the large-scale landscape disturbance created by energy development, the consequences can quickly be negated by effective reclamation of disturbed lands. Throughout the environmental analyses, the BLM recognizes that doing so may not be that simple. In fact, an example of constructing usable winter ranges to replace ones lost or degraded by development is unknown. In the 2008 Pinedale FEIS for the RMP, the agency recognizes that reclamation has flaws:

Although reclamation of some disturbed sites would occur, the level of habitat diversity and quality that existed prior to disturbance would likely not be achieved for several decades and may never return to pre-disturbance conditions. This would likely result in permanent reductions in wildlife populations and impairment of water quality and vegetation communities in some areas.<sup>lxvii</sup>

### **Habitat management strategies**

A number of the units in this analysis recognize the need to manage habitat strategically outside of the RMP process. Some RMPs call for creation of specific, targeted habitat management plans. These plans seem to offer site-specific advantages and enable the agency to be more intentional about the needs and stresses for individual species like mule deer. Although firm commitments are made to habitat management plans, recent planning is moving away from HMP development, possibly as a response to

the BLM's increased pressure to accommodate increased energy development. The role of HMPs was not evident in any new RMP revisions or planning efforts that we examined.

In its 1986 RMP, the Kemmerer FO calls for the creation of HMPs "as opportunities arise."<sup>lxviii</sup> Specifically, the Rock Creek HMP is designed specifically for deer and elk range in coordination with GF. The Overthrust HMP will "address impacts to important wildlife habitat from energy development and associated activities within the Overthrust Belt."<sup>lxix</sup> We could not locate these HMPs.

The Rock Springs District identifies in its RMP that "habitat management plans will be developed, where needed, particularly for highly developed and disturbed areas to mitigate wildlife habitat loss."<sup>lxx</sup> Presumably, these plans would be developed to help mitigate the consequences of energy development in crucial ranges. It is unclear whether any plans have been developed; none were located.

The Rawlins FO has used a strategy of identifying wildlife habitat management areas where specific habitat objectives are provided to meet resource needs for wildlife. A number of these were created specifically for mule deer. The agency was to develop habitat management plans for each WHMA. Three are identified for the purposes, in part, of mule deer habitat. We did not locate any of these documents; nor did they seem instrumental in planning for the resource area during the RMP revision.

### **Wyoming Game and Fish objectives**

Another prevalent theme in these RMPs is the Wyoming Game and Fish Department's population objectives for mule deer herds within the respective planning area's jurisdiction. The WGFD manages the wildlife populations. While it has little control over the habitat management, it usually participates as a cooperating agency during RMP development.

The documents repeatedly reference WGFD mule deer population objectives. In 1986 the Kemmerer FO declared, "Activities which would jeopardize the attainment of the [Wyoming Game and Fish Department's] population objectives would not be taken."<sup>lxxi</sup> Similarly, the 1988 Pinedale RMP states that it will manage mule deer habitat to meet 1987 WGFD population objectives. During the RMP revision process, the Pinedale FO again emphasizes that meeting the population objectives is a priority.

In Rock Springs, the agency also addresses the issue, including potential changes to population objectives: "To the extent possible, suitable wildlife habitat and forage will be provided to support the WGFD 1989 Strategic Plan objectives. Changes within WGFD planning objective levels will be considered based on habitat capability and availability and site specific analysis"<sup>lxxii</sup> (p 24).

The problem with the current approach appears to be the lack of measurable actions that the BLM provides for itself within the RMP process. The agency is not specifying measures that will be necessary to attain the WGFD's population objectives. The BLM fails to identify and prescribe tangible actions that it can adopt to be held accountable for meeting objectives through habitat management or energy development activities. Simply saying that the BLM will meet the population objectives does not establish means for achieving them. In practice, it is a reactive policy, whereby negative consequences are realized and the BLM cannot be held accountable for failing to take specific steps to protect habitat.

The BLM itself recognizes the difficulty of attaining these goals. In the 2008 FEIS of the approved RMP, the Pinedale FO says, "These [cumulative] impacts would also reduce the capability to maintain current population objectives."<sup>lxxiii</sup> Certainly, as development continues at the level prescribed by the FOs in their RMPs, attaining these objectives will become increasingly impossible.

The BLM commits to working with and achieving WGFD population objectives for mule deer but fails to outline specific actions or commitments to meeting them. In managing important habitats for mule deer along with energy development activities that can severely impact this habitat, energy development actions and needs take priority over mule deer habitat management, particularly in how authorized development will impede the BLM's ability to manage habitats to meet WGFD population objectives.

### **Monitoring and inventories**

Most of the management actions outlined in the RMPs require effective monitoring to be of value. They also require the establishment of baseline inventories of the resource for future comparison (which is a fundamental premise of proper resource monitoring and management). The first stage of the RMP revision process is to amass a useful inventory of the current resource conditions in the planning area. If done properly, these two tasks – monitoring and inventories – will provide positive feedback to each other. The BLM commits to these actions, and both emerge as key themes in the documents examined.

In Pinedale, home to one of the herds of mule deer most important to sportsmen, monitoring was a critical piece of the 1988 RMP. It states that “mule deer ... use patterns will be monitored. Habitat trends for the species will be interpreted through survey data collected, in cooperation with ... monitoring activities. Interdisciplinary selection of key areas and plant species will ensure that crucial habitats are monitored.”<sup>lxxiv</sup>

In the Kemmerer 1988 RMP, the agency is responsible for inventorying important wildlife habitat. “Generally, inventories will be conducted to provide baseline data for a proposed management action, such as a habitat management plan, or to provide information in response to other program activities.”<sup>lxxv</sup> An example would be wildlife stipulations. In addition, the RMP states that important wildlife habitat will be monitored to determine seasonal habitat use and to identify areas in need of habitat improvement. Crucial big game ranges would be an example. “These data will be used to reach site-specific management decisions.”<sup>lxxvi</sup>

Concerns exist as to the usefulness of these approaches. According to the Kemmerer Draft RMP, “The BLM currently tracks disturbance in crucial wildlife habitat as part of the oil and gas inspection and enforcement program using data from a variety of sources, including industry”<sup>lxxvii</sup> (p 4-96).

Commitments to monitoring and inventory are admirable and required as part of FLPMA and NEPA, but no clear evidence emerged that the monitoring was completed as promised. We found no annual monitoring reports for any RMP implemented at the time we completed this investigation for this project. The agency appears to lack the resources, and therefore the commitment, to monitor mule deer and other wildlife at levels indicated in the RMPs, with exceptions where intensive monitoring was part of specific energy projects, like the Pinedale Anticline and Jonah projects.

### **Policy summary**

In addressing the unavoidable impacts of its proposed RMP (which opens 98 percent of the planning area to energy development) in 2008, the Rawlins FO summarizes its position on protecting mule deer habitat:

Because large areas of crucial big game habitat coincide with known areas of high and moderate oil and gas potential, impacts to crucial habitats would be unavoidable under current BLM policy to foster oil and gas development. However, productive oil and gas well sites and their associated infrastructure would be mitigated to the extent possible to minimize wildlife habitat fragmentation and avoid the most significant wildlife habitat values. Unavoidable adverse impacts to wildlife and wildlife habitat include reduction in quantity and quality of wildlife

habitat caused by oil and gas roads, facilities, engine noise, and human activity. This impact would occur for the life of the plan and beyond in many project areas.<sup>lxxviii</sup>

The BLM has made it clear in its environmental analyses that the most significant factor in accelerating the adverse impacts of energy development on wildlife is the rate at which lands are developed, resulting in loss of habitat, degraded habitats and fragmentation. The agency, however, has continually refused to address phased development as a viable alternative during energy projects. The result is that decisions affecting the rate of development occur at the leasing stage, which was not the intent during RMP development but rather a product of influence from industry. Interestingly, the market has had more to do with the rate of development than either permitting or access, a consequence of energy being a commodity and influenced by investors and proximity to end users. When market prices for natural gas are high, the pressure on and interest in development on BLM lands is extreme, and when the prices fall, the pressure subsides.

The Pinedale FO acknowledges this fact in the 2008 FEIS: “Because of the large amount of oil and gas reserves and existing leases in the planning area, loss of important habitat could occur throughout the planning area, depending on the economic feasibility of development and fluctuations in market price.”<sup>lxxix</sup>

These disturbances will cause large-scale stress on the greater ecosystem of the Green River Basin, a place where wildlife populations are highly migratory. Disturbing crucial ranges in one area significantly affects animals that populate a much larger area throughout the rest of the year. “As development expands throughout southwestern Wyoming, the ability of big game species and sage-grouse to disperse into habitats outside of the Upper Green River Valley becomes limited. This may create isolated populations in areas where habitats remain intact.”<sup>lxxx</sup> This is evident with the mule deer affected by the Pinedale Anticline project. The mesa portion of the herd is known, through GPS collars, to populate the entire northern portion of the Wyoming Range and Gros Ventre Range (12 WGFD hunt units).

## **Colorado**

The Colorado analysis includes two BLM Field Offices:

1. White River Field Office
2. Little Snake River Field Office

The analysis does not include the Glenwood Springs Field Office for two reasons. While at first glance the Roan Plateau within the Glenwood FO had the potential of offering important insight into the mule deer management question, upon closer analysis, the environmental analysis and planning did not bring anything significantly new to light that has not been considered in the Piceance Basin project. Second, the Roan Plateau and Glenwood FO do lie outside the Green River Basin watershed, so their inclusion was not relevant for this project. The Grand Junction FO was also briefly considered for analysis, but it clearly fell outside the Green River Basin and therefore did not warrant inclusion.

## **RMP mineral decisions**

Table 6 highlights the acreage managed by each FO in the Colorado portion of the study area. It shows the percentage of the planning area that the most current RMP opens to nomination of leasing for fluid minerals, both with under standard leases and with stipulations.

**Table 7. Acreage by Colorado Field Office**, including percentage of planning area open for leasing

State Office	Field Office	Surface Acres	Sub-surface Acres	% Open for Fluid Mineral Leasing
Colorado	Little Snake River FO	1,349,400	2,400,000	88.08
	White River FO	1,455,900	1,820,900	94.25

The summary of the mineral decisions in the Colorado portion of the study area shows results similar to Wyoming – that the BLM has significantly opened most of the Field Offices’ planning areas to leasing of fluid minerals, leaving essentially only municipalities and formal designations like WSAs unavailable.

Protective stipulations are used in Colorado to protect wildlife values during energy development. As discussed in the Wyoming section, the Colorado BLM accommodates requests for relief from protected stipulations through exceptions, modification and waivers. Table 8 shows the approval rates for the selected Field Offices.

**Table 8. Exception, modification and waivers for Colorado, by Field Office (2007-2008)**

	<u>White River*</u>	<u>Little Snake</u>
Requests	22	3
Approved	21	3
Denied	0	0
Modified	3	0
Unknown/No documentation	0	0
Approval Rate	95%	100%
Denial Rate	0%	0%

While significantly lower than Wyoming’s, Colorado also has a high approval rate for requested relief. These rates highlight the fact that even with protective stipulations intended to protect wildlife, the agency appears to make it easy for energy companies to access resources whenever requested.

### **Oil shale decisions**

In addition to the BLM revisiting the programmatic EIS as described in the Wyoming section on oil shale, the Little Snake River FO’s most current RMP revision process proposes considering applications for oil shale development as they are received. Generally, only the lands open for oil and gas leasing (88 percent of the FO) would be open for oil shale development.<sup>lxxxii</sup> Oil shale is not mentioned in the 1989 RMP, but this RMP was amended by the decision that was a result of the PEIS for oil shale (which was litigated).

The 1997 RMP for the White River FO prescribes opening lands to leasing for oil shale, both in situ and open pit. Potential oil shale leases are mainly located in the Piceance Basin, home to the largest deer and elk herds in Colorado. The document says that appropriate surface stipulations will be included on the leases, but it does not elaborate what those stipulations will be.<sup>lxxxiii</sup> Given BLM operations and

recent large-scale oil and gas development, stipulations probably would consist of seasonal timing limitations and possibly some level or cap on surface disturbance. Oil shale has the greatest impact potential for mule deer habitats managed by the White River FO, which is experiencing a boom in development for natural gas in the Piceance Basin.

### **Renewable energy decisions**

Wind resources are not as great as in the Wyoming portions of the study. A surprising dearth of wind energy analysis exists for the White River FO, with little to no mention of wind or other renewable energy development. The existing RMP for the Little Snake River FO also did not address wind or renewable energy. Arguably, this is because it was written in 1997, before the wind energy debate began in earnest. In the current revision of the Little Snake River FO, the agency proposes a site-specific NEPA approach to wind development. This requires the agency to conduct an in-depth environmental analysis of each proposal, as they are submitted, rather than an upfront analysis at the planning level of where wind would conflict most with wildlife. In some cases, the BLM appears to recognize that potentially serious wildlife consequences exist to wind development in the sage steppe communities.

Additionally, little mention is made of large-scale solar energy projects (or geothermal) within the RMP documents, except in the Proposed Little Snake River RMP, which says that solar energy would be encouraged as long as it is consistent with other resource objectives.<sup>lxxxiii</sup>

### **Crucial winter ranges**

As in Wyoming, the BLM has identified that mule deer populations are limited by the presence of intact crucial winter range. The agency recognizes that mule deer herds in this portion of the basin depend heavily on winter range to survive western Colorado's harsh weather and deep snows.

The 1989 Little Snake River RMP establishes crucial wildlife habitat seasonal restrictions on 36 percent of the federal mineral estate in the planning area.<sup>lxxxiv</sup> Seasonal restrictions apply to both migration routes and crucial winter range for mule deer.<sup>lxxxv</sup> An oil and gas amendment affirms the policy on seasonal restrictions. Big game crucial ranges are eligible for restrictions from Dec. 1 through April 30. Severity of winter can affect the duration of the restrictions, either shortening or extending them.<sup>lxxxvi</sup>

In the White River FO, the agency promulgates the standard seasonal limitations on winter ranges for mule deer. Although, it does include the possibility of designating summer range as critical to mule deer survival, necessitating timing limitations, none were identified. White River also tries to use seasonal restrictions to minimize road density to 1.5 miles per square mile on big game crucial habitat and 3 miles per square mile on all other habitats.<sup>lxxxvii</sup> Nonetheless, mule deer are mentioned infrequently in the FEIS, despite their prominence in the RMP. The RMP offers a general sense of mule deer's importance to the region but includes little information about the impacts of fluid mineral development on the species.

In the Piceance Basin, the White River FO deals directly with mule deer populations. "Habitat conditions sufficient to support a minimum winter deer population of 24,900 on BLM land in the Piceance Basin will be maintained as a critical threshold. Once development has met or exceeded this threshold, limitations to further development may occur."<sup>lxxxviii</sup> To achieve this goal, the RMP states that it will "reduce the duration, extent, and intensity of manageable forms of animal harassment during critical timeframes, and avoidance-induced disuse of suitable habitats considered limited in supply and/or critical."<sup>lxxxix</sup>

The Little Snake River FO encompasses 228,460 acres of crucial mule deer winter range within the planning area. The preferred alternative opens 149,670 acres to leasing in high oil/gas potential and 67,720 in medium potential. It places no surface occupancy on only 44,600 acres and controlled surface use on 6,440 acres. It closes 9,390 acres<sup>xc</sup> (p 4-59).

The Little Snake River FO does create a unique and interesting “opt-in” program for energy companies to reduce surface disturbance in exchange for loosening seasonal drilling restrictions. It sets a 5-percent surface disturbance threshold in exchange for year-round drilling.<sup>xcv</sup> The program’s effectiveness at benefiting mule deer populations remains unclear, particularly since no evidence exists how this would be implemented and research in Pinedale showed a 60-percent decline with less than 3-percent surface disturbance.

The Colorado BLM recognizes that the seasonal restrictions alone are insufficient to protect the habitat on which mule deer depend to survive. The agency observes that “seasonal restrictions would allow specifically for protection of wildlife during sensitive life stages, reducing stress on animals during these critical time periods; however, they would not provide long-term protection of habitat.”<sup>xcvii</sup> The Little Snake River FEIS acknowledges,

Mineral development would cause the greatest impacts on mule deer habitats on all lands within the CIAA through direct loss of habitat and animal displacement. Depending on the timing of activities and location of surface disturbance within the CIAA, disruption of severe winter range continuity and migration corridors between key habitats could occur, which would likely affect mule deer populations. It is unknown whether effects would be significant.<sup>xcviii</sup>

Some crucial winter ranges are within designated ACECs in Colorado, but again the BLM has argued that simply the presence of crucial winter ranges is not sufficient to meet the ACEC standard. Limited areas are scattered across the two FOs where this strategy has been used. It is less than in the Wyoming FOs.

The BLM identified that reducing stress on wintering deer is an issue and the reason for seasonal restrictions to activity but put less importance on the impacts and longer-term implications of habitat loss, degradation and fragmentation (although the attempt to limit road densities is based on limiting fragmentation of habitats). Interestingly, the Little Snake River revision process does not use the Sawyer et al. (2006) information to analyze the impacts of energy development on wildlife. In the White River FO, the agency has argued that the Sawyer information is not pertinent to the Piceance Basin mule deer herd.<sup>xcix</sup> This is contrary to what the WAFWA Mule Deer Working Group has postulated and is a specific attempt to discount or ignore research that indicates energy development has serious consequences for mule deer.

Reclamation also is noted as a way to mitigate impacts to mule deer but no reference is made to the effectiveness of reclamation actions. In the 2008 Little Snake River FEIS the agency recognizes that reclamation has flaws, stating, “Reclamation efforts, however, do not guarantee that habitat would return to its original function.”<sup>xcx</sup>

### **Habitat management strategies**

The 1989 Little Snake River prescribes that the BLM create habitat management plans for all resource areas, including wildlife.<sup>xcxi</sup> It does not stipulate that the agency must do species-specific planning. Once again, it is unclear as to whether or not these have been completed.

The White River FO refers to the Piceance Basin Habitat Management Plan. The RMP calls for the incremental revision of that document as projects and activity plans continue to occur.<sup>xcxii</sup> It is unclear whether this has occurred or even if the plan exists. Specifically, it refers to the road density objectives being identified as part of this process. In the Piceance in references the population objective set for mule deer, the BLM is mandated by its RMP to manage habitats to meet specific population objectives. No specific direction exists for how the BLM would meet this commitment; presumably these would be contained in an HMP for mule deer for the Piceance Basin, but we did not locate that document. Nor is it

referenced in specific projects that we reviewed. Recent large-scale energy development projects can potentially make achieving those commitments much harder.

### **Colorado Division of Wildlife objectives**

The Little Snake River RMP revision process creates a different picture of the relationship between the CDOW and the BLM in addressing habitat management. From the revision documents it appears that the BLM takes an advisory role with the CDOW regarding what populations can be sustained on the given habitat on BLM lands. This is different than the Wyoming FOs where the BLM committed, at least in the RMP, to managing habitat to meet the Game and Fish Department's population objectives.

The White River FO refers to the CDOW population objectives. The agency argues that its actions must "ensure that big game habitats provide components and conditions necessary to sustain big game populations at levels commensurate with multiple use objectives and state-established population objectives"<sup>xcviii</sup> (p 2-26).

The Colorado FOs are intentional about providing for Animal Unit Months within the planning process for wildlife populations. AUMs are used by the BLM to allocate forage for livestock grazing and typically not used for wildlife. This would suggest that the BLM is making the decision to provide a certain level of habitat or forage to sustain certain levels of wildlife, the CDOW population objectives, in managing habitats. This process, unlike Wyoming's, provides some measurable actions for achieving management of the mule deer populations.

For example, in the Little Snake River FO, the 1989 RMP says that "forage will be provided on BLM land to maintain approximately 66,400 mule deer ... [and] will contribute to total resource area big game populations of 110,660 mule deer."<sup>xcix</sup> The agency also lays the groundwork for the relationship that the two agencies will use to maintain these levels:

Wildlife-use adjustments will be implemented through consultation and coordination with the Colorado Division of Wildlife (CDOW) if monitoring data indicate that adjustments are necessary. Negotiation to implement changes in wildlife use will proceed as soon as data are available to support that change.<sup>c</sup>

The 1989 RMP for the Little Snake River describes briefly the value of mule deer in the planning area:

Because the Little Snake Resource Area supports an extraordinarily large number of mule deer, a rapidly expanding elk herd, varied small game, varmint, and furbearer populations, and consists of large consolidated blocks of readily accessible public land, the area remains one of the most highly regarded locations in Colorado for sport hunting.<sup>ci</sup>

In the Little Snake River RMP revision process, the agency appears very aware of the declines in mule deer populations during the 1990s and the consequences of those declines. The causes and consequences are considered at length in that document. Furthermore, the BLM recognizes the value of mule deer to sportsmen and local economies and identifies mule deer as a high economic/recreational value species. In the socioeconomic analysis, the agency attempts to identify the changes in value to local economies as a result of changes to mule deer populations.

### **Monitoring and inventories**

The monitoring and inventory pieces were not as prominent in the Colorado FOs as they were in Wyoming. It was mentioned more subtly and often in the general implementation sections rather than

specifically addressing mule deer monitoring or even wildlife in general. No RMP implementation reports or mule deer monitoring reports were located.

**Policy summary**

In addressing the unavoidable impacts of its proposed RMP in 2008, the Little Snake River FO summarizes its position on protecting mule deer habitat:

The short-term use of big game severe winter range, birthing areas, and/or migratory corridors for energy and minerals, Right of Ways, and cross-country OHV use could impair the long-term productivity of big game populations by displacing animals from primary habitats and removing components of these habitats that might not be restored for more than 20 years.<sup>cii</sup>

Again, the BLM identifies the pace and scale of development as key to managing other habitats within areas developed for energy. Crucial winter habitats for mule deer are identified as a limiting factor to mule deer populations. The Colorado BLM attempts to link habitat management to specific population objectives by habitat planning or the use of AUMs.

**Utah**

The Utah analysis includes three BLM Field Offices:

1. Vernal Field Office
2. Price Field Office
3. Moab Springs Field Office

**RMP mineral decisions**

Table 9 highlights the acreage managed by each FO within the Utah portion of the study area. It also shows the percentage of the planning area that the most current RMP opens to nomination of leasing for fluid minerals, both with under standard leases and with stipulations.

**Table 9. Acreage by Field Office, including percentage of planning area open for leasing**

State Office	Field Office	Total Surface Acres	Total Sub-surface Acres	% Open for Fluid Mineral Leasing
Utah	Vernal FO	1,697,039	1,911,000	88.99
	Price FO	2,479,000	2,723,000	77.24
	Moab FO	1,821,000	1,850,000	79.67

The Utah lease numbers are certainly lower than the other states, but that is because nearly all of the areas closed to leasing are WSAs, of which Utah has significantly more than either Wyoming or Colorado. Virtually no lands outside of WSAs are unavailable to leasing, and areas certainly are not made unavailable based on wildlife values. For example, in the Price FO the agency identifies 569,000 acres as unavailable to leasing, but only 39,000 of those are outside of WSAs that are unavailable.

The agency recognizes that opening lands for energy development will have consequences for wildlife. In the Price FO FEIS for the 2008 RMP, the agency admits that opening lands for energy exploration and production “would affect mule deer and elk populations and winter habitat, which would reduce regional big game populations, habitat carrying capacity and hunting opportunities.”<sup>ciii</sup> In the Vernal FO,

the agency argues, “In general, the greatest impacts to wildlife habitat would be fragmentation of essential wildlife and fisheries habitat due to continued minerals development.”<sup>civ</sup>

The Utah BLM also uses seasonal timing limitations as stipulations and management actions to protect crucial mule deer populations during winter periods from Nov. 15 to April 30. Investigation has shown that the Utah State Office has granted 100 percent of requests for relief from winter range restrictions when asked by industry for through a waiver, modification or exception.

The Utah FOs considered in this analysis all go to great lengths to highlight the principles of the Energy Policy and Conservation Act of 2005. Specifically, they identify the following:

1. Environmental protection and energy production are both desirable and necessary objectives of sound land management practices and are not to be considered mutually exclusive priorities.
2. The BLM must ensure the appropriate amount of accessibility to energy resources necessary for the nation’s security while recognizing that special and unique non-energy resources can be preserved.
3. Sound planning will weigh the relative resource values consistent with the Federal Land Policy and Management Act.
4. All resource impacts, including those associated with energy development and transmission will be mitigated to prevent unnecessary or undue degradation.<sup>cv</sup>

This emphasis might be because most of Utah’s RMPs were recently completed and subject to controversy over opening up previously restricted lands to leasing. An agreement between former Utah Governor Mike Leavitt and former Secretary of Interior Gayle Norton forbade the BLM from analyzing any additional lands for wilderness protection during the RMP process. This agreement discounted lands that might have met certain characteristics that would have not allowed making lands available for mineral leasing. This agreement was recently rescinded by current Secretary of Interior Ken Salazar through the new “wild lands” policy. Throughout the last two decades, much controversy and litigation has existed over Utah BLM mineral development policy as it relates to public land management within the state.

### **Oil shale**

Utah does not address oil shale specifically in any RMP but will implement decisions from the programmatic EIS for oil shale currently being revised by the national BLM office. Oil shale will predominantly impact the Vernal FO, which has received heavy oil and gas development.

### **Renewable energy decisions**

Similar to Wyoming and Colorado, the Utah BLM has taken a site-specific approach to wind and solar development on public lands. The programmatic EIS gives general direction for wind development and was incorporated into recent RMP decisions. In the Price FO, the RMP states that wind energy requires a site-specific NEPA analysis. Projects are considered on a case-by-case basis. The agency will not permit wind energy in areas of NSO or areas unavailable to fluid mineral leasing. Whether seasonal protections afforded mule deer critical habitats will be extended to wind projects remains unclear.

A draft solar PEIS gives specific direction for solar development in “solar development zones” and other BLM lands in the southern part of the state. Preliminary analysis of the document indicates the BLM will use seasonal construction restrictions for mule deer on winter habitats, but it does not address habitat loss, degradation or fragmentation.

### **Crucial winter range**

In the Moab FO, the agency intends to “protect deer and/or elk crucial winter habitat (349,955 acres) by applying a timing limitation stipulation for oil and gas leasing as well as other surface-disturbing activities,”<sup>cv</sup> It does not directly mention a policy of protecting actual habitat; rather, it supposes that preventing disturbance is equivalent and sufficient for mule deer. It does recognize the value of these habitats. “Maintain, protect, and enhance habitats to support natural wildlife diversity, reproductive capability, and a healthy, self-sustaining population of wildlife and fish species. Manage crucial, high-value, and un-fragmented habitats as management priorities.”<sup>cvii</sup> Without clear and precise measures for protecting these habitats, however, the BLM limits its ability to meet these obligations.

As noted in other states, timing limitations are only as useful as the agency implements them. By maintaining a high rate of granting modifications, waivers and exceptions, the agency prevents these stipulations from effectively addressing the impacts of additional stress on wintering mule deer. The Moab, Price and Vernal offices recognize that a seasonal restriction is not guaranteed:

The timing limitation stipulations in the Approved RMP are applied to crucial big game wildlife habitats identified by the BLM and the Utah Division of Wildlife Resources. The areas with timing limitations are open to oil and gas leasing and other surface disturbing activities but would be closed during identified timeframes that are important to the health of the species such as during winter and birthing periods, unless a waiver, exception, or modification to the stipulation applies.<sup>cviii</sup>

The timing limitation and controlled surface use stipulations in the Approved RMP allow for oil and gas development and other surface disturbing activities while providing protection for wildlife habitats, sensitive soils, and high quality visual resources. These stipulations are the least restrictive necessary for the protection of these resources.<sup>cix</sup>

This statement raises interesting questions as to how the agency defines the resource. It also places a substantial burden on the agency to prove their actions actually protect the resource rather than placing the burden of proof on industry to prove that their actions do not harm the protected resource.

The BLM is cooperating with the state in identifying crucial winter range boundaries, which determine the seasonal restrictions. “BLM uses the State Utah Division of Wildlife Resources (UDWR) crucial habitat boundaries to apply these restrictions because UDWR is the entity with jurisdiction and expertise over wildlife in Utah.”<sup>cx</sup>

The Price FO recognizes the problems that increased levels of disturbance that energy development create for wildlife. In doing so, it acknowledges that the statewide trends on mule deer crucial range could cause irreplaceable losses to key habitats and populations, “Critical mule deer habitat is continuously being lost in many parts of Utah and severely fragmented in others due to human expansion and development.”<sup>cx</sup> It also seems to recognize the consequences of expanded energy development on these landscapes:

It is anticipated that 1,540 gas and CBNG well pads would be developed over the next 20 years. This would result in approximately 12,366 acres of initial surface disturbance and 4,512 acres of long-term surface disturbance because of reclamation activities. Between 80 percent and 90 percent of the disturbance from oil and gas development would occur in the areas with high oil and gas potential. These areas contain habitat for ... mule deer. Wildlife would be directly impacted through the loss and fragmentation of crucial winter habitats, potentially causing redistribution or avoidance ...<sup>cxii</sup>

Most of the crucial winter range in the Price FO lies within these areas identified as high potential for oil and gas development: “About 70 percent to 80 percent of the crucial mule deer and elk winter range north and west of Price, Utah, also possesses high mineral material potential and would remain open for sale and development.”<sup>cxiii</sup>

The agency recognizes that these ranges already are limiting the ability of managers to meet mule deer population objectives. In the Vernal FO, all of the population units included in the study area are below the objective levels; however, the BLM risks the disturbance of even more habitat by opening 80-100 percent of the Critical range to fluid mineral extraction. The agency identifies that populations are below objectives due to drought and low productivity along with other factors, including energy development.

The Vernal Office attempts to do two things to help minimize losses of crucial winter ranges. First, a cap is set on the amount of lands that can be disturbed at any one time within these lands. “Within crucial deer winter range, no more than 10 percent of such habitat will be subject to surface disturbance and remain un-reclaimed at any given time.”<sup>cxiv</sup> Second, the office seeks to “acquire and protect crucial wildlife habitat through sale or exchange.”<sup>cxv</sup> These efforts are not supported by evidence that even as little as 3 percent of surface disturbance can cause drastic population declines and that winter range habitats are not effectively created elsewhere; they are determined by location and weather patterns over thousands of years. Furthermore, Utah citizens do not care for more federal land acquisitions.

### **Utah Division of Wildlife Resources objectives**

The Utah review of RMPs did not reference the state wildlife agency as explicitly as in the Wyoming case. The Utah Division of Wildlife Resources is the state agency that manages mule deer in Utah.

Largely, the Utah FO RMPs prescribe population objectives within the RMP rather than deferring to UDWR numbers. The RMPs repeatedly refer to the fact that mule deer populations across eastern Utah fall below population objectives identified by the UDWR. In the Price Office, the “affected environment” section of the RMP FEIS notes that populations of mule deer throughout the planning area are below the objectives identified by the UDWR.

In the Price FO, the BLM plans to identify and act on wildlife priorities but not specifically mule deer. Seemingly, these actions would be identified in conjunction with the UDWR. In identifying activities the agency will do the following:

Where possible, implement the conservation actions identified in the *Utah Comprehensive Wildlife Conservation Strategy* (Gorrell et al. 2005), which identifies priority wildlife species and habitats, identifies and assesses threats to their survival, and identifies long-term conservation actions needed, including those on BLM-administered lands.<sup>cxvi</sup>

In the Vernal FO, the agency attempts to build a relationship with the UDWR for establishing seasonal restrictions:

The BLM will coordinate with the State on issues related to crucial habitat to determine stipulations necessary to address impacts to the subject wildlife species. Following consultation, the BLM may grant an exception, modification, or waiver. BLM and the State will execute a protocol to implement this provision.<sup>cxvii</sup>

The extent to which this partnership has been fostered or if the protocol has been completed is unclear. Implementation is the key, but no regular reporting has been identified to indicate successful and effective implementation of these commitments.

In Moab, the agency aims to “coordinate with UDWR and other partners to help accomplish the population and habitat goals and objectives of big game Herd Management Plans that are consistent with and meet the goals and objectives of this land-use plan.”<sup>cxviii</sup>

The BLM also states that habitat improvement projects are a priority and, in executing them, will work with the UDWR. After identifying the critical habitat, the BLM will work with the state to find solutions to habitat degradation:

Manage UDWR current deer habitat of 534,329 acres in the Bookcliffs and 313,551 acres on the La Sal Mountains as mule deer habitat by improving or maintaining vegetative conditions to benefit both livestock and wildlife and by maintaining or improving the ecological condition of rangelands.<sup>cxix</sup>

### **Habitat management strategies**

A number of the units within this analysis recognize the need to manage habitat strategically outside of the RMP process through specific, targeted habitat management plans. These plans seem to offer site-specific advantages as well as enabling the agency to more intentionally address the needs and stresses of individual species like mule deer. How many of these plans have been completed by the agency remains unclear.

The Vernal FO openly endorses the strategy of habitat planning. “Existing Habitat Management Plans (e.g., Brown’s Park, Myton, and Diamond Mountain-Ashley Creek) will continue to be implemented and revised, and new ones will be developed as necessary.”<sup>cxx</sup> A number of these plans are mentioned throughout the planning documents, but how they relate to mule deer management is uncertain.

The Moab office also is concerned about using habitat strategies. “Habitat Management Plans: Continue to implement and modify three Habitat Management Plans (HMPs) summarized in Appendix U: Hatch Point HMP, Dolores Triangle HMP, and the Potash-Confluence HMP.”<sup>cxxi</sup> The Dolores Triangle area is especially important to mule deer, and the HMP mostly focuses on the herd in that area.

The Price FO also encourages the use of HMPs. In that resource area the agency will “continue existing Habitat Management Plans (HMP). Allow or participate in research of all wildlife species and their habitats.”<sup>cxxii</sup> It opens the possibility of forging unique partnerships to address specific mule deer habitat needs and how populations are impacted by energy development and other human activities.

### **Scientific information**

Interestingly, in the Vernal FO, the BLM added the Sawyer (2006) study on mule deer in the Pinedale Anticline in the modifications from draft RMP to final RMP. The office states that the inclusion of the information did not affect the big-game management decisions in the resource area and that the inclusion of the documents in the work cited did not affect the outcomes of the RMP planning process. *They argue that the inclusion was primarily because of protest letters filed by environmental organizations.*

In the Price FO, no mention is made of the Sawyer et al. (2006) mule deer study in either the RMP or the FEIS. The consequences of energy development on mule deer are said to be largely unknown. Clearly, a lack of consistent consultation and application of published science exists regarding mule deer in Utah FOs.

The Price FO attempts to address the emergence of any new or changing information through the leasing process, stating,

Review all lease parcels prior to lease sale. If the PFO determines that new resource data information or circumstances relevant to the decision is available at the time of the lease review that warrants changing a leasing allocation or specific lease stipulation, the PFO will make appropriate changes through the plan maintenance or amendment process<sup>cxxiii</sup> (p 125).

### **Monitoring and inventories**

Most of the management actions outlined in the RMPs require effective monitoring to meet goals and objectives. Nonetheless, the monitoring and inventory pieces were not as prominent in the Utah FOs as they were in Wyoming. They were referenced more subtly and often in the general implementation sections rather than specifically addressing mule deer monitoring, or even wildlife in general.

### **Policy summary**

In its analysis of the irreversible and irretrievable impacts in the 2008 Vernal FO FEIS, the agency recognizes the consequences of the decisions in the RMP:

Land categorization for minerals development in the VPA proposes to open, to minerals development, approximately 80 percent to 100 percent of available habitat for most wildlife and fisheries on BLM managed lands in the VPA. The habitat fragmentation associated with this development would create an irretrievable impact to wildlife populations by potentially breaking up wildlife populations into smaller populations more susceptible to population declines and possible extinction from random events. Additionally, this fragmentation would make wildlife movement between fragments difficult, as well as decreasing the habitat suitability for large mobile wildlife species that may require large habitat areas. This shift to smaller populations and smaller discrete habitats would create an irretrievable loss in wildlife productivity until the areas used as access roads and for other developments associated with minerals activities were reclaimed. Eventually those areas could be restored, so this impact would not necessarily be irreversible. However, there is the possibility of an irreversible loss of small isolated wildlife populations due to this fragmentation, particularly if reclamation of cleared well pads and roads does not occur within 20 to 30 years.<sup>cxxiv</sup>

At the same time, the agency stresses that energy companies should not worry about similar consequences of wildlife within the Price FO. The FO says, "Accordingly, neither the Proposed RMP nor any of the alternatives would result in unavoidable adverse impacts to mineral development."<sup>cxxv</sup> In fact, "The direct impacts of mineral resources decisions on oil, gas and CBNG development would be beneficial."<sup>cxxvi</sup> This highlights the stark difference in priorities in the RMP documents from Utah.

All of the Utah RMPs offer incomplete analyses of the impacts of energy development on mule deer. The literature is significantly less than analysis completed in other areas at the same time (the analysis of impacts on mule deer in the Pinedale RMP revision was much more extensive). The information was available and being used elsewhere; the agency simply failed to incorporate it into the RMP process.

### **Forest Service**

The USFS analysis includes seven national forests:

1. Medicine Bow-Routt National Forest (Wyoming/Colorado)
2. Bridger-Teton National Forest (Wyoming)
3. White River National Forest (Colorado)
4. Ashley National Forest (Utah/Wyoming)
5. Manti-La Sal National Forest (Utah)

6. Uinta National Forest (Utah)
7. Wasatch-Cache National Forest (Utah/Wyoming)

For each USFS unit, the most current forest plan and its accompanying FEIS were analyzed in an attempt to identify specific policies, strategies and actions taken by the USFS to conserve mule deer habitat in the face of energy development. This is most important because the national forests are home to significant summer ranges for the mule deer populations.

National forest planning is dictated by the National Forest Management Act, or NFMA, planning rule (1982), which guides how forest plans should be developed. Controversy surrounds forest planning, and numerous attempts have been made to rewrite the rules (in 2001, 2005 and 2008), along with much litigation. In 2010, the Forest Service once again undertook the process of revising the planning rule, and a draft NFMA planning rule was released in early 2011. The rule likely will be finished in 2011-2012 – and probably will be subject to continued litigation. The plans evaluated for this project were developed based on the 1982 planning guidelines, which did not emphasize energy development.

Not all portions of these national forest units lie within the Green River Basin. For example, the land use plan of the Medicine Bow National Forest includes portions of forest in eastern Wyoming, including the Thunder Basin National Grassland. To the extent possible, this analysis includes management prescriptions for only the areas of the national forest units located within the basin.

### **Mineral decisions**

The USFS mineral process is notably different from the BLM's. In fact, the agency does not have the authority to lease its lands directly for development. Rather, it operates under a memorandum of understanding with the BLM that requires the USFS's approval of any lease offered on national forests. The BLM retains the authority to grant the leases. At the review and approval stage, the USFS can attach stipulations to the lease to conserve the resource values in the development process.

Most decisions regarding stipulations are made at the lease point, rather than at a more forward point similar to the BLM process. Very few general stipulations are prescribed in the forest plans, unlike the RMPs written by the BLM. In fact, a number of the forest plans make no mention of the specific stipulations to be applied to the leases, and others fail to address specific stipulations that will be used to conserve national forest resources like mule deer in the face of energy development. This piecemeal approach may not be the most effective.

The Ashley National Forest's 1986 plan recognizes the agency's mandate in regard to mineral decisions. "In accordance with the Federal Land Policy and Management Act of 1976, the Forest Service must consider that all National Forest System lands are available for mineral exploration and development unless they are withdrawn from mineral entry and leasing."<sup>cxxvii</sup> The Forest also acknowledges, "The Forest is situated in the middle of major mineral and energy related development areas of the Uintah Basin and southwestern Wyoming."<sup>cxxviii</sup>

In the Bridger-Teton NF, the agency identifies that "minerals or energy exploration and development is encouraged. Lease stipulations emphasize mineral commodity production, while meeting some other resource objectives."<sup>cxxix</sup> The Bridger-Teton has addressed energy development through subsequent planning exercises, particularly when interest has been expressed through the lease nomination process. The Wyoming Range portion of the Bridger-Teton does have active production of leases in the Big Piney area, as well as plans for further exploration in the Hoback area. The Wyoming Range Legacy Act removes most of the forest from energy development, except for leases already held by industry. Certain areas of the forest have specific lease requirements and stipulations intended to protect fish and

wildlife, but whether those will remain in effect as development pressure continues is uncertain. The revision of the Bridger-Teton Forest Plan will address energy development and likely have to deal with mule deer specifically, given the impacts deer have experienced on adjacent BLM lands.

In the Manti-La Sal, the forest will “provide appropriate opportunities for and manage activities related to locating, leasing, exploration, development, and production of mineral and energy resources. Ensure that adequate reclamation of disturbed areas is accomplished.”<sup>cxxx</sup> The level of reclamation required is unclear; presumably it is mandated by the BLM at the time of the lease sale.

These documents barely recognize the tradeoff between energy development and other resources in the national forests. Unlike the RMPs prepared by the BLM, the environmental consequences of energy development on wildlife are barely acknowledged, if at all, in the accompanying EISs. A glimpse of these consequences is found in the Manti-La Sal 1986 Forest Plan, in which the agency acknowledges, “The entire Forest has been affected by the intense interest in oil and gas exploration and development generated by recent discoveries.”<sup>cxxxi</sup>

### **Renewable energy**

The forest plans do very little regarding the development of renewable energy on national forest lands. How the relatively new push for expanded renewable energy development on Western public lands will be managed on the national forests is unclear. The scientific community recognizes that large-scale development of renewable sources will affect wildlife populations, yet the extent of those effects is uncertain. Presumably, issues related to renewable energy development will be addressed in specific forest plan revisions.

### **Winter range**

The USFS units analyzed within this study were notably less vocal about the value of crucial winter range for the survival of mule deer. A number of the plans mention the need to enhance winter range habitat; however, very few deal directly with the impacts of oil and gas development on these lands.

Various factors could explain why the winter range issue is less central in the forest plans compared to how the BLM addresses these landscapes.

First, crucial winter ranges tend not to be located on national forests, leaving minimal portions of these habitats to the USFS. Most of these critical habitats are found on lands administered by the BLM or private landowners. Nonetheless, they are present on forests like the White River and Manti-La Sal. The forests that do expressly mention winter ranges within their planning documents rarely address threats from energy development.

Furthermore, none of the forest plans reviewed in this analysis has been updated since the most significant studies on the impacts of energy development on mule deer have been published. The Sawyer work on the Pinedale Anticline mule deer herds, the most important in answering this question, was not published until 2006. The most current record of decision within the study area was published in 2003. Certainly, this highlights a significant weakness with the system of land use planning: The agency continues to fail to meet its statutory obligation to use the best available science in its decisions affecting resources on the public’s lands.

The forest plans do make significant mention of winter ranges, however. In the Routt National Forest’s 1998 Plan, the agency states, “Deer ... winter or transition ranges are managed to provide adequate amounts of quality forage, cover, and solitude.”<sup>cxxxii</sup> The agency continues: “Deer ... will use this area during the winter and spring without being disturbed by human activities. Management of the area will

be coordinated with Colorado Division of Wildlife and other agencies responsible for wildlife management.”<sup>cxxxiii</sup>

Across the region, an intentional effort is under way to identify and improve these habitats. On the Bridger-Teton, “Sufficient habitat should be provided to maintain desired populations and distribution of big game species.”<sup>cxxxiv</sup> On the Manti-La Sal, the forest plans to “maintain or improve habitat carrying capacity for elk or deer. Cooperate with the State in keeping wildlife populations within the habitat capacity.”<sup>cxxxv</sup> These are relatively easy statements to issue at the planning stage, and their effective execution usually depends on budgets, a consideration that will be detailed in the section on habitat management plans.

For the most part, the national forests provide summer range for mule deer herds of the study area. Arguably, many of the national forest landscapes encompass relatively small expanses of crucial winter range when compared to the lands managed by the BLM. So, in some regards, the few mentions of winter range for mule deer in these documents is to be expected. Many of the lands managed by the national forests, however, do hold important transitional ranges. Mule deer biologists make it clear that these transitional ranges are vital to the survival of mule deer. Often these ranges serve as fawning grounds and provide much-needed forage for both surviving the winter and migrating to summer ranges. Interestingly, in the Cache National Forest, the agency argues that these ranges are not necessarily important and do not require actively management for stressors, including energy development.<sup>cxxxvi</sup>

Nonetheless, when the agency does prescribe protective stipulations within the land use plan, it is less aggressive about protecting crucial winter range for mule deer. That none of the forest units identifies specific stipulations is not implied; indeed, some forest plans do promulgate stipulations. One example is the Medicine Bow National Forest in Wyoming. At the same time, however, the stipulations for the winter ranges that do exist on the Medicine Bow are about protecting winter recreation use areas (which prescribe no surface occupancy, compared to the seasonal restriction of winter ranges).

### **Cooperation with other agencies**

A critical step to managing mule deer herds that readily move across lands overseen by multiple owners will be intentional and effective cooperation between land management agencies. It also is necessary given the unique situation previously described in which land agencies manage habitat and state wildlife agencies manage mule deer populations. A number of the forest plans acknowledge the need to cooperate in these endeavors.

For example, in the Ashley National Forest, the managers recognize the connectivity of management among different land managers. In the 1986 forest plan, they argue:

The condition and amount of available winter range adjacent to the Forest are critical factors governing the deer and elk populations as the majority of winter range occurs on lands adjacent to the Forest. The available habitat with suitable browse for winter range has decreased in past years. The summer range for deer and elk is much less critical for most of the Forest. However, summer range is a limiting factor on the South Unit of the Tavaputs Plateau because of the lack of water in the summer months.<sup>cxxxvii</sup>

The Bridger-Teton National Forest does not acknowledge as directly that cooperation is essential to managing mule deer across the landscape. Its 1990 forest plan recognizes that cooperation is necessary among a number of agencies in the management of wildlife species, including mule deer. It does not expressly state, however, that the actions taken by a particular agency affect wildlife populations as a

whole. The Forest Service was minimally involved in the recently completed Pinedale FO RMP and numerous large energy projects adjacent to Forest Service lands in the area. The Forest Service and BLM have a shared position regarding coordination, but that position has been used primarily to process permits for energy development activities.

In the case of the Bridger-Teton, the mule deer populations that spend the summer in the forest utilize the broad sage steppe of the Upper Green River Valley as critical winter range. These landscapes have been significantly impacted by energy development in the Pinedale area. Therefore, the actions of the BLM in the management of these landscapes directly impact the mule deer populations within the national forest, and vice versa.

Monitoring may be one of the most significant opportunities for collaboration. In the Medicine Bow National Forest, monitoring is done in close collaboration with the WGFD to establish and evaluate herd objectives, according to the 1990 forest plan.<sup>cxxxviii</sup>

Clearly, however, these land-use planning processes do little to set up an actionable framework of cooperation with the state wildlife agencies to match habitat planning with herd objectives. This framework must become more explicit to achieve higher levels of cooperation regarding the management of mule deer.

### **Recognizing importance of the species**

A number of the national forest units recognize that mule deer are an important part of the forest ecosystem and critical to the regional economies and communities that surround the national forests. Some also acknowledge that they can be used to assess the success of landscape-level, ecosystem-based management. They do this by identifying them as a management indicator species, a designation used during monitoring to assess the effectiveness of management prescriptions. Research has shown that mule deer require a complex assemblage of plant communities across the landscape to survive in significant numbers.

Due to their popularity among hunters across the West, mule deer also contribute significantly to local economies. Therefore, a number of Forest Service units identify them as an economically important species. For example, in the 1998 forest plan for the Routt National Forest, the FEIS recognizes the mule deer as an economically important species for the local communities. Additionally, the 1986 forest plan for the Ashley National Forest acknowledges that hunting provides vital economic support for the forest and surrounding communities. These designations are important to recognizing the value of actively managing the landscapes and habitats necessary for mule deer to propagate successfully.

In the Manti-La Sal National Forest, the unit uses mule deer as a management indicator species, “Mule deer are an economically important species occurring and hunted throughout the Forest. Hunting demand has been high, increasing, and is expected to continue increasing.”<sup>cxxxix</sup>

A number of the units analyzed here are in the process of revising their forest plans. These processes offer important opportunities to address the relatively few mentions of mule deer with the land use prescriptions. Unfortunately, the vision for the revised Bridger-Teton National Forest plan barely mentions mule deer management. The management of these important animals continues to be omitted from comprehensive visioning processes within the national forests.

### **Habitat management plans**

None of the national forest units expressly identifies the need to develop habitat management plans for mule deer, or any species, within its land-use plan. They rely on forest plan implementation and wildlife

program management, which typically is driven by annual budgets, to manage mule deer habitat in a strategic, comprehensive or cumulative manner. As previously noted, by addressing the stress of mule deer habitat at the individual lease point, the agency fails to tackle the landscape-level consequences of energy development in a forward thinking, direct manner.

### **Summary**

USFS documents offer little perspective about the ways land-use agencies are addressing increased pressures from energy development on public lands. This omission indicates a lack of commitment to managing mule deer populations within these lands. Historically, mule deer management was done within the framework of timber sale planning, and the recent decline in timber sales likely has affected the Forest Service's ability to manage mule deer populations. Political boundaries are creating problems in the ability of land managers to think in a broader sense – and to recognize that their management actions create consequences across the landscape.

It appears that the Forest Service has largely taken the perspective that since summer ranges are not the limiting factors for mule deer populations throughout the region, the agency's actions are less consequential than on BLM lands, where a majority of the winter range is found. Certainly, this situation will not help resolve the complex challenges that mule deer will face as large-scale development of energy resources continues on the public landscape. To effectively address this, collaborative management plans must be devised that endorse transboundary, ecosystem-based management.

The absence of any earnest analysis of the effects of energy development on mule deer also highlights significant faults with the process. The management of these habitats needs to better reflect the changing understanding and knowledge of the consequences of management actions. The current system does not embrace those axioms.

### **Conclusions**

The goal of this project was to undertake a basic policy assessment of agency approaches to conserve mule deer and their habitat in the face of energy development, evaluate the current level of coordination between state and federal agencies, and make recommendations to improve policy and/or coordination for mule deer management. We focused on the region known as the Greater Green River Basin as our project area for two reasons: One, the GRB is home to some of the most significant mule deer herds in North America, and, two, the region also hosts some of the largest energy reserves in the United States, creating the potential for substantial conflict.

We assessed federal land use plans (BLM resource management plans and forest plans) in the region for how they dealt with mule deer management and how management practices were applied during energy development planning. We also evaluated state wildlife agency planning for mule deer in the region. We did not intend for this study to be an exhaustive review of every action that agencies take for mule deer or energy management; rather, it analyzed how policy for habitat and population management is addressed through the planning and implementation of land-use plans. We focused on the planning level for this project because it is the point at which national land-use policy is implemented, resource and management priorities are identified, and all subsequent actions on public lands are based. Some overarching themes emerge and conclusions can be drawn from this analysis.

## General summary

- Mule deer are a vitally important economic and social species across the West, particularly in the Greater Green River Basin.
- Federal agencies recognize the importance of mule deer habitats within plans and projects but employ an inconsistent approach to analysis and future management.
- Crucial winter habitats are identified as the primary concern in most plans and NEPA analyses, with increased awareness and concern for continued impacts on crucial winter range but no apparent specific plans to avoid or mitigate ongoing or future impacts.
- Habitat management plans are used inconsistently in the management of habitat, and whether the proposed HMPs in planning were ever completed or exist today remains unclear.
- Seasonal and timing stipulations and restrictions, which address activity only during winter, are the most common approach to mule deer habitat management on federal lands.
- No reference to existing state level mule deer initiatives or the Western Association of Fish and Wildlife Agencies Mule Deer Working Group products were found in plans or projects, nor did they specifically reference how habitat would be managed to meet population objectives.
- Management across geo-political boundaries in both cultures, state and federal, was essentially nonexistent.
- Federal agencies have not embraced the recommendations for implementing state mule deer planning and the North American Mule Deer Conservation plan developed by WAFWA.
- Actions to coordinate mule deer management often rely on individual biologists or specialists, and no formal process exists for systematically incorporating mule deer science, management guidelines or recommendations into land-use planning or energy project design.
- Little coordinated comprehensive policy exists regarding the management of mule deer in relation to energy development on public lands.
- State wildlife agencies serve an important role as brokers of credible scientific information and advocates of mule deer habitat within their respective states.
- To varying degrees, some state wildlife agencies are politicized by the influence of governors and their staffs through their structural design (the appointment of wildlife commissions that provide management direction for the agency).

## Conclusions specific to the BLM

- Energy development has become the dominant land-use priority on the public lands in the Green River Basin.
- The BLM has adopted a policy that fosters the development of energy resources on public lands, and that policy is set at a high level within the agency, most recently by presidential directive.
- Wildlife is prioritized below energy development activities on BLM-administered lands. Public land agencies are developing a “hierarchy of use” approach for conflicting resources, with energy being the highest priority.
- BLM Field Offices operate in relative insularity, further complicating jurisdictional fragmentation that negatively affects the management of migratory populations of wildlife.
- Management analysis of impacts to mule deer from energy development and specific management actions for mule deer habitat management is inconsistent and differs between states and offices based on the same literature, information and science.
- Mule deer strategies are not incorporated into land-use plans or specific energy project development plans.
- The BLM continues to lease and develop crucial winter ranges, while admitting that doing so will limit its ability to manage habitats and could have drastic impacts to mule deer populations.

- The BLM has overwhelmingly approved most requests for relief from protective seasonal stipulations for wildlife, including mule deer.

### **Conclusions specific to the Forest Service**

- Most forest plans did not address energy development as specifically as BLM plans.
- Most forests do not have significant amounts of crucial winter range.
- The Forest Service is significantly behind in updating their Forest Plans and their guidance on energy development and the analysis on how energy development impacts mule deer habitat on forest lands is inconsistent.

### **Recommendations**

Based on the analysis and our knowledge of policy, planning and wildlife conservation, we can make the following recommendations to improve policy, process and coordination, which should lead to better mule deer management in the GRB and across the mule deer range.

#### **Coordination**

1. Revise current agreements between the BLM, Forest Service and state wildlife agencies to guarantee that each agency is represented on all planning and projects that affect mule deer populations and habitats.
2. Ensure recommendations from state mule deer initiatives, WAFWA Mule Deer Working Group, and the North American Mule Deer Conservation Plan are implemented.
3. Develop regional coordinating groups for the transboundary coordination of mule deer management.

#### **Science**

1. Complete a thorough review of the state of the science on mule deer and how they are impacted by energy development activities.
2. Establish a regular review process for incorporating science into future land-use plans and energy projects.
3. Address gaps in understanding by undertaking coordinated research on those areas.

#### **Planning**

1. Specifically identify state-set population objectives for mule deer and how those objectives will be met by habitat management actions, land-use designations and protection of specific habitat needs to meet long-term sustainability of mule deer populations.
2. Develop specific monitoring requirements and reporting for annual reviews on how commitments made in land-use plans are being implemented and met.
3. Incorporate state-level mule deer planning, WAFWA mule deer recommendations and habitat guidelines, and other specific mule deer information into all plans and energy projects.

#### **Management**

1. Develop specific habitat management plans or regional mule deer plans that include agreed-upon goals and objectives for mule deer based on habitat and population needs.
2. Develop a set of guidelines or best management practices to be implemented during energy development activities within mule deer habitats.
3. Develop specific stipulations and actions that address habitat loss, degradation and fragmentation of mule deer habitat from energy development.

## **About the TRCP**

*The TRCP believes in and promotes responsible energy development that balances land and resource values that sustain fish and wildlife populations and maintain opportunities for hunting and fishing. Our work is guided by a team of representatives of our conservation partner organizations – the TRCP Fish, Wildlife and Energy Working Group – and a staff of experienced wildlife and policy experts. By combining the science-based expertise of the FWEWG with an active network of sportsmen, the TRCP Center for Responsible Energy Development is working with hunters and anglers throughout the country to conserve our outdoor traditions by supporting a balanced approach to energy development and the management of fish and wildlife resources.*

*A 501c3 nonprofit corporation, the TRCP is a coalition of hunting, fishing and conservation organizations, labor unions and individuals who represent the wide spectrum of America’s outdoor community. In order to guarantee all Americans quality places to hunt and fish, the TRCP strengthens laws, policies and practices affecting fish and wildlife conservation by leading partnerships that influence decision makers.*

## References/literature cited

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- <sup>i</sup> Mason, B. The Mule Deer Foundation, Regional Representative. Personal interview. 27 July 2009.
- <sup>ii</sup> Western Association of Fish and Wildlife Agencies, Mule Deer Working Group. 2003. *Mule Deer in the West: Changing Landscapes, Changing Perspectives*. Prepared by the Mule Deer Working Group, p i.
- <sup>iii</sup> Western Association of Fish and Wildlife Agencies, Mule Deer Working Group. 2003. *Mule Deer in the West: Changing Landscapes, Changing Perspectives*. Prepared by the Mule Deer Working Group.
- <sup>iv</sup> Map of mule deer range in North America from [www.hunter-ed.com](http://www.hunter-ed.com).
- <sup>v</sup> Hal Sawyer, et al., "Winter Habitat Selection of Mule Deer Before and During Development of a Natural Gas Field," *Journal of Wildlife Management*, 70, no. 2 (2006): p 396–403.
- <sup>vi</sup> Sawyer, H., F. Lindzey, D. McWhirter, and K. Andrews. 2002. Potential Effects of Oil and Gas Development on Mule Deer and Pronghorn Populations in Western Wyoming. Transactions of the 67th North American Wildlife and Natural Resources Conference 67:350-365.
- <sup>vii</sup> Lutz et al. 2010. Oil/gas, wind, and solar energy development guidelines for mule deer. Western Association of Fish and Wildlife Agencies Mule Deer Working Group.
- <sup>viii</sup> Federal Land and Policy Management Act of 1976, as amended, 43 U.S.C § 1702 (a).
- <sup>ix</sup> Multiple Use and Sustained Yield Act of 1960, as amended, 16 U.S.C § 528.
- Nie, M. *The Governance of Western Public Lands: Mapping Its Present and Future*. Lawrence, KS: University Press of Kansas. 2008.
- <sup>x</sup> Dan Stroud, personal communication, Wyoming Game and Fish Department, 31 July 2009.
- <sup>xi</sup> License sales and revenue for project area states for 2010. FWS iFAIMS database. [www.fws.gov](http://www.fws.gov).
- <sup>xii</sup> Steve Tessmann, personal communication, Wyoming Game and Fish Department, 5 Aug 2009.
- <sup>xiii</sup> Western Association of Fish and Wildlife Agencies, Mule Deer Working Group. 2004. *North American Mule Deer Conservation Plan*. Prepared by the Mule Deer Working Group, p 3.
- <sup>xiv</sup> Steve Tessmann, personal communication, Wyoming Game and Fish Department, 5 Aug 2009.
- <sup>xv</sup> Campbell, C., S. Gray, & D. Horwitt. "Rigged Game: How Oil and Gas Drilling on Public Lands Threatens Habitat – And Hunting," *Environmental Working Group*. 2007. <<http://www.ewg.org/sites/riggedgame/index.php>> (9 Aug 2009).
- <sup>xvi</sup> United States Department of the Interior (USDI), Bureau of Land Management (BLM). *Oil and Gas Statistics*. 22 Dec 2008. <[http://www.blm.gov/wo/st/en/info/newsroom/Energy\\_Facts\\_07/statistics.html](http://www.blm.gov/wo/st/en/info/newsroom/Energy_Facts_07/statistics.html)> (10 Aug 2009).
- <sup>xvii</sup> United States Department of the Interior (USDI), Bureau of Land Management (BLM). *Oil and Gas Statistics*. 22 Dec 2008. <[http://www.blm.gov/wo/st/en/info/newsroom/Energy\\_Facts\\_07/statistics.html](http://www.blm.gov/wo/st/en/info/newsroom/Energy_Facts_07/statistics.html)> (10 Aug 2009).
- <sup>xviii</sup> Lease and Well statistics derived from GIS files from BLM Geocommunicator, Wyoming Oil and Gas Conservation Commission, Utah Division of Wildlife, Colorado Oil and Gas Commission. ESRI ArcMap software was used to query data from this website in February 2011 by TRCP GIS staff.
- <sup>xix</sup> Energy Information Administration. *State Profiles – Wyoming*. 26 Nov 2008. <[http://tonto.eia.doe.gov/dnav/ng/ng\\_prod\\_sum\\_a\\_EPG0\\_FGW\\_mmc\\_f\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_prod_sum_a_EPG0_FGW_mmc_f_a.htm)> (28 Nov 2008).
- <sup>xx</sup> Energy Information Administration. *State Profiles – Wyoming*. 26 Nov 2008. <[http://tonto.eia.doe.gov/dnav/ng/ng\\_prod\\_sum\\_a\\_EPG0\\_FGW\\_mmc\\_f\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_prod_sum_a_EPG0_FGW_mmc_f_a.htm)> (28 Nov 2008).
- <sup>xxi</sup> Ray Ring. "A Political Speech the West Needs to Hear." *High Country News*. 21 Jan 2008. <<http://www.hcn.org/issues/362/17451>> (1 Dec 2008).
- <sup>xxii</sup> Energy Information Administration. *State Profiles – Utah*. 6 Aug 2009. <[http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=UT](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=UT)> (6 Aug 2009).

- 
- <sup>xxiii</sup> Energy Information Administration. *State Profiles – Colorado*. 6 Aug 2009.  
<[http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=CO](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=CO)> (6 Aug 2009).
- <sup>xxiv</sup> Energy Information Administration. *State Profiles – Utah*. 6 Aug 2009.  
<[http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=UT](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=UT)> (6 Aug 2009).
- <sup>xxv</sup> Energy Information Administration. *State Profiles – Colorado*. 6 Aug 2009.  
<[http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=CO](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=CO)> (6 Aug 2009).
- <sup>xxvi</sup> Energy Information Administration. *Gas Production in Traditional Fields, Lower 48*. 8 April 2009.  
<[http://www.eia.doe.gov/oil\\_gas/rpd/conventional\\_gas.pdf](http://www.eia.doe.gov/oil_gas/rpd/conventional_gas.pdf)> (6 Aug 2009).
- <sup>xxvii</sup> Hal Sawyer, et al., “Winter Habitat Selection of Mule Deer Before and During Development of a Natural Gas Field,” *Journal of Wildlife Management*, 70, no. 2 (2006): p 396–403.
- <sup>xxviii</sup> United States Department of the Interior (USDI), Bureau of Land Management (BLM). *Oil and Gas Statistics*. 22 Dec 2008.  
<[http://www.blm.gov/wo/st/en/info/newsroom/Energy\\_Facts\\_07/statistics.html](http://www.blm.gov/wo/st/en/info/newsroom/Energy_Facts_07/statistics.html)> (10 Aug 2009).
- <sup>xxix</sup> United States Department of the Interior (USDI), Bureau of Land Management (BLM). *Oil and Gas Statistics*. 22 Dec 2008.  
<[http://www.blm.gov/wo/st/en/info/newsroom/Energy\\_Facts\\_07/statistics.html](http://www.blm.gov/wo/st/en/info/newsroom/Energy_Facts_07/statistics.html)> (10 Aug 2009).
- <sup>xxx</sup> United States Department of the Interior (USDI), Bureau of Land Management (BLM). *Oil and Gas Statistics*. 22 Dec 2008.  
<[http://www.blm.gov/wo/st/en/info/newsroom/Energy\\_Facts\\_07/statistics.html](http://www.blm.gov/wo/st/en/info/newsroom/Energy_Facts_07/statistics.html)> (10 Aug 2009).
- <sup>xxxi</sup> United States Department of the Interior (USDI), Bureau of Land Management (BLM). *Oil and Gas Statistics*. 22 Dec 2008.  
<[http://www.blm.gov/wo/st/en/info/newsroom/Energy\\_Facts\\_07/statistics.html](http://www.blm.gov/wo/st/en/info/newsroom/Energy_Facts_07/statistics.html)> (10 Aug 2009).
- <sup>xxxii</sup> Executive Order 13212, p 1. 18 May 2001.
- <sup>xxxiii</sup> United States Department of the Interior (USDI), Bureau of Land Management (BLM). 2002. *Utah Oil and Gas Program Review Final Report, conducted August 13-17, 2001, issued January 4, 2002*. Prepared by the Bureau of Land Management, Utah State Office.
- <sup>xxxiv</sup> United States Department of the Interior (USDI). 2008. *Inventory of Onshore Federal Oil and Natural Gas Resources and Restrictions to Their Development – Phase III Inventory*. Prepared by the U.S. Departments of Interior, Agriculture, and Energy, Washington, D.C., p 1-2.
- <sup>xxxv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Pinedale Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p 4-217.
- <sup>xxxvi</sup> David Freudenthal, Governor of the State of Wyoming. Personal letter to Jim Anderson. 18 May 2009, accessed online at <<http://www.windaction.org/documents/22058>>.
- <sup>xxxvii</sup> Jon Huntsman, *Renewable Energy – Utah Governor Huntsman’s Energy Policy*, 2009.  
<[http://www.energy.utah.gov/energy/governors\\_priorities/renewable\\_energy.html](http://www.energy.utah.gov/energy/governors_priorities/renewable_energy.html)> (10 Aug 2009).
- <sup>xxxviii</sup> Energy Information Administration. *State Profiles – Colorado*. 6 Aug 2009.  
<[http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=CO](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=CO)> (6 Aug 2009).
- <sup>xxxix</sup> Connaughton, J. “Cooperating Agencies in Implementing the Procedural Requirements of the National Environmental Policy Act,” Memorandum, President’s Council on Environmental Quality. 30 Jan 2002.
- <sup>xl</sup> Wyoming Game and Fish Department, Mule Deer Working Group. 2007. *The Wyoming Mule Deer Initiative*. Prepared by the Wyoming Game and Fish Department, Mule Deer Working Group, p 13.

- 
- <sup>xli</sup> Wyoming Game and Fish Department, Mule Deer Working Group. 2007. *The Wyoming Mule Deer Initiative*. Prepared by the Wyoming Game and Fish Department, Mule Deer Working Group, p 12.
- <sup>xlii</sup> Utah Department of Natural Resources, Division of Wildlife Resources. 2008. *Statewide Management Plan for Mule Deer*. Prepared by the Utah Department of Natural Resources, Division of Wildlife Resources, Salt Lake City, UT, p 4.
- <sup>xliii</sup> Wyoming Game and Fish Department, 2009. *Strategic Habitat Plan*. Prepared by the Wyoming Game and Fish Department, Cheyenne, WY.
- <sup>xliiv</sup> Wyoming Game and Fish Department, 2009. *Strategic Habitat Plan*. Prepared by the Wyoming Game and Fish Department, Cheyenne, WY.
- <sup>xliiv</sup> Wyoming Game and Fish Department, 2009. *Strategic Habitat Plan*. Prepared by the Wyoming Game and Fish Department, Cheyenne, WY, p 5.
- <sup>xlivi</sup> Utah Department of Natural Resources, Division of Wildlife Resources. 2008. *Statewide Management Plan for Mule Deer*. Prepared by the Utah Department of Natural Resources, Division of Wildlife Resources, Salt Lake City, UT, p 4.
- <sup>xliivii</sup> Wyoming Game and Fish Department, Mule Deer Working Group. 2007. *The Wyoming Mule Deer Initiative*. Prepared by the Wyoming Game and Fish Department, Mule Deer Working Group, p 12.
- <sup>xliiii</sup> Wyoming Game and Fish Department, Mule Deer Working Group. 2007. *The Wyoming Mule Deer Initiative*. Prepared by the Wyoming Game and Fish Department, Mule Deer Working Group.
- <sup>xlix</sup> Wyoming Game and Fish Department, Mule Deer Working Group. 2007. *The Wyoming Mule Deer Initiative*. Prepared by the Wyoming Game and Fish Department, Mule Deer Working Group, p 13.
- <sup>l</sup> Colorado Division of Wildlife. 2006. *Colorado's Comprehensive Wildlife Conservation Strategy and Wildlife Action Plans*. Prepared by the Colorado Division of Wildlife, Denver, Colorado.
- <sup>li</sup> Utah Department of Natural Resources, Division of Wildlife Resources. 2008. *Statewide Management Plan for Mule Deer*. Prepared by the Utah Department of Natural Resources, Division of Wildlife Resources, Salt Lake City, UT, p 4.
- <sup>lii</sup> Utah Department of Natural Resources, Division of Wildlife Resources. 2008. *Statewide Management Plan for Mule Deer*. Prepared by the Utah Department of Natural Resources, Division of Wildlife Resources, Salt Lake City, UT, p 4.
- <sup>liii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Pinedale Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p A7-2.
- <sup>liv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Kemmerer Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Kemmerer District, p 4-91.
- <sup>lv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Great Divide Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rawlins District, p 2-17.
- <sup>lvi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the Green River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rock Springs District, p 24.
- <sup>lvii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1990. *Record of Decision and Approved Resource Management Plan for the Great Divide Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rawlins District, p 45.

- 
- <sup>lviii</sup> BLM Manual 1613, *Areas of Critical Environmental Concern, section 1613.1.11.*
- <sup>lix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Great Divide Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rawlins District, p 3-148.
- <sup>lx</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Great Divide Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rawlins District, p 4-453.
- <sup>lxi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Great Divide Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rawlins District, p 4-534.
- <sup>lxii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Great Divide Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rawlins District, p 4-456.
- <sup>lxiii</sup> Sawyer, H. and R. Nielson. 2010. *Mule Deer Monitoring in the Pinedale Anticline Project Area: 2010 Annual Report.* Western EcoSystems Technology, Inc. Cheyenne, WY.
- <sup>lxiv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Great Divide Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rawlins District, p 4-470.
- <sup>lxv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Pinedale Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p 3-129.
- <sup>lxvi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Pinedale Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p 4-247.
- <sup>lxvii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Pinedale Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p 4-297.
- <sup>lxviii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1986. *Record of Decision and Approved Resource Management Plan for the Kemmerer Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Kemmerer District, p 25.
- <sup>lxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1986. *Record of Decision and Approved Resource Management Plan for the Kemmerer Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Kemmerer District, p 25-26.
- <sup>lxx</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the Green River Resource Area.* Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rock Springs District, p 8.

- 
- <sup>lxxi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1986. *Record of Decision and Approved Resource Management Plan for the Kemmerer Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Kemmerer District, p 5.
- <sup>lxxii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the Green River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rock Springs District, p 24.
- <sup>lxxiii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Pinedale Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p 4-294.
- <sup>lxxiv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1988. *Record of Decision and Approved Resource Management Plan for the Pinedale Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p 22.
- <sup>lxxv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1986. *Record of Decision and Approved Resource Management Plan for the Kemmerer Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Kemmerer District, p 26.
- <sup>lxxvi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1986. *Record of Decision and Approved Resource Management Plan for the Kemmerer Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Kemmerer District, p 26.
- <sup>lxxvii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Kemmerer Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Kemmerer District, p 4-96.
- <sup>lxxviii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Great Divide Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Rawlins District, p 4-470.
- <sup>lxxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Pinedale Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p 4-217.
- <sup>lxxx</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Pinedale Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Pinedale District, p 4-294.
- <sup>lxxxii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the White River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, White River District, p 2-6.
- <sup>lxxxiii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Little Snake River*

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- Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 2-102.
- <sup>lxxxiv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1989. *Record of Decision and Approved Resource Management Plan for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 9.
- <sup>lxxxv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1989. *Record of Decision and Approved Resource Management Plan for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 12.
- <sup>lxxxvi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1991. *Record of Decision and Approved Resource Management Plan for the Little Snake River Resource Area, Oil and Gas Amendment*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 18.
- <sup>lxxxvii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the White River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, White River District.
- <sup>lxxxviii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the White River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, White River District, p 2-27.
- <sup>lxxxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the White River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, White River District, p 2-26.
- <sup>xc</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 4-59.
- <sup>xcj</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 4-58.
- <sup>xcii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 4-58.
- <sup>xciii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 4-232.
- <sup>xciv</sup> Tharp, F. "Can Wildlife Weather the Gas Boom?" *High Country News*, 16 July 2008, <<http://www.hcn.org/articles/17656>>.
- <sup>xcv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 4-44.
- <sup>xcvi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1989. *Record of Decision and Approved Resource Management Plan for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 3.

- 
- <sup>xcvii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the White River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, White River District, p 2-28.
- <sup>xcviii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1997. *Record of Decision and Approved Resource Management Plan for the White River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, White River District, p 2-26.
- <sup>xcix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1989. *Record of Decision and Approved Resource Management Plan for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 12.
- <sup>c</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1989. *Record of Decision and Approved Resource Management Plan for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 12.
- <sup>ci</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 1989. *Record of Decision and Approved Resource Management Plan for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 13.
- <sup>cii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Little Snake River Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Little Snake River District, p 4-243.
- <sup>ciii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Price Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Price District, p 4-446.
- <sup>civ</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 4-596.
- <sup>cv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 59.
- <sup>cvi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Moab Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Moab District, p 142.
- <sup>cvii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Moab Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Moab District, p 136.
- <sup>cviii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Moab Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Moab District, p 26.
- <sup>cix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Moab Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Moab District, p 26.
- <sup>cx</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 46.
- <sup>cxii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Price Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Price District, p 3-53.

- 
- <sup>cxii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Price Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Price District, p 4-131.
- <sup>cxiii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Price Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Price District, p 4-132.
- <sup>cxiv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 140.
- <sup>cxv</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 141.
- <sup>cxvi</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Price Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Price District, p 83.
- <sup>cxvii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 46.
- <sup>cxviii</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Moab Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Moab District, p 137.
- <sup>cxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Moab Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Moab District, p 142.
- <sup>cxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 139.
- <sup>cxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Moab Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Moab District, p 136.
- <sup>cxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Price Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Price District, p 82.
- <sup>cxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Record of Decision and Approved Resource Management Plan for the Price Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Price District, p 125.
- <sup>cxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 4-597.
- <sup>cxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 4-174.
- <sup>cxix</sup> U.S. Department of the Interior (USDI), Bureau of Land Management (BLM). 2008. *Proposed Resource Management Plan and Final Environmental Impact Statement for the Vernal Resource Area*. Prepared by the U.S. Department of the Interior, Bureau of Land Management, Vernal District, p 4-137.

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- <sup>cxxvii</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1986. *Record of Decision and Approved Forest Plan for the Ashley National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Ashley Forest District, p II-16.
- <sup>cxxviii</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1986. *Record of Decision and Approved Forest Plan for the Ashley National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Ashley Forest District, p II-4.
- <sup>cxxix</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1990. *Record of Decision and Approved Forest Plan for the Bridger-Teton National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Bridger-Teton Forest District, p 137.
- <sup>cxxx</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1986. *Record of Decision and Approved Forest Plan for the Manti-La Sal National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Manti- La Sal Forest District, p II-4.
- <sup>cxxxi</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1986. *Record of Decision and Approved Forest Plan for the Manti-La Sal National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Manti- La Sal Forest District, p II-53.
- <sup>cxxxii</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1998. *Record of Decision and Approved Forest Plan for the Routt National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Routt Forest District, p 39.
- <sup>cxxxiii</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1998. *Record of Decision and Approved Forest Plan for the Routt National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Routt Forest District, p 39.
- <sup>cxxxiv</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1990. *Record of Decision and Approved Forest Plan for the Bridger-Teton National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Bridger-Teton Forest District, p 155.
- <sup>cxxxv</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1986. *Record of Decision and Approved Forest Plan for the Manti-La Sal National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Manti- La Sal Forest District, p II-3.
- <sup>cxxxvi</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 2003. *Record of Decision and Approved Forest Plan for the Cache National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Cache Forest District.
- <sup>cxxxvii</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1986. *Record of Decision and Approved Forest Plan for the Ashley National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Ashley Forest District, p II-3.
- <sup>cxxxviii</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1990. *Record of Decision and Approved Forest Plan for the Medicine Bow National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Medicine Bow Forest District.
- <sup>cxxxix</sup> U.S. Department of the Agriculture (USDA), U.S. Forest Service (USFS). 1986. *Record of Decision and Approved Forest Plan for the Manti-La Sal National Forest Resource Area*. Prepared by the U.S. Department of the Agriculture, U.S. Forest Service, Manti- La Sal Forest District, p II-52.