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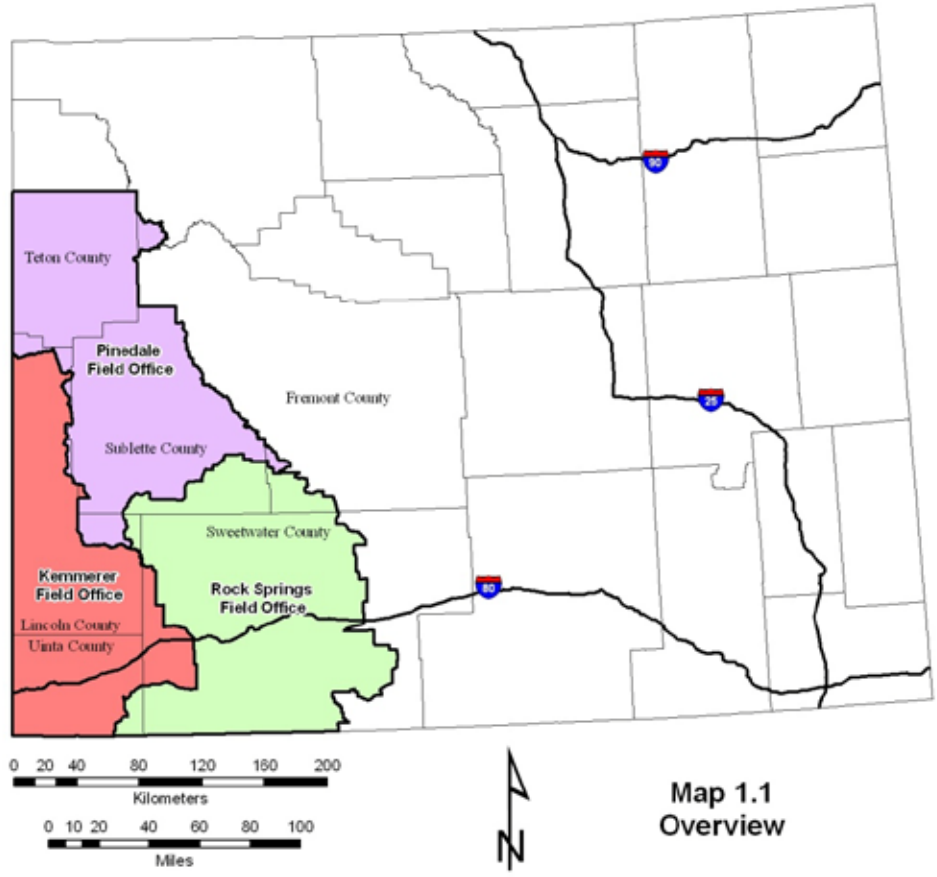
Invasive Plant Management – Kemmerer, Pinedale, and Rock Springs Field Office(s)

Location: The Bureau of Land Management (BLM) Kemmerer Field Office (KFO), Pinedale Field Office (PFO) and Rock Springs Field Office (RSFO) administrative areas are located in West, and Southwest Wyoming. The KFO, PFO, and RSFO, includes approximately 6.2 million acres of public land in Fremont, Lincoln, Teton, Uinta, Sublette and Sweetwater Counties.



Map 1.1
Overview

NO WARRANTY IS MADE BY THE BUREAU OF LAND MANAGEMENT
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U.S. DEPARTMENT OF THE INTERIOR - BUREAU OF LAND MANAGEMENT

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Invasive Plant Management – Kemmerer, Pinedale, and Rock Spring Field Office(s)
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1.0 PURPOSE & NEED

1.1 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the invasive plant management as proposed by KFO, PFO and RSFO. The EA is a multi-field office analysis of potential effects that could result in the implementation of the *Proposed Action*. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts could result from the analyzed actions.

"Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record (DR) may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A DR attached to a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in Kemmerer Resource Management Plan (RMP)(August 8, 2008), Pinedale RMP (November 26, 2008), and the Green River RMP (August 8, 1997).

1.2 Background:

Invasive plants are defined as "non-native plants whose introduction does or is likely to cause economic or environmental harm or harm to human health," based on the definition provided in Executive Order 13112[1]. Invasive plants are compromising the ability to manage BLM lands for a healthy native ecosystem.

Invasive plants can create a host of environmental and other effects, most of which are harmful to native ecosystem processes, including: displacement of native plants; reduction in functionality of habitat and forage for wildlife and livestock; increased potential for soil erosion and reduced water quality; alteration of physical and biological properties of soil; loss of long-term riparian area function; loss of habitat for culturally

[1] EXECUTIVE ORDER 1311 INVASIVE SPECIES (1999) - directs federal agencies to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.

significant plants; high cost (dollars spent) of controlling invasive plants; and increased cost to maintaining transportation systems and recreational sites.

The BLM proposes to manage invasive plants throughout the entire KFO, PFO, and RSFO, (Appendix B, Maps 1-2, 1-3 and 1-4) by utilizing integrated pest management[2]. The management methods evaluated in this EA include:

Biological - Biological control involves the intentional use of domestic animals, insects, nematodes, mites, or pathogens (agents such as bacteria or fungus that can cause diseases in plants) that weaken or destroy vegetation. Biological control is used to reduce the targeted weed population to an acceptable level by stressing target plants and reducing competition with the desired plant species.

Chemical - Herbicides are chemicals that kill or injure plants. Herbicides can be categorized as selective or non-selective. Selective herbicides kill only a specific type of plant, such as broad-leaved plants, while non-selective herbicides kill all types of plants. Only BLM-approved herbicides and adjuvant can be used on public lands administered by the BLM. The list of approved herbicide and adjuvant is updated .periodically. Pesticide Use Proposals (PUPs) must be filled out in compliance with this list. Contact your local BLM office for the most current list.

Physical – Manual/ Physical control involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Treatments include cutting undesired plants above the ground level; pulling, grubbing, or digging out root systems of undesired plants to prevent sprouting and re-growth; cutting at the ground level or removing competing plants around desired species; or placing weed-free mulch around desired vegetation to limit competitive growth.

1.3 Need for the Proposed Action

The KFO, PFO, and RSFO proposes to implement integrated pest management to address the introduction and spread of invasive plants. Increased use of public land has contributed to habitat degradation as invasive plants replace native vegetation. Invasive vegetation reduces soil productivity, water quality and quantity, native plant communities, wildlife habitat, wilderness values, recreational opportunities, and livestock forage. The percentage of land infested by invasive plants is relatively low in the KFO, PFO, and RSFO, thus providing an opportunity to aggressively treat new and existing infestations. The current untreated, known weed-infested acreage is estimated at 335,000 acres (not including areas infested with cheatgrass[3]). However, most of the KFO, PFO, and RSFO areas have not been inventoried for noxious and invasive species;

[2] INTEGRATED PEST MANAGEMENT - a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks (DOI Departmental Manual 517)

[3] CHEATGRASS – Refers to downy brome grass (*Bromus tectorum)*

thus, the actual number of acres needing treatment has not been established. Historically, the KFO, PFO, and RSFO have treated approximately 25,000 acres of vegetation per year. The current treatment focus is on Wyoming state listed noxious weeds[4]; however, controlling other invasive species (halogeton, black henbane, and cheatgrass) that cause management problems related to livestock, wildlife, and human activities is a secondary focus. Surface disturbing activities associated with natural gas development, such as pad, road, and pipeline construction, are increasing the presence of these invasive species. Vegetation control is also necessary around natural gas production facilities/structures includingtanks, well heads, and meter houses to eliminate fire hazard potential. Appendix E provides a detailed description of the invasive plant and vegetation control program in the KFO, PFO, and RSFO.

The following list contains Wyoming designated noxious plants and their current known general locations (this list is not all-inclusive).

Table 1,

Species	Known Locations
Leafy Spurge	Star Valley, Muddy Creek, Leroy, Calpet Dry Piney and other isolated spots
Spotted Knapweed	Highway corridor along state Highway 412, Glasscock Hollow allotment main corridor through allotment, Kemmerer Haul Road Area, Drainage area (T13N R115WSection21&22). Trappers Point, other isolated areas
Diffuse Knapweed	No location known
Russian Knapweed	LaBarge Creek ,Fonenelle Campground, Sage Creek and Currant Creek,
Musk Thistle	Scattered throughout the District
Scotch Thistle	No location known
Plumeless Thistle	No location known
Canada Thistle	Scattered throughout the District
Field Bindweed	No location known
Dyers Woad	Sublette Mountain Range (Raymond Mountain), Huff Creek, Altamont area,
Hoary Cress	Scattered throughout the District
Perennial Pepperweed	Scattered throughout thye District
Dalmatian Toadflax	Isolated areas throughout the District

[4] WYOMING NOXIOUS WEED – Legal designation by the Wyoming Department of Agriculture

Yellow Toadflax	Isolated areas throughout the District
Skeletonleaf Bursage	No location known
Houndstongue	Scattered throughout the District
Common Burdock	Scattered throughout the District
Quack Grass	Isolated patches throughout the District
Perennial Sowthistle	Scattered throughout the district
Oxeye Daisy	Scattered throughout the District
Purple Loosestrife	None known
Saltcedar	Muddy Creek, Blacksfork River, Smithsfork River, Fontenelle Reservoir, Cottonwood Creek, Dry Creek along Highway 414 Green River and surrounding drainages
Common Tansy	None Known
Common St. Johnswort	None known

1.4 Purpose(s) of the Proposed Action

Purpose: The BLM's purpose for completing this environmental assessment is to review, disclose, and mitigate the potential impacts that may result from the Proposed Action and identified alternatives developed during project development.

This EA also assists the BLM in project planning, ensuring compliance with the National Environmental Policy Act (NEPA), and making a determination as to whether any "significant" impacts could result from the analyzed actions.

The Council on Environmental Quality (CEQ) defines significance within regulation 40 *CFR* 1508.27. An EA provides the analysis and basis for determining whether to prepare an environmental impact statement (EIS) or issue a Finding of No Significant Impact (FONSI). If the Authorized Officer (AO) of the BLM determines that this project would result in significant impacts following the analysis in the EA, BLM would be required to prepare an EIS for the project. If not, a Decision Record (DR) may be signed by the AO, approving the selected alternative, whether the Proposed Action or another alternative. A DR, including a FONSI, documents the reasons why implementation of the selected alternative would not result in significant environmental impacts.

Need: The BLM must meet its legal requirements specified under various laws (i.e. NEPA, and Federal Land Policy and Management Acts of 1976(FLPMA)) **Federal Land Policy and Management Act of 1976,** which directs the BLM to manage public lands "in a manner that will protect the quality of scientific, scenic, historic, ecological, environmental, air and atmospheric, water resources, and archeological value." ***Executive Order 13112***, ***Invasive Species***, directs federal agencies to prevent the introduction of invasive species and provide for their control, and to minimize the

economic, ecological, and human health impacts that invasive species cause. Several other federal acts provide for management and control of invasive plants. Two weed control acts, the ***Carlson-Foley Act of 1968*** and the ***Plant Protection Act of 2000*** (Public Law 106-224); includes management of undesirable plants on federal lands; authorizes the BLM to manage noxious weeds and to coordinate with other federal and state agencies in activities to eradicate, suppress, control, prevent, or retard the spread of any noxious weeds on federal lands. The ***Federal Noxious Weed Act of 1974*** established and funded an undesirable plant management program, implemented cooperative agreements with state agencies, and established integrated management systems to control undesirable plant species. The objectives of the ***Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the Bureau of Land Management in the State of Wyoming (1997)*** are to "promote healthy sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning conditions…and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands."

In addition to federal mandates, the State of Wyoming, **Weed and Pest Act of 1973**, requires the federal government to control undesirable plant species by the use of integrated weed management.

Reducing the number of infested acres of invasive plants would meet the objective of sustaining biological communities as directed by the **BLM Operating Plan 2004-2008**. It would also meet the objectives of the **KFO, PFO, and RSFO Noxious Weed Prevention Plans**, which include best management practices for surface disturbances, roads, vehicles, livestock grazing, recreation sites, and wild land or prescribed fire, that are designed to eliminate or minimize impacts from noxious and invasive weeds.

1.5 Conformance with KFO, PFO, and RSFO Land Use Plans

The proposed action and alternatives described below are in conformance with the Final Kemmerer RMP, dated August 2008, the Pinedale RMP, dated November 2008, and the Green River RMP dated August 1997. The management objective is to control the introduction and proliferation of noxious and invasive species and reduce the established populations to acceptable levels determined through consultation, and coordination with local, state, and other federal plans, policies, and agency agreements. Management actions would include:

- the priority for control of noxious and invasive species would be to reduce and eliminate, where possible, small new infestations and to control large infestations;

- vegetation treatments (physical, biological, chemical, and prescribed fire) would be applied to meet the standards for rangeland health and watershed function, and to achieve the desired plant community, while considering habitat for wildlife, including Special Status Species.

1.6 Relationship to Statutes, Regulations, or other Plans

The following provides a description of the authorities that apply to *Proposed Action*. This is not an all-inclusive list of statutes, limitations, and guidelines, but is a representative list of the types of laws and policy that guide the management of the public land. All laws, regulations, and policies, including BLM manuals, handbooks and internal memoranda, would be followed unless otherwise stated.

ENVIRONMENTAL POLICY

The National Environmental Policy Act (1969)

- Mandates that every Federal agency prepare a detailed statement of the effects of "major Federal actions significantly affecting the quality of the human environment."
- Establishes the need for agencies to consider alternatives to those actions. Requires systematic, interdisciplinary planning to ensure the integrated use of natural and social sciences and environmental design arts in making decisions about major federal actions that may have a significant effect on the environment

LAND USE AND NATURAL RESOURCES MANAGEMENT

Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, Record of Decision (BLM, 2007)

The ROD approved:

- the use of 18 herbicide active ingredients
- the use of a scientific protocol to guide the analytical methodology for consideration of the use or non-use of herbicides by the BLM

Federal Land Policy and Management Act (1976)

Directs the BLM to "take any action necessary to prevent unnecessary and undue degradation of public land"

Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the Bureau of Land Management in the State of Wyoming (1997)

The objectives of the rangeland health regulations are to:

- promote healthy sustainable rangeland ecosystems;
- to accelerate restoration and improvement of public rangelands to properly functioning conditions; and
- provide for the sustainability of the western livestock industry and communities that are dependent upon productive, healthy public rangelands.

Carlson-Foley Act (1968)

Directs agency heads to enter upon land under their jurisdiction with noxious plants and destroy noxious plants growing on such land.

Federal Noxious Weed Act (1974), as amended by Sec. 15, Management of Undesirable Plants on Federal Lands, 1990.

Congress amended the Federal Noxious Weed Act of 1974 and this amendment was signed into law November 28, 1990. This Act requires that each Federal agency:

- designate a lead office and person trained in the management of undesirable plants;
- establish and fund an undesirable plant management program;
- complete and implement cooperative agreements with State Agencies; and
- establish integrated management systems to control undesirable plant species.

Executive Order 13112, Invasive Species (1999)

Directs Federal agencies to prevent the introduction of invasive species and provide for control, and to minimize the economic, ecological, and human health impacts that invasive cause.

Public Rangelands Improvement Act (1978)

Requires the BLM to manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible.

BLM Manual 9014-*Use of Biological Control Agents of Pests on Public Lands*

Outlines policy, defines responsibilities, and provides guidance for the release, maintenance, and collections of biological control agents for integrated pest management programs on the lands administered by the BLM.

BLM Manual 9220 – *Integrated Pest Management*

Outlines policy, defines responsibilities, and provides guidance for implementing integrated pest management programs on lands administered by the BLM.

BLM Manual 9011 and **Manual Handbook H-9011-1** - *Chemical Pest Control*

Outlines policy and provide guidance for conduction pest control programs on public land.

BLM Manual 9015 – *Integrated Weed Management*

Addresses the BLM's policy relating to the management and coordination of noxious weed activities among activities of the BLM, organizations, and individuals.

AIR QUALITY
The **Clean Air Act (1990),** as amended (42 U.S.C. 7401, 7642
Requires the BLM to protect air quality, maintain federal- and state-designated air quality standards, and abide by the requirements of the State Implementation Plans.

Wyoming Air Quality Standards and Regulations
Specifies the requirements for air permitting and monitoring to implement Clean Air Act and state ambient air quality standards.

CULTURAL RESOURCES
The **Historic Sites Act** (16 U.S.C. 461)
Declares national policy to identify and preserve historic sites, buildings, objects, and antiquities of national significance, thereby providing a foundation for the National Register of Historic Places.

The **National Historic Preservation Act** (**1966**), as amended (16 U.S.C. 470)
Expands protection of historic and archeological properties to include those of national, state, and local significance. The Act also directs federal agencies to consider the effects of proposed actions on properties eligible for or included in the National Register of Historic Places.

The **Archaeological Resources Protection Act** (**1979)**, as amended (16 U.S.C. 470a, 470cc, 470ee)
Requires permits for the excavation or removal of federally administered archeological resources, encourages increased cooperation among federal agencies and private individuals, provides stringent criminal and civil penalties for violations, and requires federal agencies to identify important resources vulnerable to looting and to develop a tracking system for violations.

The **Native American Graves Protection and Repatriation Act (1990)** (Public Law 101-601)
Provides a process for federal agencies to return certain Native American cultural items (e.g., human remains, funerary objects, sacred objects, and objects of cultural patrimony) to lineal descendants and culturally affiliated Native American tribes.

Protection and Enhancement of the Cultural Environment (EO 11593)
Directs federal agencies to locate, inventory, nominate, and protect federally owned cultural resources eligible for the National Register of Historic Places and to ensure that their plans and programs contribute to preservation and enhancement of non-federally owned resources.

HAZARDOUS MATERIALS
The **Comprehensive Environmental Response, Compensation, and Liability Act (1980)** (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 9601–9673)
Provides for liability, risk assessment, compensation, emergency response, and cleanup (including the cleanup of inactive sites) for hazardous substances. The Act requires federal agencies to report sites where hazardous wastes are or have been stored, treated, or disposed and requires responsible parties, including federal agencies, to clean up releases of hazardous substances.

The **Resource Conservation and Recovery Act** (RCRA), as amended by the Federal Facility Compliance Act of 1992 (42 U.S.C. 6901–6992), authorizes the Environmental Protection Agency (EPA) to manage, by regulation, hazardous wastes on active disposal operations. The Act waives sovereign immunity for federal agencies with respect to all federal, state, and local solid and hazardous waste laws and regulations. Federal agencies are subject to civil and administrative penalties for violations and to cost assessments for the administration of the enforcement.

The **Emergency Planning and Community Right-To-Know Act (1986)** (42 U.S.C. 11001–11050)
Requires the private sector and federal, state, local, and tribal governments to inventory chemicals and chemical products, to report those in excess of threshold planning quantities, to inventory emergency response equipment, to provide annual reports and support to local and state emergency response organizations, and to maintain a liaison with the local and state emergency response organizations and the public.

PESTICIDE REGULATIONS
Federal Insecticide, Fungicide, and Rodenticide Act (EPA)

- provides for the registration of pesticides, certification of applicators to apply restricted use pesticides, and enforcement of pesticide regulations; and

- provides for individual states to obtain primacy for enforcement of FIFRA regulations as long as the states' requirements are at least equal to federal requirements

STATE REGULATION
Weed and Pest Act (State of Wyoming 1973)
Requires the federal government to control undesirable plant species by the use of integrated weed management.

WATER QUALITY
The **Clean Water Act** (**1987**), as amended (33 U.S.C. 1251)
Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water. The Act also requires permits for point source discharges to navigable waters of the United States and the protection of wetlands and includes monitoring and research provisions for protection of ambient water quality.

Wyoming Water Quality Regulations implement permitting and monitoring requirements for the National Pollutant Discharge Elimination System, operation of injection wells, groundwater protection requirements, prevention and response requirements for spills, and salinity standards and criteria for the Colorado River Basin.

Protection of Wetlands (EO 11990)
Requires federal agencies to take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

Floodplain Management (EO 11988)
Provides for the restoration and preservation of national and beneficial floodplain values, and enhancement of the natural and beneficial values of wetlands in carrying out programs affecting land use.

WILDLIFE
The **Endangered Species Act (1973)** (ESA), as amended (16 U.S.C. 1531, et seq.) Directs federal agencies to ensure that their actions do not jeopardize threatened and endangered species, and that through their authority they help bring about the recovery of such species.

The **Bald Eagle Protection Act (1940)** (16 U.S.C. 668), amended in 1962 to include the golden eagle
Prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions.

Fish and Wildlife Coordination Act (1958) (16 U.S.C. 661 et seq.)

Provides that, whenever the waters or channel of a body of water are modified by a department or agency of the United States, the department or agency first will consult with the U.S. Fish and Wildlife Service and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur, with a view to the conservation of wildlife resources.

Fish and Wildlife Improvement Act (1978) (16 U.S.C. 742l)
Authorizes the Secretary of the Interior and the Secretary of Commerce to assist in training of state fish and wildlife enforcement personnel, to cooperate with other federal or state agencies for enforcement of fish and wildlife laws, and to use appropriations to pay for rewards and undercover operations.

Fish and Wildlife Conservation Act (1980), as amended, (16 U.S.C. 2901–2911, commonly known as the Nongame Act)
Encourages states to develop conservation plans for nongame fish and wildlife of ecological, educational, aesthetic, cultural, recreational, economic, or scientific value. The states may be reimbursed for a percentage of the costs of developing, revising, or implementing conservation plans approved by the Secretary of the Interior. Amendments adopted in 1988 and 1989 also direct the Secretary to undertake certain activities to research and conserve migratory nongame birds.

Migratory Bird Treaty Act (1918) (16 U.S.C. 703–711)
Manages and protects migratory bird species through consultation with state and local governments and protection of land and water resources necessary for the conservation of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful.

The Sikes Act (1960) (16 U.S.C. 670a–670o), as amended, Public Law 86-797,
Provides for cooperation by the Departments of the Interior and Defense with state agencies in planning, development, and maintenance of fish and wildlife resources on military reservations throughout the United States. Public Law 93-452, signed in 1974, authorized conservation and rehabilitation programs on BLM lands. Public Law 97-396, approved in 1982, provided for the inclusion of endangered plants in conservation programs developed for BLM lands. It also defined “cooperative agreements” with states and clarified section 209 concerning purchases and contracts for property and services from states.

WILDERNESS STUDY AREAS
Invasive plant control on public lands within Wilderness Study Areas (WSAs) must comply with and be managed consistent with BLM’s Interim Management Policy Handbook (H-8550-1) For Lands Under Wilderness Review. The law provides for, and the BLM’s policy is to allow, invasive species control on lands under wilderness review in the

manner and degree that does not degrade wilderness quality. Invasive plant control methods within WSAs are subject to reasonable regulations, policies, and practices.

1.7 Identification of Issues:
During the scoping of the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (BLM, 2007),* comments from the public and agencies were used to identify significant issues that would be analyzed in the EIS. Appendix A provides a list of comments that are applicable to the scope of this project. The BLM separated the issues into two groups: significant and non-significant. The Council on Environmental Quality regulations state: "NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail" (40 CFR 1500.1(b)).

Key issues identified and considered in the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, (BLM, 2007)* are listed in Appendix A. Those key issues are also applicable to this multi-field, office-wide analysis and are incorporated either by tiering and/or by addressing specific issues of local concern.

The following issues are relevant to the invasive plant and vegetation control in the KFO, the PFO, and the RSFO:

Vegetation
- Effects of treatment on invasive plants and native vegetation

Soil Productivity and Water Quality
- Effects of herbicides on soils and surface/groundwater

Sage-grouse
- Effects of herbicide use

1.8 Summary
This chapter has presented the background, purpose and need of the proposed project, as well as the relevant issues, i.e., those elements of the human environment that could be effected by the implementation of the proposed project. The Proposed Action, the No Action, and the *No Herbicide Use* alternatives, are presented in Chapter 2. The potential environmental impacts or consequences resulting from the implementation of each alternative are then analyzed in Chapter 3 for each of the identified issues.

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Introduction

This chapter describes and compares the alternatives considered for *Invasive Plant Management in the KFO, the PFO and the* RSFO. It describes the Proposed Action, the No Action, and the No Herbicide Use alternatives as well as those actions eliminated from detailed study.

To maintain ecosystem health, the BLM is required by various laws, regulations, and policies to control invasive species, thus, the No Herbicide Use Alternative is not an appropriate option for invasive species. However, for environmental assessments, the Council on Environmental Quality recommends alternatives that compare the Proposed Action or other alternatives to: 1) no activity taking place (No Herbicide Use Alternative); or 2) to continuing with the present course of action (No Action Alternative). This analysis provides a benchmark, enabling managers to compare the magnitude of environmental effects of the action alternatives.

The Proposed Action was primarily derived from *Partners Against Weeds: An Action Plan for the Bureau of Land Management* (BLM 1996); *Pulling Together: National Strategy for Invasive Plant Management* (BLM 1998); and is accordance with BLM Manual 9015 (Integrated Weed Management).

An analysis of herbicides was conducted in the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement* (BLM, 2007), and analyzed five alternatives:

> **Continued present herbicide use –** Under this alternative, the BLM would continue to use 20 herbicide active ingredients currently approved for use in 14 western states.
>
> **Expand herbicide use and allow for use of new herbicides in 17 western states (Preferred Alternative)** This alternative represents the treatment of vegetation using 18 herbicide active ingredients in 17 western states including Alaska.
>
> **No use of herbicides -** Under this alternative, the BLM would not be able to treat vegetation using herbicides and would not be able to use new chemicals that are developed in the future. The BLM would be able to treat vegetation using fire, manual/physical, and biological control methods.

No aerial application of herbicides - This alternative is similar to the Preferred Alternative in that it represents the treatment of vegetation using herbicides in 17 western states, including Alaska, and use of the same active ingredients as allowed under the Preferred Alternative. Under this alternative, however, only ground-based techniques would be used to apply herbicides (no aerial applications of herbicides would be allowed) to would reduce the risk of spray drift impacting non-target areas.

No use of sulfonylurea and other acetolactate synthase-inhibiting active ingredients - Under Alternative, the BLM would not use sulfonylurea and other acetolactate synthase-inhibiting active ingredients approved in the earlier RODs, which are chlorsulfuron, imazapyr, metsulfuron methyl, and sulfometuron methyl.

This EA tiers to the analysis contained in the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement* (BLM, 2007) for the 18 herbicide active ingredients listed under the Preferred Action.

The use of non-herbicide control methods is discussed in the *Vegetation Treatments, Programmatic Environmental Report* (BLM, 2007). This EA will incorporate by reference the biologicaland physical control methods for invasive plants.

A primary focus of this multi-field office wide analysis is the discussion of invasive plant control *methods that comply with KFO, PFO, and RSFO Noxious Weed Prevention Plans and the Kemmerer RMP, the Pinedale RMP, and the Green River RMP.*

2.2 ALTERNATIVE A – PROPOSED ACTION

Where applicable, invasive plant control would be accomplished by using an integrated pest management approach utilizing a combination of biological, physical, and chemical methods. The *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement* (BLM, 2007) analyzed the effects of using herbicides for treating vegetation on public land in the western United States.

The ROD approved the use of the following 18 herbicide active ingredients[5] described in the Preferred Alternative including all current BLM approved herbicidesAll of these herbicide active ingredients may also be used in the KFO, the PFO, and the RSFO. The use of herbicides would be applied either aerially or by ground within each field office area, with no one treatment area of more than 300 acres. In many cases, these treatments would be spot treatments of a few plants or small infestations of less than

[5] ACTIVE INGREDIENT – the chemical or biological component that kills or controls the target pest (Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement(BLM 2007)

one acre. Total acres of all vegetation treatments under this Proposed Action would not exceed 22,000 acres per year.

Vegetation Management

Industrial Site

Although this EA primarily focuses on invasive plant control methods on Rangeland, control of undesired vegetation[6] on industrial locations and associated anthropogenic features is also necessary to meet various management objectives. In the KFO, PFO, and RSFO, surface disturbing activities associated with natural gas development, such as pad, road, and pipeline construction, require not only invasive plant control, but elimination of vegetation around production facilities. Structures such as tanks, well heads, meter houses, etc., require complete vegetation control to eliminate fire hazards. Additionally, road rights-of-way may also require vegetation control to suppress vegetation that restricts vision or pose a safety hazard. In most of these situations, the most effective, both from a practical and cost standpoint, is the use of chemicals. In some cases, biological control (goats or sheep) or physical control (disking) may also be used.

Emergency Stabilization and Burned Area Rehabilitation

The goals of Emergency Stabilization and Burned Area Rehabilitation are to mitigate the adverse effects of fire on the soil and vegetation in a cost-effective and expeditious manner and to minimize the possibility of wildland fire recurrence or invasion of weeds. The primarily invasive plant of concern in fire rehabilitation is cheatgrass.

Treatment Methods

Proposed treatment methods may include physical control (hand pulling, cutting, mowing), biological control (grazing, insects), and chemical control (aerial spraying, hand/selective herbicide applications, stem injection, spot herbicide spraying, broadcast herbicide spraying). These treatment methods are summarized in Table 2. The timing for herbicide treatments would be dependent on the species, as well as any label restrictions. The application method chosen depends upon the treatment objectives (removal or reduction); the accessibility, topography, and size of the treatment area; the characteristics of the target species and the desired vegetation; the location of sensitive areas and potential environmental impacts in the immediate vicinity; the anticipated costs and equipment limitations; and the meteorological and vegetative conditions of the treatment area at the time of treatment.

[6] Vegetation that does not meet a specific management objective.

Table 2: Summary of Possible Treatment Methods[7]

Method	Description
Manual/Physical	
Hand pulling	Pulling or uprooting plants can be effective against some shrubs, tree saplings, and herbaceous invasive plants. Annuals and tap-rooted plants are particularly susceptible to control by hand pulling. It is not as effective against many perennial invasive plants with deep underground stems and roots that are often left behind to re-sprout. The advantages of pulling include its small ecological impact, minimal damage to neighboring plants, and low (or no) cost for equipment or supplies. The key to effective hand pulling is to remove as much of the root as possible while minimizing soil disturbance. For many species, any root fragments left behind have the potential to re-sprout, and pulling is not effective on plants with deep and/or easily broken roots.
Pulling Using Tools	Most plant-pulling tools are designed to grip the plant stem and provide the leverage necessary to pull its roots out. Tools vary in their size, weight, and the size of the invasive plant they can extract. The Root Talon is inexpensive and lightweight, but may not be as durable or effective as the all-steel Weed Wrench, which is available in a variety of sizes. Both tools can be cumbersome and difficult to carry to remote sites. Both work best on firm ground as opposed to soft, sandy, or muddy substrates.
Clipping	"Clipping" means to cut or remove seed heads and/or fruiting bodies to prevent germination. This method is labor-intensive and effective for small and spotty infestations.
Clipping and pulling	Clipping and pulling" means cutting a portion of the invasive plant stem and pulling it from its substrate, generally the bole of a tree. This method is labor intensive, but can be effective for larger infestations.

[7] Adapted from Final Environmental Impact Statement Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon, including Forest Plan Amendment #16(March 2008)

Stabbing	Some plants can be killed by severing or injuring (stabbing) the carbohydrate storage structure at the base of the plant. Depending on the species, this structure may be a root corm, storage rhizome (tuber), or taproot. These organs are generally located at the base of the stem and under the soil. Cutting off access to these storage structures can help "starve" or greatly weaken some species.
Mechanical	
Mowing, cutting, brushing, trimming, weed eating	Mowing and cutting can reduce seed production and restrict invasive plant growth, especially in annuals cut before they flower and set seed. Some species however, re-sprout vigorously when cut, replacing one or a few stems with many that can quickly flower and set seed. These treatments are used as primary treatments to remove aboveground biomass in combination with herbicide treatments to prevent resprouting, or as follow up treatments to treat target plants missed by initial herbicide use. Also, mowing and cutting can be used, in conjunction with herbicide treatments, to reduce vegetative materials and to promote vigorous growth in order to decrease the amount of herbicide application needed, and to increase herbicide effectiveness.
Biological	
Grazing goats, sheep, livestock Classical biological control (insects, pathogens, nematodes, mites)	Grazing could either promote or reduce invasive plant abundance at a particular site. When grazing treatments are combined with other control techniques, such as herbicides, severe infestations could be reduced and small infestations may be eliminated. Grazing animals may be particularly useful in areas where herbicides cannot be applied (e.g., near water) or are prohibitively expensive (e.g., large infestations). Animals also could be used as part of a restoration program by breaking up the soil and incorporating in seeds of desirable native plants. Goats prefer broadleaf herbs and have been used to control leafy spurge (Euphorbia esula), Russian knapweed (Acroptilon repens), and toadflax (Linaria spp.). These animals appear to be able to neutralize the phytochemicals toxic to other animals that are present in these and other forbs. Goats could control woody species because they climb and stand on their hind legs, and browse on vegetation other animals cannot reach.

	Classical biological control agents can be introduced to an invasive plant infestation to directly damage plant tissue. Although invasive plants do not die quickly, increasing plant stress allows native plants to compete better. Biological control treatments are best used in larger infestation sites where invasive plants are well established and where short term control is not a management objective. Biological control does not eradicate invasive plants and is commonly used in conjunction with herbicide applications.
Chemical	
Hand/Selective Treatment	Selective treatment of individual plants to avoid spraying other desirable plants. There is a low likelihood of drift or delivery of herbicides away from treatment sites. This method is used in sensitive areas, such as near water, to avoid getting any herbicide on the soil or in the water. Hand/Selective methods could be done under more variable conditions than spot spraying or broadcast spraying). Specific methods include: a. Wicking and Wiping - Involves using a sponge or wick on a long handle to wipe herbicide onto foliage and stems. Use of a wick eliminates the possibility of spray drift or droplets falling on non-target plants. Herbicide can drip or dribble from some wicks. b. Foliar Application - These methods apply herbicide directly to the leaves and stems of a plant. An adjuvant or surfactant is often needed to enable the herbicide to penetrate the plant cuticle, a thick, waxy layer present on leaves and stems of most plants. There are several types of foliar application tools available. c. Basal Bark - This method applies a 6 to 12 inch band of herbicide around the circumference of the trunk of the target plant, approximately one foot above ground. The width of the sprayed band depends on the size of the plant and the species' susceptibility to the herbicide. The herbicide can be applied with a backpack sprayer, hand-held bottle, or wick. d. Frill or Hack and Squirt - The frill method, also called the "hack and squirt" treatment, is often used to treat woody species with large, thick trunks. The tree is cut using a sharp knife, saw, or ax, or drilled with a power drill or other device. Herbicide is then immediately applied to the cut with a

	backpack sprayer, squirt bottle, syringe, or similar equipment. e. Stem Injection - Herbicides can be injected into herbaceous stems using a needle and syringe. Herbicide pellets can also be injected into the trunk of a tree using a specialized tool. f. Cut-stump - This method is often used on woody species that normally resprout after being cut. Cut down the tree or shrub, and immediately spray or squirt herbicide on the exposed cambium (living inner bark) of the stump. The herbicide must be applied to the entire inner bark (cambium) within minutes after the trunk is cut. The outer bark and heartwood do not need to be treated since these tissues are not alive, although they support and protect the tree's living tissues. The cut stump treatment allows for a great deal of control over the site of herbicide application, and therefore, has a low probability of affecting non-target species or contaminating the environment. It also requires only a small amount of herbicide to be effective.
Spot Spraying	Spot applicators spray herbicide directly onto small patches or individual target plants only and avoid spraying other desirable plants. These applicators range from motorized rigs with spray hoses to backpack sprayers, to hand-pumped spray or squirt bottles, which can target very small plants or parts of plants.
Broadcast (Boom) Spraying	A boom, a long horizontal tube with multiple spray heads, may be mounted or attached to a tractor, ATV (all terrain vehicle) or other vehicle. The boom is then carried above the invasive plants while spraying herbicide, allowing large areas to be treated rapidly with each sweep of the boom. Offsite movement due to vaporization or drift and possible treatment of non-target plants can be of concern when using this method. The herbicide is carried in a tank and reaches the nozzles via tubing. All herbicides are metered out from the nozzles in a controlled manner. The nozzle controls the droplet size, the area (or cone) being covered by the herbicide and it could be turned on/off with ease. Some nozzles could rotate. All this flexibility permits the operator to carefully apply herbicide at specific rates over specific areas. Many of the new boom spray operations have very sophisticated electronic monitoring that delivers exact amounts of

	herbicides and keeps records on rates and areas covered. Offsite movement due to drift and possible treatment of non-target plants could be of concern when using this method. Not all broadcast methods include a boom; boom-less nozzles are currently in use that can reduce the risk of non-target effects. Backpacks may also be used as a broadcast tool, if not directed at individual plants.
Aerial	Herbicides applied aerially by helicopter or fixed-wing aircraft.

Integrated Pest Management[8]

Although it may be preferable to control invasive plants without using herbicides[9], this approach would not meet the purpose and need for action. The BLM has treated invasive plants with non-herbicide methods for many years. These treatment methods, used exclusively, however, have not effectively controlled invasive plant infestations. In addition, research and anecdotal evidence have demonstrated that herbicide treatments have been found to be the most effective treatment for many of the invasive plants proposed for treatment in the KFO, PFO, and RSFO. One of the most effective non-herbicide strategies for invasive plant control is to incorporate cultural practices to reduce the likelihood of plant establishment. The Kemmerer RMP, Pinedale RMP and Green River RMP address practices that can be used to prevent the introduction of invasive plants including implementing actions consistent with the goals included in the Partners Against Weeds (BLM 1996). Examples of these practices include: 1) minimizing the amount of surface disturbance to reduce the area for noxious and invasive plant establishment; 2) reestablish native vegetation on all disturbed soil from construction, reconstruction, and maintenance activities; 3) avoid trailing livestock through noxious weed infested areas; and 4) require certified noxious weed-free straw or hay for use as mulch. Another important element of preventing the establishment of invasive plants is utilizing an early detection/rapid response strategy. Early detection/ rapid response refers to the immediate treatment of newly discovered invasive plant infestations, particularly those small infestations that are new to the field office or new to a particular area of the field office.

[8] This section is references the Final Environmental Impact Statement Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon, including Forest Plan Amendment #16(March 2008) and the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, (BLM 2007)

[9] Based on public comments of the Draft Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement

Integrated pest management (IPM) is an approach for selecting methods for preventing, containing, and controlling invasive plants in coordination with other resource management activities to achieve desired vegetation condition. IPM is species-specific, tailored to exploit the weaknesses of a particular invasive plant, and designed to be practical with minimal risk to the organisms and their habitats. IPM requires an ecologically based, interdisciplinary approach. This approach uses a combination of treatment methods that, taken together, would control a particular invasive plant or infestation efficiently and effectively, with minimum adverse impacts to non-target organisms. IPM seeks to combine two or more treatment methods that would interact to provide better control than any one action might provide alone. The IPM approach contrasts with the traditional approach of using a single control action, such as applying herbicides, to treat all invasive plant problems. Herbicides are one useful technique, but they are not the only method to control invasive plants and may not always be the most effective. Selection of treatment methods is based on information such as the biology of particular invasive plant species, site location, proximity to water, and size of the infestation. Multiple treatments may be required to appropriately treat the invasive plants and meet the treatment strategies for each treatment area. Treatments may be repeated as needed on an annual basis. Similarly, the herbicide used at a treatment area may change over time as the mixture of invasive plants present and/or site conditions change.

Site Restoration

After treatments take full effect, some areas may require the re-establishment of native vegetation if areas of bare ground are present. The *Wyoming Reclamation Policy* outlines the requirements for rehabilitation of disturbed sites. In regards to NEPA compliance, any seeding or planting activities conducted under this *Proposed Action* would be covered by a categorical exclusion.

Approval Process

As per *BLM Manual 9011 (Chemical Pest Control*), all pesticide applications on BLM lands require the submission of a *Pesticide Use Proposal*. This *Proposal* requires information on the target pests, chemicals to be used, rates of application, locations of applications, and identification of any issues of concern. For herbicides, only those formulations on the BLM approved list may be used. [10] Additionally, for biological control introductions, a *Biological Control Agent Release Proposal* must be approved prior to any releases to the environment.

Minimizing Herbicides Effects

[10] The *BLM Approved List of Herbicides* is located at: http://www.blm.gov/style/medialib/blm/wy/weeds/forms.Par.54383.File.dat/ApprovedHerbicideFormulations_092807.pdf

To reduce the effects to environmental and human resources from herbicide use, the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, (BLM 2007), includes Standard Operating Procedures, see Appendix C and Conservation Measures.[11] Additional *Mitigation Measures* were also developed to address risks to environmental and human resources from the use of specific herbicides see Appendix D. To provide for protection of the human and natural environment, this EA will adopt and adhere to the *Conservation Measures, Standard Operating Procedures, and Mitigation Measures.*

In addition to the *Standard Operating Procedures and Mitigation Measures,* herbicide application must be in accordance to label requirements. A herbicide label provides valuable information about proper handling, use, storage, potential risks, and instructions on minimizing risks. The *Federal Insecticide, Fungicide, and Rodenticide Act* mandates that pesticide applicators have legal responsibility to read, understand and follow all label directions.

Monitoring

To ensure all mitigation measures are implemented and the treatment methods are achieving their goals, monitoring is a key component of an integrated pest management strategy. A detailed discussion on monitoring is included in *Appendix D* of the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, Record of Decision (BLM 2007).*

2.3 ALTERNATIVE B – CONTINUE PRESENT MANAGEMENT

Under a previous Record of Decision[12], the KFO, PFO, and RSFO would be able to continue to use 20 herbicide active ingredients

2.4 ALTERNATIVE C – NO HERBICIDE USE

No herbicide use would occur under this alternative. The KFO, PFO, and RSFO would be able to treat vegetation using manual/physical and biological control methods.

2.5 ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM DETAILED STUDY

During the scoping of the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (BLM 2007),* many issues identified were considered, but not analyzed and, subsequently, will not be analyzed in this EA. Alternatives specific to this EA that will not be analyzed in detail, are discussed below.

[11] The Conservation Measures are located in Appendix C of the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, Record of Decision, (BLM 2007)

[12] *Northwest Area Noxious Weed Control Program EIS (BLM, 1985)* and the Vegetation Treatment on BLM Lands in 13 Western States EIS (BLM, 1991)

Prescribed Fire

The use of prescribed fire to control invasive plants was not considered in this EA. Many of the invasive plants considered in this proposal would respond positively to burning. Additionally, the size of the treatment areas proposed is not conducive to successful burning. When situations arise where prescribed fire is an appropriate integrated pest management option, a site specific EA will be completed.

Biological, Cultural, Chemical, or Physical Control Alone

As directed by various guidance documents, including the Department of Interior, Integrated Pest Management Policy[13]; the Federal Insecticide, Fungicide, and Rodenticide Act; Partners Against Weeds: An Action Plan for the Bureau of Land Management (BLM 1996); federal agencies are directed to use an integrated pest management approach to managing invasive species. Thus, the use of any one technique, exclusively, was not considered in this EA.

[13] Department of the Interior, *Integrated Pest Management Policy*, Environmental Quality Series, Part 517, Chapter 1

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter describes aspects of the environment likely to be affected by the Proposed Action, the No Action, and the No Herbicide alternatives. Also described are the environmental effects (direct, indirect, and cumulative) that would result from undertaking the Proposed Action, the No Action, and the No Herbicide alternatives. Together, these descriptions form the scientific and analytical basis for the comparison of effects in Chapter 2.

Direct Effects are caused by the action and occur at the same time and place.
Indirect Effects are caused by the action and occur later in time or farther removed in distance.
Cumulative Effects are effects on the environment which result from incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

3.2 INVASIVE PLANT SPECIES

Affected Environment

A summary of specific information on invasive plant species addressed in the analysis is provided below. [14]

Leafy Spurge (Euphorbia esula L.)

Leafy spurge is an erect, perennial herbaceous plant that grows from 2 to 3.5 feet tall. The plant is easily identified by its showy yellow flower bracts and the milky sap that flows if the stem is broken or a leaf is removed. Flower parts are in threes and the stem is smooth. Leaves are oval-shaped and smooth. Large infestations give the landscape a yellowish tinge due to the yellow bracts. Leafy spurge invades prairies, pastures and other open areas. It can completely overtake large areas of land and displace native vegetation. Leafy spurge is native to Europe and was introduced accidentally into America in the early 1800s as a seed contaminate.
Location: Star Valley and scattered patches throughout KFO, PFO, and RSFO.
Wyoming Noxious Weed: Yes

[14] Species descriptions referenced from www.invasive.org, the USDA, Forest Service, Weed Eradication and Control on the Inyo National Forest - Environmental Assessment (August 2007), the Colorado State University Cooperative Extension, and the Colorado Weed Management Association.

Spotted Knapweed (Centaurea stoebe ssp. micranthos **)**

Spotted knapweed is an herbaceous biennial or perennial plant that invades open areas throughout most of the United States. Its name is derived from the black margins of the flower bract tips which give the flower heads a spotted look. A basal rosette of deeply lobed leaves is produced the first year. Flowering stems are 8-50 inches tall and branched. Stem leaves are alternate and may be slightly lobed or linear. Flowers are purple to pink in color and occur on small flower heads. Spotted knapweed invades a wide variety of habitats including pastures, open forests, prairies, meadows, old fields, and disturbed areas. It displaces native vegetation and reduces the forage potential for wildlife and livestock. Spotted knapweed is native to Europe and western Asia. It was accidentally introduced into the United States in contaminated alfalfa and clover seed in the late 1800s.
Location: Isolated patches throughout the KFO, PFO, and RSFO.
Wyoming Noxious Weed: Yes

Diffuse Knapweed (*Centaurea diffusa*)

A short-lived perennial, a biennial, or occasionally an annual. It reproduces and spreads from seed. The plant develops a single shoot (stem), 1 to 2 feet tall, that is branched toward the top. Grazed plants may produce multiple stems. Rosette and lower shoot leaves are finely divided. Leaves become smaller toward the top of the shoot and have smooth margins. Many solitary flowering heads occur on shoot tips. They are about 1/8 inch in diameter and 1/2 to 2/3 inch long. Flowers usually are white but may be purplish. Involucre bracts are divided like teeth on a comb and tipped with a slender spine that makes them sharp to the touch. Sometimes the bracts are dark-tipped or spotted like spotted knapweed. The long terminal spine differentiates diffuse from spotted knapweed.
*Location***:** Isolated patches throughout KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Russian Knapweed *(Acroptilon repens*)

A long-lived perennial herb that can spread vegetatively or by seed. Roots can grow 6 to 8 feet deep during the first growing season, and 16 to 23 feet deep in the second growing season. The primary method of reproduction is vegetative from the creeping root system. In addition to these traits, it exhibits allelopathic effects, suppressing other plant species. Hand pulling of this species reportedly has limited effectiveness and repeated pulling may not eradicate the infestation.
Location: Isolated patches throughout KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Musk thistle (*Carduus nutans*)

A herbaceous biennial plant that grows to 6 feet tall. It has become a serious invader of open lands throughout the continental United States. It can be recognized by its showy, red-purple flowers and very spiny stem and leaves. The large disk-shaped terminal flower heads droop when mature giving this plant its other common name, nodding thistle. Musk thistle invades a variety of disturbed areas. Pastures are particularly at risk because musk thistle is unpalatable to livestock. Once established it can spread rapidly due to high seed production (as much as 120,000 seed per plant). Musk thistle is native to Western Europe and was accidentally introduced into the United States in the early 1900s.
Location: Scattered throughout the KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Scotch thistle (*Onopordum acanthium*)

This plant can reach a height of 8 feet with large, coarsely lobed, hairy leaves have a velvety-gray appearance. The rosette forms the first year and can have leaves up to 2 feet long and 1 foot wide. The spiny-edged, alternate leaves form leaf wings that extend down onto the stem. This branching plant has reddish-purple to violet flowers and a large, fleshy taproot. It is found primarily along roadsides and railroads, but can become an impassable obstacle to livestock on rangeland and pastures.
Location: No locations known within the KFO, PFO, or RSFO at this time.
Wyoming Noxious Weed: Yes

Plumeless Thistle (*Carduus acanthoides*)

Mature plants are between 1-4 feet tall and have a stout, fleshy taproot. Stems are freely branched above and covered with leaf-like spines that extend up to the flowering heads. Flower heads are solitary at the ends of branches or in clusters of 2-5. Flower bracts are narrowly lance-shaped and appear as sharp spines. Flowers are purplish-pink and clustered in heads that are 1-2 inches in diameter. Plumeless thistle does not typically pose a threat to high quality natural areas, although it has been known to invade native and restored grasslands despite the presence of dense, native prairie vegetation. However, this species is highly aggressive in disturbed areas, and can pose a major problem in buffer and restoration areas Plumeless thistle is one of the most aggressive thistles due to its large seed production
Location: No locations known within the KFO, PFO, or RSFO at this time.
Wyoming Noxious Weed: Yes

Canada Thistle (*Cirsium arvense*)

A tall, erect, spiny herbaceous plant that grows to 4 feet tall. It has an extensive creeping rootstock. The leaves are lance-shaped and irregularly lobed with very prickly margins. The stems are ridged and hairy. The flowers are purple to white and can be up to 0.5 inches in diameter. The small seeds, called achenes, are 1 to 1.5 inches long and have a feathery structure attached to the base which lets them float through the air. Numerous species of thistle occur in America, and while some are invasive, many are native. Often the species are difficult to distinguish. Canada thistle can invade a variety of open habitats including prairies, savannas, fields, pastures, wet meadows, and open forests. It forms dense stands which can shade out and displace native vegetation. Once established it spreads rapidly and is difficult to remove. Canada thistle is native to Europe and Asia and was first introduced accidentally during the 1600s.
Location: Along drainages and scattered throughout the KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Field Bindweed (*Convolvulus arvensis*)

A member of the Morning glory family. This creeping perennial was introduced from Europe. It reproduces by seeds and horizontal roots. The stems are smooth, slender, slightly angled, 1 to 4 feet long, and spread thickly over the ground or wind around erect plants or other objects. The leaves are alternate, 1 to 2 inches long, with great variation in shape. They are somewhat arrow-shaped with spreading, pointed, or blunt lobes at the base. The flowers are bell or trumpet-shaped, white, pink, or variegated, and about 3/4 to 1 inch broad. It is one of the most competitive perennial weeds. A two or three-year food supply is stored in the extensive underground root system. This makes it hard to kill by cultivation because roots will live as long as their food reserve lasts. Seeds can also stay viable in the soil for up to 40 years.
Location: No locations known within the KFO, PFO, or RSFO at this time.
Wyoming Noxious Weed: Yes

Dyers Woad (*Isatis tinctoria*)

A member of the mustard family. It is a winter annual, biennial or short-lived perennial, 1 to 4 feet tall. The leaves are bluish-green with a whitish vein on the upper surface. The flower has a flat top with yellow petals. The fruit is a purplish-brown pod containing one seed. Dyers woad has a thick tap root that can exceed 5 feet in depth. It is found in disturbed sites and spreads to range and croplands by seed from late spring to mid-summer**.** Dyer's woad is an aggressive weed that infests disturbed and undisturbed sites and then spreads outward into crops and rangeland. There is some evidence that dyer' woad produces allelopathic chemicals.
Location: Isolated patches throughout KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Hoary Cress (*Cardaria draba*)

A perennial forb in the mustard family that can grow up to 2 feet tall. The leaves are soft, gray-green and finely-hairy with heart-shaped bases. The upper leaves clasp to the stem of the plant. The four-petaled flowers are white and the heart-shaped seed pods occur in flattened clusters. Hoary cress invades rangelands, pastures, streambanks, and open forests primarily in the western United States, although it does occur in the East. It can form large infestations that can displace native species and reduce grazing quality. Hoary cress is native to Central Europe and Western Asia and was first introduced into the United States in the early 20th century
Location: Patches throughout KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Perennial Pepperweed (*Lepidium latifolium*)

Forms dense colonies by adventitious shoots from roots and deep-seated rhizomes and spreads vigorously. It also produces abundant highly germinable seeds which can survive in the soil for at least 1 year. Fluctuating temperature regimes produce optimum germination. It can grow at altitudes of 4,000 to 8,000 feet. Perennial pepperweed is an aggressive invader of moist to wet ecosystems, even invading ecologically healthy areas. Perennial pepperweed spreads agressively by both seeds and root sprouts. Manual/Physical removal has been shown to be ineffective because plants form clonal stands and continue to sprout from extremely deep roots, and from root fragments.
Location: Scattered throughout KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Dalmatian Toadflax (*Linaria dalmatica macedonica*)

A member of the Figwort family. It was introduced as an ornamental from Europe, and is now rapidly invading dry rangeland from 5,000 to 6,500 feet. It is a creeping perennial that closely resembles yellow toadflax. The leaves are waxy, heart-shaped, and clasp the stem. The stems are from 2 to 4 feet tall. The flowers are snapdragon-shaped, bright yellow, sometimes with orange centers. Dalmatian toadflax is especially well adapted to arid sites and can spread rapidly once established. Because of its deep, extensive root system, waxy leaf, and heavy seed production, this plant can be difficult to manage.
Location: Sublette Range (Raymond Mountain) and scattered patches within the KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Yellow Toadflax (*Linaria vulgaris*)

Mature yellow toadflax plants are 1-3 feet tall with 1-25 smooth erect floral stems.

Flowers are bright yellow and resemble snapdragons. Flowers are arranged in a raceme at the ends of the branches. Leaves are soft, lance-shaped, and pale green. Leaves are mainly alternate but lower leaves appear to be opposite due to crowding. Taproots may be up to a meter in length. Horizontal roots may grow to be several meters long, and can develop adventitious buds that may form independent plants. Yellow toadflax is quick to establish in open sites and is capable of adapting growth to a wide range of environmental conditions. Yellow toadflax aggressively forms colonies through adventitious buds from creeping root systems. These colonies can push out native grasses and other perennials, thereby altering and simplifying the species composition of natural communities and reducing forage production for livestock and wildlife.
Location: Sublette Range (Raymond Mountain) and scattered patches within the KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Houndstongue (*Cynoglossum officinale*)

Flowers are reddish-purple, with five petals, arranged in panicles in the upper leaf axils. Leaves are alternate, 1-12 inches long, 1-3 inches wide, rough, hairy, and lacking teeth or lobes. Basal leaves are elliptical to oblanceolate and tapered at the base. Houndstongue produces a single flowering stem. The stem is erect, stout, heavy, 1.5 to 3 feet high and usually branched above. Houndstongue has a thick, black, woody taproot. Houndstongue is poor competitor with native perennials and requires disturbed or bare areas to establish. Once established, houndstongue quickly forms dense monocultures. Houndstongue contains toxic alkaloids that stop liver cells from reproducing. Therefore, houndstongue reduces livestock and wildlife forage and grazing animals should be kept away from houndstongue infested areas.
Location: Scattered throughout the KFO, PFO, and RSFO
Wyoming Noxious Weed: Yes

Common Burdock *(Arctium minus)*

Mature plants are 3-7 feet tall. The stem is erect, coarse, and much branched. Stem leaves are alternate, broadest at the leaf base and somewhat diminished upward. Leaf margins are toothed or wavy, and the entire leaf is wooly beneath and dark green above. Rosette leaves are large, hairy, and heart-shaped. Common burdock can commonly be found growing along roadsides, ditchbanks, in pastures and waste areas. It generally prefers riparian areas that have moist, fertile soils with high nitrogen contents.
Location: KFO in the Lost Creek Allotment along the main Underwood Road in the drainages.
Wyoming Noxious Weed: Yes

Oxeye Daisy (*Chrysanthemum leucanthemum*)

Mature plants are 10-24 inches tall with erect, smooth to sparsely hairy stems. Alternately arranged leaves become progressively smaller upward along the stem. Basal and lower stem leaves are 2-5 in long, lance-shaped to narrowly egg-shaped. The upper leaves become stalkless and toothed. Flowering heads are solitary at the ends of branches. Flowerheads have white ray flowers and yellow disk flowers. Oxeye daisy has the potential to invade disturbed areas, form small colonies, and modify existing communities.
Location: None Known in KFO, PFO, or RSFO
Wyoming Noxious Weed: Yes

Saltcedar (*Tamarix ramosissima*)

Salt cedar is deciduous shrub that can grow up to 15 feet in height. Leaves are small, scale-like, gray-green in color, and overlap along the stem. The bark is smooth and reddish on younger plants, turning brown and furrowed with age. Several species are considered invasive in the United States and distinguishing the species can often be difficult. Salt cedar invades streambanks, sandbars, lake margins, wetlands, moist rangelands, and saline environments. It can crowd out native riparian species, diminish early successional habitat, and reduce water tables and interferes with hydrologic process. Salt cedar is native to Eurasia and Africa and was introduced into the western United States as an ornamental in the early 1800s.
Location: In KFO along Muddy Creek, Blacksfork River, Fontenelle Reservoir, Cottonwood Creek
Wyoming Noxious Weed: Yes

Downy brome (*Bromus tectorum*)

Cheatgrass is an annual grass that forms tufts up to 2 feet tall. The leaves and sheathes are covered in short, soft hairs. The flowers occur as drooping, open, terminal clusters that can have a greenish, red, or purple hue. These annual plants will germinate in fall or spring (fall is more common), and senescence usually occurs in summer. Cheatgrass invades rangelands, pastures, prairies, and other open areas. Cheatgrass has the potential to completely alter the ecosystems it invades. It can completely replace native vegetation and change fire regimes. It occurs throughout the United States and Canada, but is most problematic in areas of the western United States with lower precipitation levels. Cheatgrass is native to Europe and parts of Africa and Asia. It was first introduced into the United States accidentally in the mid 1800s.
Location: Throughout the KFO, PFO, and RSFO
Wyoming Noxious Weed: No

Halogeton (*Halogeton glomeratus*)

A succulent annual forb which can produce 200-400 pounds of seed per acre. It produces two types of seed; brown seed is produced during long-photoperiod seasons and black seed during short-photoperiod seasons. Black seeds are only viable for about 1 year, whereas brown seeds can survive burial for up to 10 years. Seeds may be spread by livestock, wildlife, road grading equipment, and wind.
Location: Throughout the KFO, PFO, and RSFO
Wyoming Noxious Weed: No

Black Henbane (*Hyoscyamus niger L.)*

An erect, bushy, annual or biennial, leaves alternate, coarsely toothed, shallowly lobed, very hairy, foliage has a foul odor. Stems erect branched 1-3 feet tall. Flower large 1-2 inches in diameter, brownish yellow with a purple center and purple veins. Root medium taproot, seeds tiny and black, hundreds in 1 inch long pineapple-shaped or vase shaped seed capsules. All parts of this plant or toxic.
Location: Throughout the KFO, PFO, and RSFO but mainly along the roadways
Wyoming Noxious Weed: No

ENVIRONMENTAL CONSEQUENCES
Alternative A – Proposed Action
Direct and Indirect Effects

This alternative would result in control or eradication of invasive plants where treatments are conducted. Biological control will be used when they are available and reasonably effective, resulting in containment of invasive plant in terms of both numbers and vigor of invasive plants. Additionally, complete vegetation control would be conducted on industrial locations of Chemical treatments would involve the use of imazapic-based herbicides to treat cheatgrass. The use of imazapic may be an important tool for emergency stabilization and rehabilitation of wildfire burned areas. With the additional acreage treated using imazapic under the PA, there would be a potential increase of adverse effects to some native plants. Adverse impacts would be reduced in most situations because treatments would be primarily conducted in burned areas or areas that are dominantly cheatgrass.

Overall, there is a slight risk of damage to native plants from unforeseen environmental conditions. Severe thunderstorms or windstorms, for example, could move some herbicides away from their intended target species. Because of the protection of non-target species by the direct application method; the implementation of the *Standard Operating Procedures, see Appendix C,* following the herbicide label requirements;; and

the small amount of herbicide being used; no long term adverse effects are expected from *PA*.

Alternative B – Continue Present Management
Direct and Indirect Effects

Under thisalternative the KFO, PFO, and RSFO would be able to use 20 previously approved herbicide active ingredients. Without the imazapic-based herbicides, total invasive plant treatments would be reduced to using a combination of manual/physical and chemical treatments.

This alternative results in eradication of most invasive plants where herbicide treatment is conducted, and control and/or eradication of invasive plant populations where biological or manual/physical treatment is completed. Treatment results in reduced invasive plant infestations in terms of both number and size of infestations. Additionally, complete vegetation control would be conducted on industrial locations.

Not having the ability to use imazapic-based herbicides for cheatgrass treatments removes an effective tool for cheatgrass control. *Emergency Stabilization and Burned Area Rehabilitation* efforts would be less effective and potentially would allow continued cheatgrass invasion and spread in wildfire burned areas. For rangeland infested with cheatgrass, imazapic can provide a window of opportunity to allow sagebrush seedlings and perennial grasses and forbs to establish with normal precipitation.[15]

Adverse effects under this alternative are addressed in the PA.

Alternative *C* – No Herbicide Use

Direct and Indirect Effects

Many of the invasive plants proposed for treatment are most effectively controlled with herbicide methods, making non-herbicide methods ineffective and unsuccessful when used exclusively.[16] For many invasive plants, /manual/physical treatment is difficult and often ineffective regardless of the size of the population. Examples include hawkweed species (orange, meadow or yellow, and common), yellow star thistle, and knapweed species (spotted and diffuse). manual/Physical treatment is not recommended for many

[15] Effects of Cheatgrass Control on Wyoming Big Sagebrush in Southeastern Utah, Daniel B. Eddington, Brigham Young University,
[16] Final Environmental Impact Statement Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon, including Forest Plan Amendment #16(March 2008)

invasive plants because digging out roots or rhizomes, in addition to being extremely labor-intensive, tends to spread rhizome fragments, which would produce new plants.

It is not generally recommended to exclusively maually/physically treat salt cedar because disturbance to the plant would stimulate the growth of new plants and increase their rate of spread. Although manual/physical treatments may be effective for yellow star thistle, plants would survive if leaves and buds are still attached at the base of the plant, even if a fragment of a stem less than 2 inches in length is left behind. Further, yellow star thistle plants are capable of producing 50 to 100 million seeds per acre and the seeds are spread through wind dispersal, which makes manual/physical treatments more difficult. manual/Physical treatment of knapweeds is difficult due to the species' tough perennial root crown, and repeated manual/physical treatment of diffuse knapweed may increase populations by spreading seeds.

No herbicide use would allow invasive plants to continue to spread and increase, eventually becoming impossible to eradicate. Seeds from invasive plant populations will continue to be transported and infest new sites throughout the area. Invasive plants will impact native ecosystems, affecting flora and fauna diversity, including sensitive species, as well as surface water availability. Native plant diversity and wildlife habitat quality will be reduced over time due to increasing invasive plants. Many existing invasive plants and populations would not be controlled, eradicated, or reduced under this alternative.

There is a high risk that seeds or propagative parts from invasive plants will migrate off site, resulting in increased infestations and subsequent manual/physical and chemical treatments over a wider area adjacent to BLM land. Increased populations and spread onto non-BLM lands will result in greater herbicide use over the long term. Herbicide use in the region could potentially be higher overall as weeds spread off BLM land, and control efforts are implemented on adjacent lands, resulting in an increased risk of non-target species exposure to herbicides and/or residues.

Cumulative Effects

Vectors (livestock, vehicles, recreationists, water, wind, wildlife) and disturbances (roads, natural gas development, grazing, fuel treatments, water developments, recreation developments, etc.) will continue to be present in the KFO, PFO, and RSFO. These factors have contributed to the establishment of invasive plant populations on the BLM lands. Project-specific mitigations, incorporated into all new projects, help to reduce the risk of new infestations and the spread of weeds associated with new disturbance. Several projects, including mineral development, have measures included for post project invasive plant control, as well as weed prevention measures, (e.g. equipment cleaning, weed free hay/mulch, revegetation, etc). Adjacent to the BLM

lands, on Forest Service, State, and private lands, invasive plant control efforts are underway for state listed noxious weeds.

Under the *No Herbicide* alternative, existing infestations will continue to spread unchecked, gaining increasing vegetative dominance over the long term, contributing to the cumulative effects of past and present invasive plant infestations. The Proposed Action and continue present management alternative would have less cumulative effects overall than the No Herbicide alternative

3.3 NATIVE VEGETATION

Affected Environment

Vegetation resources within the KFO, PFO, and RSFO are diverse and in some areas unique. The precipitation, elevation, and temperature extremes, combined with soil and geology variability, create a variety of vegetation habitat types.

Vegetation communities currently containing invasive plants are varied, including forests, woodlands, grasslands, shrubland communities, riparian and wetland communities. In many cases, weed populations are established where previous disturbance has occurred, disrupting the existing native plant community; however invasive weeds have also moved into undisturbed native plant communities.

Riparian areas, sagebrush, grasslands, are currently most at risk of degradation due to invasive plants. Several of the more aggressive tenacious invasive plants often occur in riparian areas. These areas are also subject to disturbances, natural and human caused (flooding, road crossings, dispersed recreation use, grazing, etc.), creating favorable sites for weed establishment. These are highly important areas for native plants and wildlife diversity.

ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action

Direct and Indirect Effects

Grazing animals, such as sheep or goats, eat both weeds and desirable species. Both have been shown to selectively graze leafy spurge reducing seed production. Goats are likely to browse more heavily on shrubs that may provide important wildlife food and habitat within riparian areas. The level of management will determine impact of grazing animals on non-target species. Invasive plant seeds can be spread to non-infested sites by adhering to grazing animals or passing through their digestive tract. Restricting livestock use in weed infested areas during seed ripening and dispersal will help reduce weed spread to un-infested sites.

Biological control agents can provide good control on target invasive plants. Insects would be the preferred biological control agents as they have high host specificity. They are not intended for eradication of invasive plants, but rather to reduce the vigor and productivity of invasive plants to allow for competition from native vegetation. No adverse effects to native plant species are expected from the use of biological control agents, since these insects and pathogens generally do not affect non-target plant species or habitats.

The risk of herbicide applications to non-target plants is minimized with the use of ground application equipment. Risk to off-site plants from spray drift is greater under scenarios with smaller buffer zones and application from greater heights (i.e., aerial application or ground application with a high boom). Persistent herbicides (e.g., bromacil) adsorbed to soil particles could also be carried off-site by wind or water, affecting plants in other areas. There is a risk of damage to native plants from accidental herbicide spills under this alternative. In the event of a spill, effects would range from decreased productivity or injury to plant death. This risk is minimized through the use of the *Standard Operating Procedures* and following label requirements when applying herbicides.

Manual/physical treatment of invasive plant infestations could also negatively affect native plants. Direct effects would be unintentional removal or trampling of flowers, fruits, or root systems of native plants. Other direct effects would be reduced plant vigor due to plants being damaged, reduced native seed production, soil disturbance, and canopy removal (understory, shrub layer, or overstory depending on the species). Indirect effects brought about by these direct effects could include microsite shifts such as reduction in productivity, reduction in soil moisture, disruption of mycorrhizal connections, and increase in soil temperature. These effects could produce a shift in species composition further away from a native community, and the removal of one invasive species could encourage another invasive species to take its place via windborne seeds or human transport.[17]

The greatest threat to the vegetation communities may result from ecological interactions with non-native annual grasses like cheatgrass. These species respond favorably to disturbance, including fire, and once established, they increase the susceptibility of these communities to repeated frequent fires. Over time, this can potentially lead to changes in the fire regime that can negatively affect and potentially exclude native plant species, resulting in complete vegetation type conversion. In addition, these species can compete directly with native plant species, affecting biodiversity and wildlife habitat quality.

[17] Paragraph adapted from Final Environmental Impact Statement Site-Specific Invasive Plant Treatments for Mt. Hood National Forest and Columbia River Gorge National Scenic Area in Oregon, including Forest Plan Amendment #16(March 2008)

Although this alternative would result in the most extensive impacts to vegetation (both negative and positive) because it proposes the most acres for treatment, it provides the best long term protection overall for native vegetation communities, due to the greater effectiveness of invasive plant eradication methods under this alternative. This is true in particular for riparian plant communities, as the deeper-rooted riparian invasive plants are more resistant to manual/physical treatments. Under this alternative, invasive plants will be controlled or eradicated from approximately 22,000acres, resulting in improved quality of native vegetation communities in these areas. Physical treatments will be prioritized and are not expected to eradicate some of the primary invasive plant species of concern due to their widespread distribution, e.g. cheatgrass, Russian thistle.

Alternative B – Continue Present Management
Direct and Indirect Effects

Under this alternative there would be a continuation of current invasive plant and vegetation control management. However, control of cheatgrass would not be as effective without the use of imazapic-based herbicides. Imazapic has been reported to successfully control the spread of aggressive invasives, including cheatgrass, Russian knapweed, and perennial pepperweed, and has had positive effects on native prairie restoration.[18]

The risk associated with herbicide applications to non-target plants is less under this alternative compared to the *Proposed Action,* due to fewer acres treated.

All other direct and indirect effects under this alternative are addressed in the *Proposed Action.*

Alternative C – No Herbicide Use
Direct and Indirect Effects

Biological and manual/physical treatment of invasive plants would be allowed under this alternative and would continue within the KFO, PFO, and RSFO. These treatment methods could be limited in their effectiveness as far as controlling or containing invasive plant infestations, especially large infestations and those species that could reproduce vegetatively from rhizomes, stolons, or root fragments.

Improvement in ecosystem health as a result of vegetation management may be less than under the *Proposed Action*, as there are certain invasive species for which herbicide use is the only effective method of treatment or for which treatment by other

[18] Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement(BLM 2007)

methods is impractical due to cost, time, accessibility, or public concerns. For example, rough terrain may prevent treatment by methods that require ground vehicle and foot access, while aerial treatment with herbicides would be possible in these areas. Vegetation treatments on ROW and oil and gas production facilities would have to be done by manual/physical means or not done at all. Both options may be unfeasible for ROW, while the latter option would compromise the safety of oil and gas production facilities.

There would be no risk of herbicide damage to native plants under this alternative. The anticipated continued increase in invasive plant populations in the KFO, PFO, and RSFO in the absence of control efforts would result in degradation of native ecosystems. This degradation of native plant communities could result from direct competition for moisture, light, and/or nutrients between weeds and native plant species, as well as from changes in ecosystem processes such as fire and flooding. Areas would continue to be weed infested, with reduced native plant diversity and habitat quality. This acreage would likely increase over time across the KFO, PFO, and RSFO, and the severity of the existing infestations would worsen, further impacting native plant communities. Over the long term, the lack of control efforts in the KFO, PFO, and RSFO could also contribute to a loss or degradation of native plant communities off BLM lands, as uncontrolled invasive plant populations spread onto adjacent lands. This could lead to greater overall herbicide use and risk to non-target species in the region, as control efforts on adjacent lands are accelerated to deal with weeds spreading off BLM lands.

Under the Proposed Action, expanded use of herbicides to treat invasive plants may harm or kill non-target plants. A treatment schedule for persistent infestations that require herbicide application for three to five years would increase the potential for non-target plants being negatively affected (harmed, weakened, or killed) by herbicides. Many of the invasive plant populations in the treatment areas could require successive years of herbicide application to be effectively treated depending on the extent and severity of the infestation and how invasive plant populations respond to a given treatment.
Non-target plants in the sunflower (*Asteraceae*), legume (*Fabaceae*), or mustard (*Brassicaceae*) families may be the most sensitive to herbicide treatment. Species in the lily family (*Liliaceae*) may be more sensitive to some of the sulfonylurea herbicides.

Manual/Physical treatments could also harm native plants. Physical treatments could also alter the composition and structure of native plant communities, as released growing space previously occupied by invasive plants is made available. Certain native plants would be able to out produce other native plants for this growing space. The growing space could also be re-invaded by invasive plants. Active restoration would help in preventing re-invasion of invasive plants following treatment.

Cumulative Effects

Over several years time, the cumulative effects of not treating invasive plants would outweigh most concerns about effects on non-target plants and native plant communities. For example, salt cedar is an example of a highly invasive plant that is already present within the KFO, PFO, and RSFO and spreading rapidly in riparian zones in stream and river corridors. Without additional treatment options (herbicide use), populations of invasive plants, including salt cedar, are expected to continue to expand in size, increase in number, and spread elsewhere, displacing native plants and plant communities, and, in the process, degrading native ecosystems. Overall, manual/physical, biological, and chemical treatments would have aminute biological effect as far as harming native plants and plant communities if the project is implemented with the appropriate mitigation measures. Treatments could be expected to benefit native plants and plant communities and special status plants by restoring native habitats and plant communities.

Many other activities have historically impacted, and in some cases continue to impact upland and riparian native plant communities to varying degrees on BLM land, including roads, oil/gas activities, grazing, fuel treatments, water developments, recreation developments, and special use activities. Effects range from direct removal of or damage to native plants, effects on plant health and the overall productivity of native communities, to effects on ecosystem processes integral to the long term health of native plant communities.

As new activities are undertaken, measures are implemented to minimize the risk of new invasive plant infestations or further spread of existing populations. However, existing populations continue to affect native plant communities. The *No Herbicide* alternative would contribute the most to the cumulative effects of past, present, and reasonably foreseeable actions on native plant communities, as one of the more existing threats to native communities, i.e. invasive plants, would continue to the greatest degree under this alternative.

3.4 SOIL PRODUCTIVITY

Affected Environment

Soils across the KFO, the PFO, and the RSFO are quite variable. They vary in texture, depth, salt content, organic matter, and parent material. These areas are distinguished by varying amounts of precipitation, elevation, soil temperature, and soil parent material. Most soils in the KFO, PFO, and RSFO support vegetation that is used by livestock and wildlife. Soil characteristics and environmental factors that affect soil productivity include organic matter content, salt content, precipitation, soil temperature, aspect, soil depth, and soil parent material.

ENVIRONMENTAL CONSEQUENCES
Alternative A – Proposed Action
Direct and Indirect Effects

Chemical Control

The effect of an herbicide treatment on the soil depends on the particular characteristics of the herbicide used, how it is applied, and soil physical, chemical and biological conditions. Herbicides may indirectly affect soil through plant removal resulting in changes in physical and biological soil parameters. As vegetation is removed, there is less plant material to intercept rainfall and less to contribute organic material to the soil. Loss of plant material and soil organic matter can increase the risk of soil susceptibility to wind and water erosion. The risk for increased erosion would be temporary, lasting only until native vegetation was reestablished. If herbicide treatments lead to revegetation with native plants, soil stability may be improved relative to sites dominated by invasive plants.

Of the herbicides most often used by the BLM, chlorsulfuron, picloram, and tebuthiuron are persistent in soil for a year or more, while glyphosate and 2, 4-D are relatively non-persistent in soil. None of these herbicides appears to result in severe adverse impacts to soil. Of these, glyphosate has been shown to have little or no impact on biological crusts cover after 1 year. Soil organisms are important to the human environment because they could affect soil productivity. None of the herbicides under consideration has notable effects to overall long term soil productivity or permanent impairment of soil ecosystems. Information about specific herbicide effects to each of the myriad of soil organisms is scarce. Therefore, caution will be used when applying these chemicals to soils supporting biological soil crusts.

To reduce the impacts to soil productivity, treatments would be minimized or eliminated in areas of the KFO, PFO, and RSFO that have steep slopes or the potential for soil mobility. Herbicide treatments would benefit soil by removing invasive plants and other unwanted vegetation and allowing restoration of native vegetation and return of natural fire regimes.

Manual/Physical Control

Manual/Physical treatments would result in soil disturbance and compaction at localized treatment site. The specific effects to soils would depend on the type and area of treatment, site soil texture and structure, and soil moisture at the time of treatment Use of certain manual/physical treatments would directly disrupt biological soil crusts. Crusts are sensitive to compaction by vehicles and other heavy equipment. The removal or destruction of biological soil crusts could adversely affect soil quality by increasing susceptibility to erosion, reducing nitrogen inputs, infiltration, and potentially

encouraging weed establishment. In general, use of heavy equipment on treatment sites would be expected to result in increased soil compaction, and heavy equipment can shear and rut wet soils. Compaction by vehicles and other heavy machinery can reduce soil pores and limit water infiltration, soil aeration, and root penetration.
Although, the manual/physical treatment of invasive plants removes vegetation, loosens soil and creates a potential source for wind and water erosion and stream sedimentation, the planned amount of treatments in the KFO, PFO, and RSFO are very limited and site specific. There is low risk that treatment would result in adverse effects to soil quality. Replacement of invasive plants with native plants would maintain and improve soil quality in the long-term. Implementation of appropriate project designs would result in maintaining soil quality over time. Manual/Physical treatments that ultimately result in improved plant cover and diversity can improve habitat for soil organisms.

Biological Control

Biological control of vegetation using domestic animals would result in some effects to soil on public lands. The effects would be dependent on the type of animal used and the intensity and duration of the treatment in a particular area. Goats and other browsing animals are used more frequently than cattle. The action of animal hooves would cause some disturbance, shearing, and compaction of soil, increasing its susceptibility to both water and wind erosion. These effects can be severe in heavily grazed areas, but may be less so under light and moderate grazing intensities.

Invasive plants would have negative effects on soil properties. Invasive plants may increase the proportion of bare ground, increase or decrease the amount of organic matter in the soil, deplete the soil of nutrients or enrich the soil with certain nutrients, change fire frequency, and produce toxic herbicides that affect soil organisms. Some of these changes may be difficult to reverse and could lead to long-term soil degradation and difficulty in re-establishing native vegetation.

Alternative B – Continue Present Management
Direct and Indirect Effects

Negative effects to soils associated with the presence of invasive plants could be greater because fewer acres would be treated under this alternative, particularly cheatgrass. Research has shown how cheatgrass alters physical and biological properties of soils, thus impairing ecosystem health.[19] Additionally, as cheatgrass infested areas are prone

[19] Cheatgrass Invasion Alters Soil Morphology and Organic Matter Dynamics in Big Sagebrush-*Steppe Rangelands.* USDA Forest Service Proceedings RMRS-P-31. 2004. Jay B. Norton, Thomas A. Monaco, Jeanette M. Norton,Douglas A. Johnson, Thomas A. Jones

to wildfires that would potentially alter the physical properties of soil by consuming organic matter, modifying soil structure, and harming soil organisms.[20]

All other direct and indirect effects under this alternative are addressed in the *Proposed Action*.

Alternative C – No Herbicide Use
Direct and Indirect Effects

Physical treatments would result in soil disturbance and compaction at localized treatment site. The specific effects to soils would depend on the type and area of treatment, site soil texture and structure, and soil moisture at the time of treatment Use of certain physical treatments would directly disrupt biological soil crusts. Crusts are sensitive to compaction by vehicles and other heavy equipment. The removal or destruction of biological soil crusts could adversely affect soil quality by increasing susceptibility to erosion, reducing nitrogen inputs, infiltration, and potentially encouraging weed establishment. In general, use of heavy equipment on treatment sites would be expected to result in increased soil compaction, and heavy equipment can shear and rut wet soils. Compaction by vehicles and other heavy machinery can reduce soil pores and limit water infiltration, soil aeration, and root penetration.
Although, the physical treatment of invasive plants removes vegetation, loosens soil and creates a potential source for wind and water erosion and stream sedimentation, the planned amount of treatments in the KFO, PFO, and RSFO are very limited and site specific. There is low risk that treatment would result in adverse effects to soil quality. Replacement of invasive plants with native plants would maintain and improve soil quality in the long-term. Implementation of appropriate project designs would result in maintaining soil quality over time. Physical treatments that ultimately result in improved plant cover and diversity can improve habitat for soil organisms.

Biological control of vegetation using domestic animals would result in some effects to soil on public lands. The effects would be dependent on the type of animal used and the intensity and duration of the treatment in a particular area. Goats and other browsing animals are used more frequently than cattle. The action of animal hooves would cause some disturbance, shearing, and compaction of soil, increasing its susceptibility to both water and wind erosion. These effects can be severe in heavily grazed areas, but may be less so under light and moderate grazing intensities.

[20] Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement(BLM 2007)

Cumulative Effects

The cumulative effects of an invasive plant infestation could be dramatic and irreversible. Soil lost to erosion may take years to replace. The loss of soil biota also could lead to degradation of soil properties that are not easily re-established. Changes in the soil biota could lead to changes in nutrient cycling that lead to a loss of nutrients from the ecosystem. Although very little research has been done on the restoration of soil biological communities, it stands to reason that large persistent invasive plant infestations would detrimentally effect the re-establishment of soil biota and native plant communities. Preventing the spread of invasive plants would have a positive impact on soils.

Cumulative effects of each alternative would be similar to its direct effects. Non-herbicide treatments may result in nutrient decrease, erosion, reduction in mycorrhizal hyphae, increased bare ground, and decreased litter layer, which transient effects are given revegetation with native or non-invasive species. Soil compaction, loss of microbiotic crusts, formation of hydrophobic surface layer on soil, and loss of volatized nitrogen, phosphorus and potassium may have longer term effects and need to be minimized or eliminated through site-specific *Standard Operating Procedures, see Appendix C*. Some herbicides are metabolized by soil bacteria, while others are toxic to soil microorganisms or no information about effects to these organisms is available. Picloram, chlorsulfuron, and imazapic are relatively water soluble and could move off-site in water. These herbicides are moderately adsorbed to soil particles and could be moved off-site with wind or mass soil movement.

Many other natural (i.e., wildland fire) and human influences (land development and use) may result in adverse effects on soils and soil productivity. The potential adverse effects to soils from the Proposed Action are small in comparison to the potential effects of invasive plants themselves and other influences. In the long term, restoration of healthy native plant communities proposed in this EA will have beneficial impacts on soils.

3.5 WATER QUALITY

Affected Environment

The KFO, the PFO, and the RSFO are topographically divided into two watershed systems, the Green River and Bear River Systems. The Green River watershed portion in the KFO, the PFO, and the RSFO drain into the Colorado River system and eventually into the Gulf of California. The Bear River watershed drains into the Bear River and eventually into the Great Salt Lake in Utah, making it the largest river in the western hemisphere without an ocean outlet. Water quality within the KFO, PFO, and RSFO is influenced by the type of rock and soils with which the water has been in contact, vegetation, groundwater interaction, and pollutants discharged into water bodies from

point and non-point sources. Human-induced impacts, such as changes in thermal and turbidity conditions in water bodies and impacts from increased salinity, heavy metals, and nutrients from irrigation or other discharges, affect natural water quality in this region. Water quality impacts within the KFO, PFO, and RSFO may be associated with agricultural runoff, road maintenance, removal of riparian vegetation, channel modification, stream bank destabilization, atmospheric deposition, resource extraction, oil and gas activities, urban runoff, and grazing activities. Heavy metal, nutrient, sediment, and salinity impacts can be associated with mining, oil and gas extraction, agricultural runoff, and other surface disturbing activities.

Groundwater quality in the KFO, PFO, and RSFO is highly variable, in part reflecting the complex geologic history of the region. In most areas within the KFO, PFO, and RSFO the shallow groundwater is suitable for livestock. Groundwater tends to deteriorate as the distance from recharge sources and the ground surface increases. In the Bear River Basin in Wyoming, much of the geology consists of fine grained sedimentary formations which have been thrust faulted into steep, geologically young mountains which are easily eroded. As a result, surface waters have a high load of fine sediment, and often salts, carbonates, sulfates, and/or phosphate, which are found in the parent geologic material. Streams in much of the basin are highly dependent on vegetation for physical stablizaton and are usually very sensitive to disturbance.

ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action
Direct and Indirect Effects

Chemical Control

Invasive plants can create conditions that modify water quantity and quality. Directly or indirectly, invasive plants can affect streambank stability, sediment, turbidity, shade and stream temperature, dissolved oxygen, and PH. Invasive plants can also reduce water quantity. For example, salt cedar can alter stream form and can use more water than native vegetation.

Vegetation treatments could affect both surface water and groundwater quality and quantity. Invasive plant eradication has the potential to temporarily leave treatment areas with reduced ground cover which in turn has the potential for increased erosion and resulting sedimentation. Herbicide treatments do not kill all invasive plants immediately. Repeated treatments over several successive years are often needed for invasive plant eradication, containment, and control. Short term erosion would be mitigated by creation of a restoration plan that would identify specific measures to ensure protection against erosion and resulting sedimentation. These measures would be implemented as part of the project.

The KFO, PFO, and RSFO currently uses four herbicides in riparian and aquatic habitats(2, 4-D, glyphosate, imazapyr, and triclopyr)and diquat and fluridone are authorized for riparian use as well. The remaining herbicides available for use on Public Lands are registered for use on terrestrial sites. The aquatic labeled herbicides would not impact water quality if used according to label rates of application. Herbicides registered for use in terrestrial habitats may affect surface water and groundwater as a primarily as a result of unintentional spills or movement of herbicides from the upland sites into aquatic systems.

Herbicide drift can degrade surface water quality. Herbicides can reach water through drift. Three factors contribute to drift: 1) application technique; 2) weather conditions; and 3) applicator error. Aerial and broadcast applications are most likely to reach water through drift, because the herbicide is sprayed from a helicopter/plane or through a boom and must settle through the air to reach the treatment area. Spot and localized applications are less likely to result in drift because these applications are targeted to specific plants, and less herbicide is applied. Wind speed and air temperature, and their effect on herbicide evaporation, affect the potential for drift. During application when winds are over 5 mph and temperatures are warm, the potential for drift is greater. Peak concentrations from aerial spraying of fine droplets with 50- to 70-foot buffer zones commonly range from 0.130 to 0.148 ppm. Well-vegetated buffers can intercept herbicides and reduce the potential for herbicides to reach surface water. The BLM typically uses nozzles that produce large droplets, and requires 100-foot or wider buffers, to minimize the risk of herbicides drifting into surface waters .

The potential for spray drift to impact perennial and intermittent streams would be low because minimum 10-foot (ground-hand application), 25-foot (ground-vehicle), or 100-foot (aerial) buffers would be provided between treatment areas and water bodies.[21]

Manual/Physical/ Biological Control
Proposed manual/physical and cultural treatment measures such as pulling, mowing, weed wacking, or grazing by goats are not likely to cause much soil disturbance or increase the potential for measurable surface erosion/sedimentation. Hand-pulling involves manually pulling the invasive plant/roots out of the ground. When invasive plants are pulled, some surface soil may be exposed during the process, but the amount of off-site sediment movement is expected to be insignificant due to the small amount of soil exposure expected.

Alternative B – Continue Present Management (No Action)
Direct and Indirect Effects

[21] Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement(BLM 2007)

Potential negative effects to water quality would be less because fewer acres would be treated under this alternative.

All other direct and indirect effects under this alternative are addressed in the *Proposed Action.*

Alternative C – No Herbicide Use
Direct and Indirect Effects

The most pronounced effect of the *No Herbicide Use* alternative on aquatic organisms and ecosystems is the continued existence and spread of invasive plants that could out-compete native vegetation. Severe infestations of some invasive plants could negatively affect a variety of riparian functions at the site-specific scale including shade and soil stability. Although not every infestation would reduce aquatic habitat quality, there is an increase in the risk of accelerated impairment without aggressive treatment.

Cumulative Effects

Even if the invasive weed treatments are occurring at the same time on both Federal and nonfederal lands, the potential for sediment-related cumulative effects is very low considering the negligible amount of sediment expected to reach perennial streams from either biologicalor manual/physical treatments of invasive plants.
The potential for cumulative effects is negligible considering the insignificant amount of herbicide or sediment expected to reach surface water due to implementation of *Standard Operating Procedures* that would minimize the amount and type of herbicides that actually reach surface water, and the distance between potential treatment areas.

3.6 GREATER SAGE-GROUSE

Affected Environment

The greater sage-grouse occupies sagebrush habitats throughout the KFO, PFO, and RSFO. Essential habitat features such as strutting grounds (leks) and adjacent nesting areas on displayed in Appendix B, Maps 3-13, 3-14 and 3-15. During the spring, grouse concentrate for courtship and breeding in these areas, which are typically in openings surrounded by sagebrush, with an average canopy density of 10 to 30 percent. Greater sage-grouse nest under sagebrush, with 60 percent of hens nesting within a 2-mile radius of the lek, and 70 percent of hens nesting within a 4-mile radius of the lek. Young birds rely initially on insects. During warm, dry summer periods, grouse tend to stay within 1.5 miles of intermittent and perennial streams, where they feed on succulent forbs. Greater sage-grouse diets shift to a majority of sagebrush later in the year. Wintering areas for greater sage-grouse typically contain tall sagebrush that is available above the snow for cover and food.

Population declines of greater sage-grouse are largely attributed to the loss and degradation of sagebrush habitats.[22] No causative factors have been identified that explain population reductions throughout Wyoming, although changes in the sagebrush-dominated areas where the birds typically reside are thought to be among the principal factors.

Cheatgrass, mustards, and Russian thistle are generally the principal invasive plants that occur widespread throughout greater sage-grouse habitat throughout their entire range. Cheatgrass, in particular, is a major threat to greater sage- grouse habitat in the KFO, PFO, and RSFO, and has substantively degraded sage-grouse habitat across the BLM. Once established after wildfire it may prevent the return of native plants, including sagebrush, to greater sage-grouse habitat.

ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action

Direct and Indirect Effects

Chemical Control

Although field studies suggest that appropriate herbicide use in not likely to affect wildlife species in general, there is potential for herbicides to directly harm individuals or populations of wildlife. Possible adverse direct effects to individual animals include death, damage to vital organs, change in body weight, decrease in healthy offspring, and increased susceptibility to predation. Of the proposed herbicides to be used in the KFO, PFO, and RSFO, the following herbicide active ingredients pose some risk to greater sage-grouse:[23]

2, 4-D – Moderate to high risk if contaminated insects or vegetation are ingested
Clopyralid – Low risk if contaminated insects or vegetation are consumed at the maximum application rate
Gloyphosate – Low to medium risk if contaminated insects or vegetation are ingested
Imazapyr – Low risk if contaminated insects are ingested
Triclopyr - to medium risk if contaminated insects or vegetation are ingested

Assumptions for risk factors include, but are not limited to: broadcast spraying ; amount of absorption; and an assumption that 100% diet is contaminated food. Additionally, toxicological data does not exist for specific wildlife species, including the greater sage-grouse. Consequently, toxicological data for surrogate wildlife receptors, obtained from a literature review, were evaluated and used to establish quantitative benchmarks (i.e.,

[22] Kemmerer Resource Management Plan (2008)
[23] Details on risk assessment are found in the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, (BLM 2007)

toxicity reference values for the ecological species of concern). Based on these factors, along with the proposed small treatment areas, incorporating the *Standard Operating Procedures*, by avoiding herbicide application during critical breeding or nesting periods, the potential risks to greater sage-grouse will be greatly reduced.

In general, adverse indirect effects of herbicides to wildlife could include a reduction in plant species diversity and consequent availability of preferred food, habitat, and breeding areas; a decrease in population densities within the first year following application as a result of limited reproduction; habitat and range disruption (as wildlife may avoid sprayed areas for several years following treatment), resulting in changes to territorial boundaries and breeding and nesting behaviors; and an increase in predation due to loss of ground cover.

Manual/Physical Control

For individual treatments near the *Proposed Action* limit of 300 acres per individual treatment, physical manipulations could make habitats less suitable for some the greater sage-grouse, requiring displaced them to find suitable habitat elsewhere. There is a possible indirect effect of disturbance to nesting birds. Some birds would be flushed during the nesting season from personnel that are conducting manual/physical or cultural treatments. Most of these birds would return to the nest if only flushed once or twice because nest fidelity is high.

Biological Control

The effects of biological treatment using insects and pathogens would be insignificant. In most cases, the target plants would remain standing, although weakened or unable to reproduce. One of the more promising research areas under investigation is the use of a biocontrol agent such as the seed fungus (*Ustilago bullata)* to control cheatgrass. This fungus causes head smut disease in cheatgrass by infecting its germinating seeds. Although the fungus allows cheatgrass to grow to maturity, when the cheatgrass plant flowers, the head smut pathogen prevents the plant from producing seeds and thus prevents it from reproducing.

The Proposed Action would rehabilitate sagebrush habitat by eradicating, controlling and containing invasive plants, particularly cheatgrass. This rehabilitation would return these areas to native vegetation degraded by human-related activities. Besides benefiting the greater sage-grouse, the *Proposed Action* would also remove or control competing vegetation that would improve species diversity and habitat quality for all sagebrush obligate species. Without control activities, cheatgrass and other invasive plants would likely continue to exist and spread throughout their current range and continue to threaten the long-term stability of the sagebrush ecosystems.

Alternative B – Continue Present Management
Direct and Indirect Effects

With fewer acres treated under this alternative, there would potentially be less greater sage-grouse habitat improved, particularly associated with the control of cheatgrass.

All other direct and indirect effects under this alternative are addressed in the *Proposed Action.*

Alternative C – No Herbicide Use
Direct and Indirect Effects

Under this alternative, the greater sage-grouse would not be affected by herbicide use. Improved wildlife habitat as a result of vegetation management could be reduced under this alternative, as there are certain invasive species for which herbicide use is the only effective method of treatment or for which other methods are impractical due to cost, time, accessibility, or public concerns (e.g., saltcedar in riparian areas).

Cheatgrass would continue to spread throughout sage-grouse habitats, primarily below 9,000 feet in elevation, and pose a long-term substantive threat to the suitability of greater sage-grouse habitat. Other invasive plants such as red brome, salt cedar, pepperweed, hoary cress, halogeton, would likely continue to spread throughout sage grouse habitat and would continue to slowly reduce sage grouse habitat quality.

Cumulative Effects

Herbicide use occurs on other federal, state, and county ownerships, state and private forestry lands, rangeland, utility corridors, road rights of way, agricultural lands and private residences. Herbicide use on BLM land within the KFO, PFO, and RSFO could contribute to some cumulative effects, but data is lacking that would permit any quantitative estimates of cumulative exposure or risk. Since greater sage-grouse move and migrate, they could be exposed to herbicides on adjacent lands or along their migration routes. Greater sage-grouse could also be exposed to other chemicals, such as insecticides, rodenticides, fungicides, and others.

4.0 MITIGATION MEASURES

The *Proposed Action* incorporates planning processes that includes: compliance with statutory mandates and other BLM program guidance pertaining to vegetation management; compliance with vegetative management goals outlined in the Kemmerer Land Use Plan; utilizing integrated pest management; coordination with other local, state, federal agencies, private landowners, and industry; requiring soil and vegetation

disturbances be minimized in all BLM actions; requiring preventative measures to reduce invasive plant introductions in all BLM actions; and education and outreach. Specific mitigation measures for vegetation treatments, include:
compliance with label requirements for herbicide use; following the Conservation Measures, Standard Operating Procedures, Mitigation Measures, addressed in the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, Record of Decision (BLM 2007); post treatment monitoring; and restoration, if applicable.

5.0 RESIDUAL EFFECTS

Implementation of any action alternative would cause some adverse environmental effects that cannot be effectively mitigated or avoided. Unavoidable adverse effects often result from managing the land for one resource at the expense of the use or condition of other resources. Most adverse effects can be reduced, mitigated or avoided by limiting the extent or duration of effects. The majority of the residual effects would be associated with herbicide use. The possible adverse residual effects are detailed in Chapter 4 of the V*egetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, (BLM 2007).*

6.0 MONITORING AND/OR COMPLIANCE

The monitoring framework for the Proposed Action is presented in the KFO, PFO, and RSFO Weed Management Prevention Plan in accordance with the Record of Decision, Appendix D (Monitoring) of the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (BLM 2007) and the BLM National Monitoring Strategy (2006).

This framework describes the monitoring needed to assure the desired future condition and treatment strategies are achieved. The framework includes implementation / compliance and effectiveness monitoring components. Some components of the framework are outlined below.

Implementation/Compliance Monitoring
• Develop a project work plan for herbicide use.
• Ensure contracts and agreements include appropriate prescriptions and that herbicide ingredients and application rates meet label requirements and that all *Standard Operating Procedures* are followed.
• Document and report herbicide use and certified applicator information in the Pesticide Use Proposals and Pesticide Application Records.

Effectiveness Monitoring
• Implementation monitoring would occur to ensure objectives of the *Proposed Action* are implemented as planned. Post-treatment reviews would occur on a sample basis to

determine whether treatments were effective and whether or not passive/active restoration occurred as expected.
• Post-treatment monitoring would be used to detect whether the *Standard Operating Procedures* were appropriately applied.
• Contract and agreement administration and other existing mechanisms would be used to correct deficiencies.
• Herbicide use would be reported to the Environment Protection Agency, as required by BLM regulations.
• Re-treatment and active restoration prescriptions would be developed based on post treatment results. Changes in treatment methods would occur based on effectiveness of treating the invasive plant infestations. For example, an invasive plant population treated with a broadcast herbicide may be retreated with a spot spray or hand pulled, once the size of the infestation is reduced.

Site-Specific Invasive Plant Treatments
Monitoring requirements would be accomplished using trained BLM employees or through partnership with the herbicide applicators, such as the counties located within the KFO, PFO, and RSFO, and/or private applicators working for industry. Currently, the herbicide applicators who work on BLM lands complete an herbicide treatment and *Pesticide Application Record* that documents and monitors the site treated, treatment methods, herbicide used, and method of application. The monitoring records require a follow-up visit and an assessment of effects on non-target species. Similar records may be developed in the future to meet the monitoring needs. Additional monitoring would be completed as part of the *BLM National Monitoring Strategy (2006)* and other required monitoring processes.

7.0 CONSULTATION AND COORDINATION

Persons, Groups, and Agencies Consulted

Prepared by; Carl Bezanson- KFO, James Glennon- RSFO, Deej Brown-PFO

Reviewed by:

Name	Title	Responsible for the Following Section(s) of this Document
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Kevin Schreier	NEPA/Archeologist	Review NEPA and Cultural Resource section

James Roberts	Natural Resource Specialist	Reclamation and Hazardous Materials
Dan Oles	Forester/GIS	GIS
Jed Gregory	NRS/ GIS	GIS
Gavin Lovell	Fire/Fuels Specialist	Vegetation Projects
James Glennon	Botanist	Botany, Special Status Plants and Invasive Non-Native Weed & Pest Coordinator-All Sections
Deej Brown	Reclamation Specialist, Weed Management Coordinator	Non-Native Weed & Pest Management, Vegetation Treatments-All Sections
Kelli Taylor	Natrual Resource Specialist	Restoration
Cara Farr	Rangeland Management Specialist	Rangeland Management Specialist. Review NEPA and Soils Section.

APPENDIX A

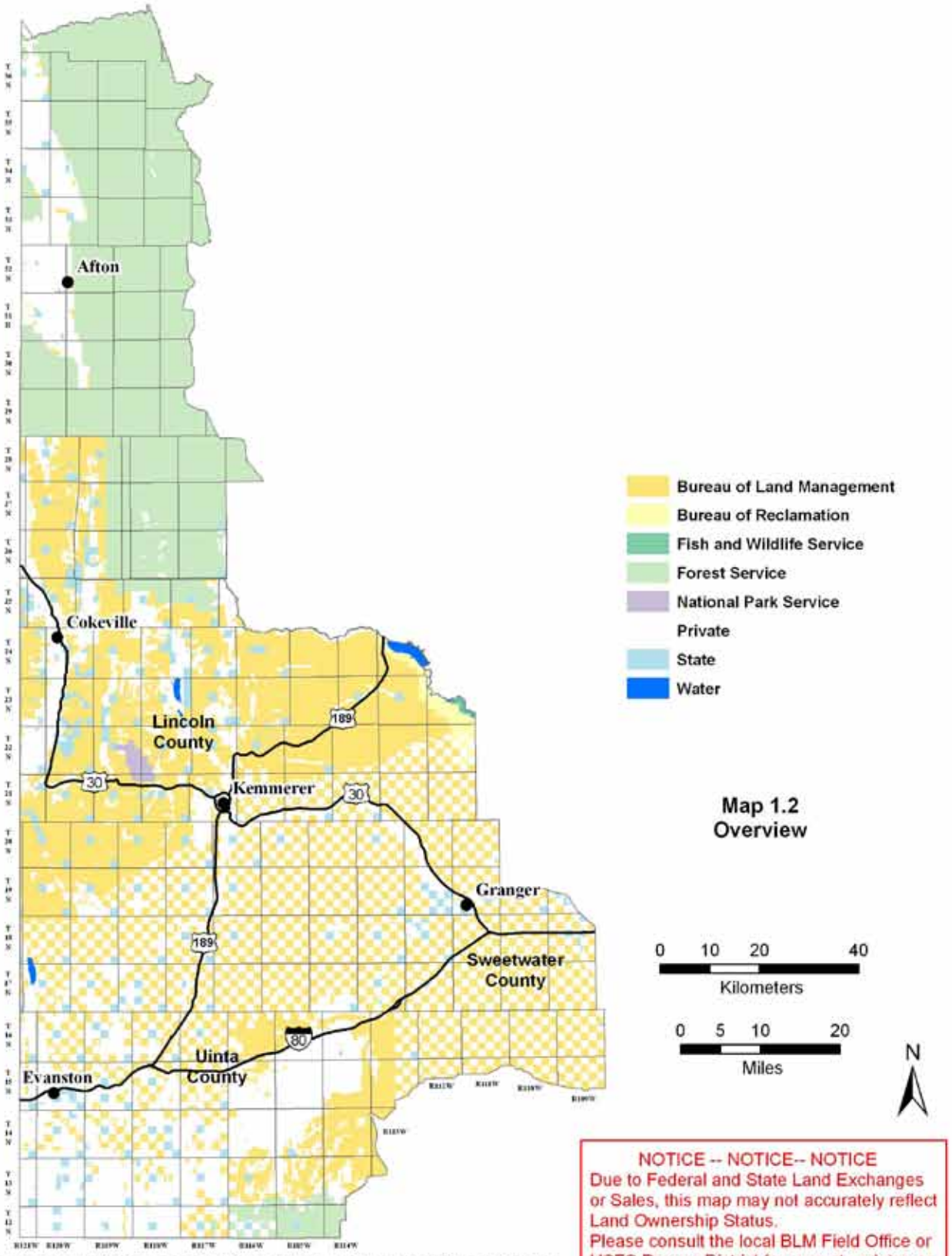
Key Issues Identified During the Scoping of the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement

Program Purpose and Need
Focus on long-term ecosystem sustainability and biological diversity; clearly define restoration objectives Need to address all invasive plants, not just weeds Evaluate land use impacts, such as grazing and fire suppression, on the decline of ecosystem health Focus on addressing the causes rather than treating the symptoms Address how PEIS will impact Resource Management Plans and other local planning Work closely with agencies, conservation groups, and private landowners on vegetation management
Proposed Action
Ensure that adequate funds are available to treat enough land and monitor treatment success Consider all treatment methods Naturally-occurring fires should be allowed to burn and restored to public lands Use newer, less toxic herbicides where feasible, and limit use or avoid use of herbicides Describe how herbicides were chosen and evaluated in the PEIS Describe where acres will be treated and method of accounting for acres that receive multiple treatments
Other Potential Alternatives
Reduce or eliminate the use of herbicides; apply from the ground rather than from the air Fuels reduction should only occur in WUI or where there is a threat of significant wildfire Treat more acres; treat fewer acres Develop a no-grazing alternative; develop a no-logging alternative; develop a no-OHV alternative Develop restrictions on motorized vehicle use on public lands Develop an alternative based on an ecosystem management approach
Restoration Goals and Best Management Practices
Identify restoration objectives and focus on preventative measures to eliminate the causes of land degradation Restoration efforts should focus on restoring natural disturbance regimes and

ecosystem processes Improve management of public lands for multiple use and maximum public benefit Use native plants and certified native seed, where practical, for revegetation Restrict grazing on lands that are being rehabilitated or that have not been impacted by livestock Monitor success of treatments and establish performance measures to determine treatment success Include public education as part of the vegetation treatment program
Environmental Consequences
Address the impacts on air quality from prescribed burning Address the impacts of herbicides on water quality Assess the role of fire in contributing to weed growth Evaluate the effects of herbicide treatments on non-target species Address the role of grazing in controlling weeds and other invasive vegetation and hazardous fuels Vegetation treatments should focus on restoring habitat and natural ecological processes Address the impacts of treatments on species of concern Describe how treatments will occur in wilderness areas Address the impacts of prescribed fire on power line operations and safety Evaluate the impacts to subsistence crops used by Native Americans and Alaska Natives Address the risks to humans and fish and wildlife from use of herbicides and smoke from prescribed fire Address how will vegetation treatments will affect the local economy

APPENDIX B

MAPS



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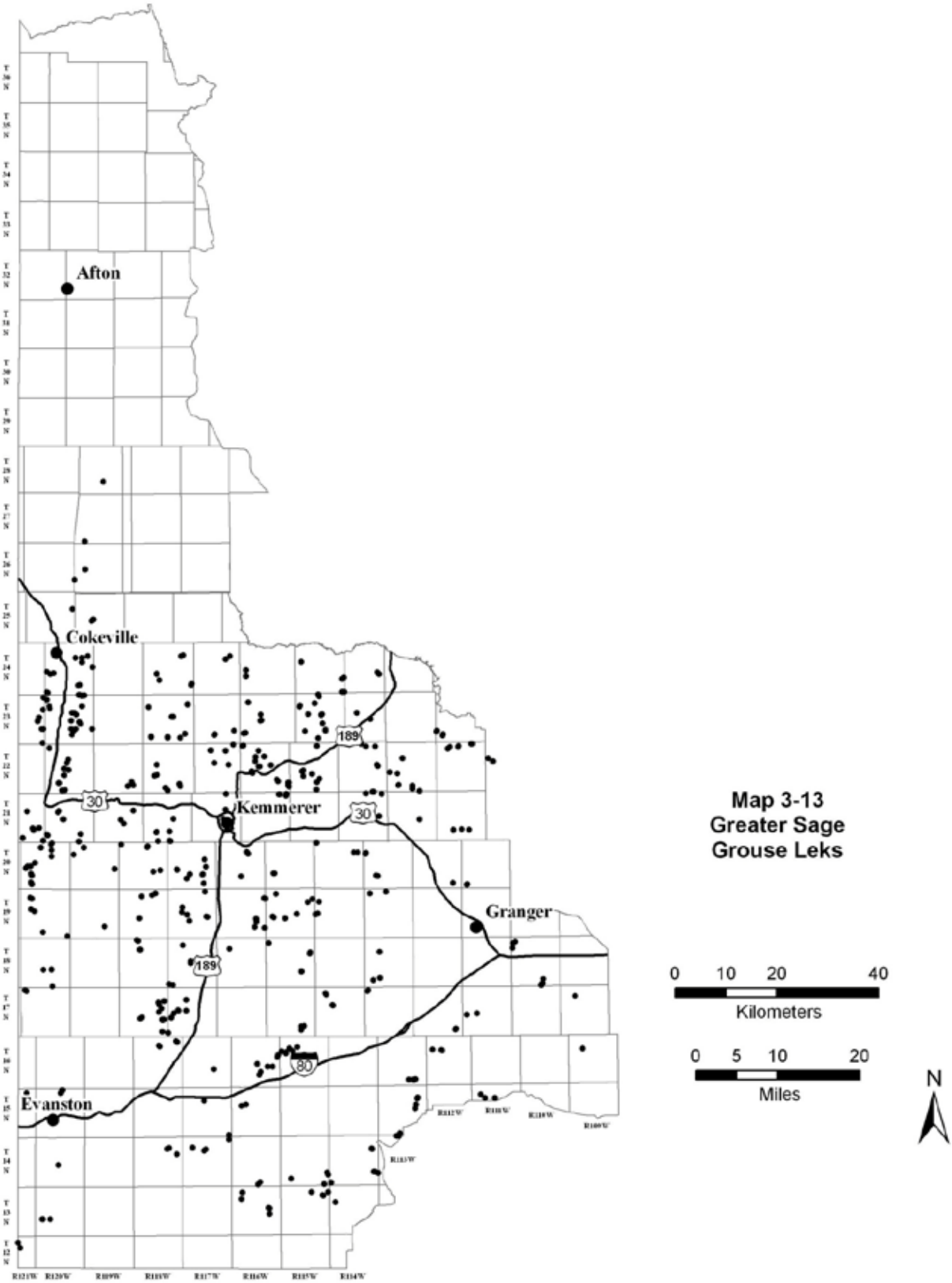

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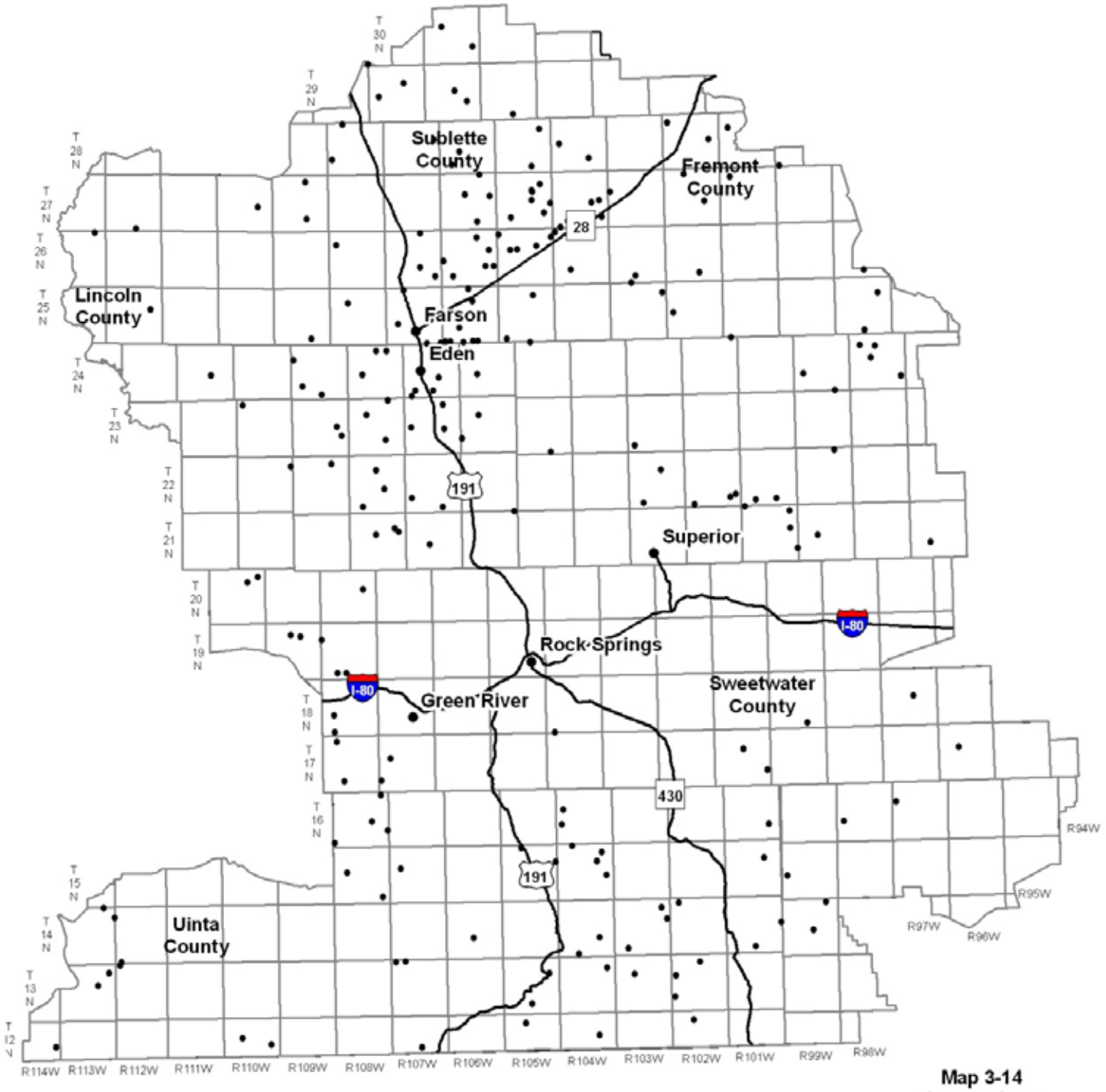

Map 3-14
Greater Sage Grouse Leks

0 10 20 40 Kilometers

0 5 10 20 Miles

N

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Map 1.3
Overview

Bureau of Land Management
Bureau of Reclamation
Forest Service
Private
State
Water

0 10 20 40 Kilometers

0 5 10 20 Miles

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APPENDIX C

STANDARD OPERATING PROCEEDURES

BLM Activity	Preventative Measures
Project Planning	• Incorporate prevention measures into project layout and design, alternative evaluation, and project decisions to prevent the introduction or spread of weeds. • Determine prevention and maintenance needs, including the use of herbicides, at the onset of project planning. • Before ground-disturbing activities begin, inventory weed infestations and prioritize areas for treatment in project operating areas and along access routes. • Remove sources of weed seed and propagates to prevent the spread of existing weeds and new weed infestations. • Pre-treat high-risk sites for weed establishment and spread before implementing projects. • Post weed awareness messages and prevention practices at strategic locations such as trailheads, roads, boat launches, and public land kiosks. • Coordinate project activities with nearby herbicide applications to maximize the cost effectiveness of weed treatments.
Project Development	• Minimize soil disturbance to the extent practical, consistent with project objectives. • Avoid creating soil conditions that promote weed germination and establishment. • To prevent weed germination and establishment, retain native vegetation in and around project activity areas and keep soil disturbance to a minimum, consistent with project objectives. • Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict travel to periods when the spread of seeds or propagates is least likely. • Prevent the introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material. • Inspect material sources on site, and ensure that they are weed-free before use and transport. Treat weed-infested sources to eradicate weed seed and plant parts, and strip and stockpile contaminated material before any use of pit material. • Survey the area where material from treated weed-

	infested sources is used for at least 3 years after project completion to ensure that any weeds transported to the site are promptly detected and controlled. • Prevent weed establishment by not driving through weed-infested areas. • Inspect and document weed establishment at access roads, cleaning sites, and all disturbed areas; control infestations to prevent weed spread within the project area. • Avoid acquiring water for dust abatement where access to the water is through weed-infested sites. • Identify sites where equipment can be cleaned. Clean equipment before entering public lands. • Clean all equipment before leaving the project site if operating in areas infested with weeds. • Inspect and treat weeds that establish at equipment cleaning sites. • Ensure that rental equipment is free of weed seed. • Inspect, remove, and properly dispose of weed seed and plant parts found on workers' clothing and equipment. Proper disposal entails bagging the seeds and plant parts and incinerating them.
Revegetation	• Include weed prevention measures, including project inspection and documentation, in operation and reclamation plans. • Retain bonds until reclamation requirements, including weed treatments, are completed, base on inspection and documentation. • To prevent conditions favoring weed establishment, reestablish vegetation on bare ground caused by project disturbance as soon as possible using either natural recovery or artificial techniques. • Maintain stockpiled, un-infested material in a weed-free condition. • Re-vegetate disturbed soil (except travel ways on surfaced projects) in a manner that optimizes plant establishment for each specific project site. For each project, define what constitutes disturbed soil and objectives for plant cover re-vegetation. Re-vegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary. • Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g., road embankments or

	landings). • Inspect seed and straw mulch to be used for site rehabilitation (for wattles, straw bales, dams, etc.) and certify that they are free of weed seed and propagules. • Inspect and document all limited term ground-disturbing operations in noxious weed infested areas for at least 3 growing seasons following completion of the project. • Use native material where appropriate and feasible. Use certified weed-free or weed-seed-free hay or straw where certified materials are required and/or are reasonably available. • Provide briefings that identify operational practices to reduce weed spread (for example, avoiding known weed infestation areas when locating fire lines). • Evaluate options, including closure, to regulate the flow of traffic on sites where desired vegetation needs to be established. Sites could include road and trail rights-of-way (ROW), and other areas of disturbed soils.
Standard Operating Procedures for Applying Herbicides	
Resource Element	Standard Operating Procedure
Guidance Documents	BLM Handbook H-9011-1 (Chemical Pest Control); and manuals 1112 (Safety), 9011 (Chemical Pest Control), 9012 (Expenditure of Rangeland Insect Pest Control Funds), 9015 (Integrated Weed Management), and 9220 (Integrated Pest Management)
General	• Prepare operational and spill contingency plan in advance of treatment. • Conduct a pretreatment survey before applying herbicides. • Select herbicide that is least damaging to the environment while providing the desired results. • Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, inert ingredients, and tank mixtures. • Apply the least amount of herbicide needed to achieve the desired result. • Follow herbicide product label for use and storage. • Have licensed applicators apply herbicides. • Use only USEPA-approved herbicides and follow product label directions and “advisory” statements. • Review, understand, and conform to the “Environmental

	Hazards" section on the herbicide product label. This section warns of known pesticide risks to the environment and provides practical ways to avoid harm to organisms or to the environment. • Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas. • Minimize the size of application area, when feasible. • Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/landowners. • Post treated areas and specify reentry or rest times, if appropriate. • Notify adjacent landowners prior to treatment. • Keep a copy of Material Safety Data Sheets (MSDSs) at work sites. MSDSs are available for review at ttp://www.cdms.net/. • Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. • Avoid accidental direct spray and spill conditions to minimize risks to resources. • Consider surrounding land uses before aerial spraying. • Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). • Make helicopter applications at target airspeeds of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground. • Take precautions to minimize drift by not applying herbicides when winds exceed >10 mph (>6 mph for aerial applications), or a serious rainfall event is imminent. • Use drift control agents and low volatile formulations. • Conduct pre-treatment surveys for sensitive habitat and special status species within or adjacent to proposed treatment areas. • Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. • Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. • Turn off applied treatments at the completion of spray runs and during turns to start another spray run. • Refer to the herbicide product label when planning re-vegetation to ensure that subsequent vegetation would not

	be injured following application of the herbicide. • Clean OHVs to remove seeds.
Air Quality See Manual 7000 (Soil, Water, and Air Management)	• Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. • Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (>6 mph for aerial applications) or rainfall is imminent. • Use drift reduction agents, as appropriate, to reduce the drift hazard. • Select proper application equipment (e.g., spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). • Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).
Soil See Manual 7000 (Soil, Water, and Air Management	• Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. • Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. • Do not apply granular herbicides on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas.
Water Resources See Manual 7000 (Soil, Water, and Air Management)	• Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. • Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular herbicide, as predicted by risk assessments. • Use local historical weather data to choose the month of treatment. Considering the phonological stage of the target species, schedule treatments based on the condition of the water body and existing water quality conditions. • Plan to treat between weather fronts (calms) and at appropriate time of day to avoid high winds that increase water movements, and to avoid potential storm water runoff and water turbidity. • Review hydro geologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow

	groundwater and areas of surface water and groundwater interaction. Minimize treating areas with high risk for groundwater contamination. • Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. • Do not rinse spray tanks in or near water bodies. Do not broadcast pellets where there is danger of contaminating water supplies. • Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide- and site-specific criteria to minimize impacts to water bodies. • Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment
Wetlands and Riparian Areas	• Use a selective herbicide and a wick or backpack sprayer. • Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications
Vegetation See Handbook H-4410-1 (National Range Handbook), and manuals 5000 (Forest Management) and 9015 (Integrated Weed Management)	• Refer to the herbicide label when planning re-vegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Use native or sterile species for re-vegetation and restoration projects to compete with invasive species until desired vegetation establishes. • Use weed-free feed for horses and pack animals. Use weed-free straw and mulch for re-vegetation and other activities. • Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing permit, to maintain desirable vegetation on the treatment site.
Pollinators	• Complete vegetation treatments seasonally before pollinator foraging plants bloom. • Time vegetation treatments to take place when foraging pollinators are least active both seasonally and daily. • Design vegetation treatment projects so that nectar and pollen sources for important pollinators and resources are

	treated in patches rather than in one single treatment. • Minimize herbicide application rates. Use typical rather than maximum rates where there are important pollinator resources. • Maintain herbicide free buffer zones around patches of important pollinator nectar and pollen sources. • Maintain herbicide free buffer zones around patches of important pollinator nesting habitat and hibernacula. • Make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants (if invasive species) and in their habitats.
Fish and Other Aquatic Organisms See manuals 6500 (Wildlife and Fisheries Management) and 6780 (Habitat Management Plans)	• Use appropriate buffer zones based on label and risk assessment guidance. • Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used, and use spot rather than broadcast or aerial treatments. • Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. • For treatment of aquatic vegetation, 1) treat only that portion of the aquatic system necessary to achieve acceptable vegetation management, 2) use the appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms, and 3) follow water use restrictions presented on the herbicide label.
Wildlife See manuals 6500 (Wildlife and Fisheries Management) and 6780 (Habitat Management Plans)	• Use herbicides of low toxicity to wildlife, where feasible. • Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, especially non-target vegetation over areas larger than the treatment area. • Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife
Threatened, Endangered, and Sensitive Species See Manual 6840 (Special Status Species)	• Survey for special status species before treating an area. Consider effects to special status species when designing herbicide treatment programs. • Use a selective herbicide and a wick or backpack sprayer to minimize risks to special status plants. • Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for special status species in area to be treated.
Livestock	• Whenever possible and whenever needed, schedule

See Handbook H-4120-1 (Grazing Management)	treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. • As directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application, where applicable. • Use herbicides of low toxicity to livestock, where feasible. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. • Avoid use of diquat in riparian pasture while pasture is being used by livestock. • Notify permittees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Notify permittees of livestock grazing, feeding, or slaughter restrictions, if necessary. • Provide alternative forage sites for livestock, if possible.
Wild Horses and Burros	• Minimize using herbicides in areas grazed by wild horses and burros. • Use herbicides of low toxicity to wild horses and burros, where feasible. • Remove wild horses and burros from identified treatment areas prior to herbicide application, in accordance with herbicide product label directions for livestock. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contaminating non-target food and water sources
Cultural Resources and Paleontological Resources See handbooks H-8120-1 (Guidelines for Conducting Tribal Consultation) and H- 8270-1 (General Procedural Guidance for Paleontological Resource Management), and manuals 8100 (The	• Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act and state protocols or 36 Code of Federal Regulations Part 800, including necessary consultations with State Historic Preservation Officers and interested tribes. • Follow BLM Handbook H-8270-1 (General Procedural

Foundations for Managing Cultural Resources), 8120 (Tribal Consultation Under Cultural Resource Authorities), and 8270 (Paleontological Resource Management) See also: Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation	Guidance for Paleontological Resource Management) to determine known Condition I and Condition 2 paleontological areas, or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. • Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected by herbicide treatments. • Work with tribes to minimize impacts to these resources. • Follow guidance under Human Health and Safety in the PEIS in areas that may be visited by Native peoples after treatments.
Visual Resources See handbooks H-8410-1 (Visual Resource Inventory) and H-8431-1 (Visual Resource Contrast Rating), and manual 8400 (Visual Resource Management)	• Minimize the use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. • Consider the surrounding land use before assigning aerial spraying as an application method. • Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10 mph; minimize treatment in areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences) to contain visual changes to the intended treatment area. • If the area is a Class I or II visual resource, ensure that the change to the characteristic landscape is low and does not attract attention (Class I), or if seen, does not attract the attention of the casual viewer (Class II). • Lessen visual impacts by: 1) designing projects to blend in with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) re-vegetating the site following treatment.

	• When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established Visual Resource Management (VRM) objectives.
Wilderness and Other Special Areas See handbooks H-8550-1 (Management of Wilderness Study Areas (WSAs)), and H- 8560-1 (Management of Designated Wilderness Study Areas), and Manual 8351 (Wild and Scenic Rivers)	• Encourage backcountry pack and saddle stock users to feed their livestock only weed-free feed for several days before entering a wilderness area. • Encourage stock users to tie and/or hold stock in such a way as to minimize soil disturbance and loss of native vegetation. • Re-vegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. • Provide educational materials at trailheads and other wilderness entry points to educate the public on the need to prevent the spread of weeds. • Use the "minimum tool" to treat noxious and invasive vegetation, relying primarily on the use of ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. • Use chemicals only when they are the minimum method necessary to control weeds that are spreading within the wilderness or threaten lands outside the wilderness. • Give preference to herbicides that have the least impact on non-target species and the wilderness environment. • Implement herbicide treatments during periods of low human use, where feasible. • Address wilderness and special areas in management plans. • Maintain adequate buffers for Wild and Scenic Rivers (¼ mile on either side of river, ½ mile in Alaska).
Recreation See Handbook H-1601-1 (Land Use Planning Handbook, Appendix C)	• Schedule treatments to avoid peak recreational use times, while taking into account the optimum management period for the targeted species. • Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas. • Adhere to entry restrictions identified on the herbicide product label for public and worker access. • Post signs noting exclusion areas and the duration of exclusion, if necessary. • Use herbicides during periods of low human use, where feasible.
Social and Economic	• Consider surrounding land use before selecting aerial

Values	spraying as a method, and avoid aerial spraying near agricultural or densely-populated areas. • Post treated areas and specify reentry or rest times, if appropriate. • Notify grazing permittees of livestock feeding restrictions in treated areas, if necessary, as per herbicide product label instructions. • Notify the public of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Control public access until potential treatment hazards no longer exist, per herbicide product label instructions. • Observe restricted entry intervals specified by the herbicide product label. • Notify local emergency personnel of proposed treatments. • Use spot applications or low-boom broadcast applications where possible to limit the probability of contaminating non-target food and water sources, especially vegetation over areas larger than the treatment area. • Consult with Native American tribes and Alaska Native groups to locate any areas of vegetation that are of significance to the tribes and Native groups and that might be affected by herbicide treatments. • To the degree possible within the law, hire local contractors and workers to assist with herbicide application projects and purchase materials and supplies, including chemicals, for herbicide treatment projects through local suppliers. • To minimize fears based on lack of information, provide public educational information on the need for vegetation treatments and the use of herbicides in an Integrated Pest Management program for projects proposing local use of herbicides.
Rights-of-way	• Coordinate vegetation management activities where joint or multiple use of a ROW exists. • Notify other public land users within or adjacent to the ROW proposed for treatment. • Use only herbicides that are approved for use in ROW areas.
Human Health and Safety	• Establish a buffer between treatment areas and human residences based on guidance given in the HHRA, with a

	minimum buffer of ¼ mile for aerial applications and 100 feet for ground applications, unless a written waiver is granted. • Use protective equipment as directed by the herbicide product label. • Post treated areas with appropriate signs at common public access areas. • Observe restricted entry intervals specified by the herbicide product label. • Provide public notification in newspapers or other media where the potential exists for public exposure. • Have a copy of MSDSs at work site. • Notify local emergency personnel of proposed treatments. • Contain and clean up spills and request help as needed. • Secure containers during transport. • Follow label directions for use and storage. • Dispose of unwanted herbicides promptly and correctly.

APPENDIX D

MITIGATION MEASURES

Resource	Mitigation Measures
Air Quality	None proposed
Soil Resources	None proposed
Water Resources and Quality	• Establish appropriate (herbicide-specific) buffer zones to downstream water bodies, habitats, and species/populations of interest • Areas with potential for groundwater for domestic or municipal water use shall be evaluated through the appropriate, validated USEPA model(s) to estimate vulnerability to potential groundwater contamination, and appropriate mitigation measures shall be developed if such an area requires the application of herbicides and cannot otherwise be treated with nonchemical methods.
Wetland and Riparian Areas	• See mitigation for Water Resources and Quality and Vegetation.
Vegetation	• Minimize the use of terrestrial herbicides (especially bromacil, diuron, and sulfometuron methyl) in watersheds with downgradient ponds and streams if potential impacts to aquatic plants are identified. • Establish appropriate (herbicide-specific) buffer zones around downstream water bodies, habitats, and species/populations of interest. Consult the ecological risk assessments (ERAs) prepared for the PEIS for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios. • Limit the aerial application of chlorsulfuron and metsulfuron methyl to areas with difficult land access, where no other means of application are possible. Do not apply sulfometuron methyl aerially. • To protect special status plant species, implement all conservation measures for plants presented in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement and Kemmerer RMP dated August 8, 2008.
Fish and Other	• Limit the use of diquat in water bodies that have native fish

Aquatic Organisms	and aquatic resources. • Limit the use of terrestrial herbicides (especially diuron) in watersheds with characteristics suitable for potential surface runoff that have fish-bearing streams during periods when fish are in life stages most sensitive to the herbicide(s) used. • To protect special status fish and other aquatic organisms, implement all conservation measures for aquatic animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment*. • Establish appropriate herbicide-specific buffer zones for water bodies, habitats, or fish or other aquatic species of interest • Consider the proximity of application areas to salmonid habitat and the possible effects of herbicides on riparian and aquatic vegetation. Maintain appropriate buffer zones around salmonid-bearing streams • In aquatic environments, avoid using glyphosate formulations containing polyoxyethyleneamine (POEA), or seek to use formulations with the least amount of POEA, to reduce risks to aquatic organisms in aquatic environments. • At the local level, consider effects to special status fish and other aquatic organisms when designing treatment programs.
Wildlife	•To minimize risks to terrestrial wildlife, do not exceed the typical application rate for applications of dicamba, diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr, where feasible. • Minimize the size of application areas, where practical, when applying 2,4-D, bromacil, diuron, and Overdrive® to limit impacts to wildlife, particularly through contamination of food items. • Where practical, limit glyphosate and hexazinone to spot applications in rangeland and wildlife habitat areas to avoid contamination of wildlife food items. • Avoid using the adjuvant R-11® in aquatic environments, and either avoid using glyphosate formulations containing POEA, or seek to use formulations with the least amount of POEA, to reduce risks to amphibians. • Do not apply bromacil or diuron in rangelands, and use appropriate buffer zones to limit contamination of off-site vegetation, which may serve as forage for wildlife. • Do not aerially apply diquat directly to wetlands or riparian areas.

	• To protect special status wildlife species, implement all conservation measures for terrestrial animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment*.
Livestock	• Minimize potential risks to livestock by applying diuron, glyphosate, hexazinone, tebuthiuron, and triclopyr at the typical application rate, where feasible. • Do not apply 2,4-D, bromacil, dicamba, diuron, Overdrive®, picloram, or triclopyr across large application areas, where feasible, to limit impacts to livestock, particularly through the contamination of food items. • Where feasible, limit glyphosate and hexazinone to spot applications in rangeland. • Do not aerially apply diquat directly to wetlands or riparian areas used by livestock. • Do not apply bromacil or diuron in rangelands, and use appropriate buffer zones to limit contamination of off-site rangeland vegetation.
Wild Horses and Burros	• The Kemmerer Field Office, Pinedale Field Office and Rock Springs Field Officeis wild horses and burros free. • Minimize potential risks to wild horses and burros by applying diuron, glyphosate, hexazinone, tebuthiuron, and triclopyr at the typical application rate, where feasible, in areas associated with wild horse and burro use. • Consider the size of the application area when making applications of 2,4-D, bromacil, dicamba, diuron, Overdrive®, picloram, and triclopyr in order to reduce potential impacts to wild horses and burros. • Apply herbicide label grazing restrictions for livestock to herbicide treatment areas that support populations of wild horses and burros. • Where practical, limit glyphosate and hexazinone to spot applications in rangeland. • Do not apply bromacil or diuron in grazing lands within herd management areas (HMAs), and use appropriate buffer zones identified in Tables 4-12 and 4-14 in Chapter 4 of the Final PEIS to limit contamination of vegetation in off-site foraging areas. • Do not apply 2,4-D, bromacil, or diuron in HMAs during the peak foaling season (March through June, and especially in May and June), and do not exceed the typical application rate

	of Overdrive® or hexazinone in HMAs during the peak foaling season in areas where foaling is known to take place.
Paleontological and Cultural Resources	• Do not exceed the typical application rate when applying 2, 4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron, and triclopyr in known traditional use areas. • Avoid applying bromacil or tebuthiuron aerially in known traditional use areas. • Limit diquat applications to areas away from high residential and traditional use areas to reduce risks to Native Americans and Alaska Natives.
Visual Resources	None Proposed
Wilderness and Other Special Areas	Mitigation measures that may apply to wilderness and other special area resources are associated with human and ecological health and recreation (see mitigation measures for Vegetation, Fish and Other Aquatic Resources, Wildlife Resources, Recreation, and Human Health and Safety).
Recreation	Mitigation measures that may apply to recreational resources are associated with human and ecological health (see mitigation measures for Vegetation, Fish and Other Aquatic Resources, Wildlife Resources, and Human Health and Safety).
Health and Safety	• Use the typical application rate, where feasible, when applying 2,4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron, and triclopyr to reduce risk to occupational and public receptors. • Avoid applying bromacil and diuron aerially. Do not apply sulfometuron methyl aerially. • Limit application of chlorsulfuron via ground broadcast applications at the maximum application rate. • Limit diquat application to ATV, truck spraying, and boat applications to reduce risks to occupational receptors; limit diquat applications to areas away from high residential and subsistence use to reduce risks to public receptors. • Evaluate diuron applications on a site-by-site basis to avoid risks to humans. There appear to be few scenarios where diuron can be applied without risk to occupational receptors. • Do not apply hexazinone with an over-the-shoulder broadcast applicator.

APPENDIX E

KEMMERER FIELD OFFICE, PINEDALE FIELD OFFICE, AND ROCK SPRINGS FIELD OFFICE INVASIVE PLANT PROGRAM; WEED MANAMGEMENT PLAN

Example

Noxious and Invasive Weed Management Plan for Oil and Gas Development Areas

Introduction Weed Management Plan

Noxious and invasive weeds can occur both directly and indirectly from energy development as well as other development activities that cause disturbance. Weeds and weed seed can be transported and spread with road surfacing and other construction related events including reclamation activities. Weeds and weed seed can be attached to equipment and vehicles thus having the potential to be spread over large areas. Physical disturbance of the soil from pipelines, well locations, road development and other construction, as well as soil moisture and chemical alterations from produced water discharge, and stream flow / storage will also create opportunities for the introduction, infestation and spread of noxious and invasive weeds.
Prevention and control of noxious and invasive weeds should be incorporated into the design, layout and construction of access roads, pipelines, and well locations as well as other facilities. Discharge points for water including reservoirs, off-channel containment structures, drainages for runoff, etc. can harbor weeds and other invasive plants.
Control of noxious and invasive weeds during construction, production and reclamation using an integrated approach is most beneficial. Consideration of landscape, soils, and desirable vegetation, open water, water table locations, and land use must be considered.
The spread of weeds to off location / adjacent areas, and other pertinent factors should be addressed using the most effective combination of any or all of the following methods.

- ***Cultural***
  a. The prompt seeding and revegetation of areas of disturbed soils with certified weed-free seed.

  b. Encourage the cleaning of equipment and vehicles prior to entering or leaving each management area. (Pressure wash in a designated area)

  c. Minimize soil disturbance, where possible.

  d. Use certified weed-free mulch/straw for erosion control.

- ***Physical***
  a. Mowing of weeds in newly revegetated areas during the first season of establishment, prior to seed formation of the weeds in the revegetated area. *Care will be taken to encourage seed formation and growth of new native plants.*

  b. Hand pull and remove weedy plants in areas that BLM sensitive species are found and newly seeded areas.

- ***Biological***
  a. Use of domestic animals and approved biological agents may be utilized. ***NOTE**: biological agents are species specific and can take up to five years before any results may be detected. Biological agents also ***require prior approval***; see "Policy 1. (c)".

  b. Use of domestic livestock include, but is not limited to, livestock species/ breed; targeted weed species and necessary management/care of livestock that is used (i.e.

fencing, water, herding, etc.) Use of Livestock ***require prior approval***; see "Policy 1. (b)".

- ***Chemical***
  a. Consider weed species, the site on which the herbicide will be applied, method of application, and desired result when selecting the herbicide for treatment and control of noxious/ invasive weeds.

  b. Ensure selected herbicides are BLM approved for weed(s) that are to be controlled, and chemical label applications are followed.

  c. ALL herbicides are required to be applied by a certified commercial applicator(s).

Goals

1. Prevent new infestations of noxious weeds in and around the project area(s), provide inventory, monitoring, and control methods of existing infestations. Including the areas that are affected off pad or (lease).

2. Implement an integrated weed management plan to eradicate/manage noxious weeds populations, including areas that may be affected off pad. ***NOTE** weeds are to be mapped and reported by lease; weeds that are off pad but located on lease will be treated.

3. Maintain weed inventory, herbicide and mapping records by lease.

Policy

1. On BLM administered public lands

   a. An approved Pesticide Use Permit (PUP) is required to apply chemical herbicide.

   b. Approval and proper permitting for domestic livestock is required prior to implementing this as a weed control method.

   c. An approved Biological Release Permit (BRP) is required for the release of biological agents.

   d. Upon completion of any pesticide application, a Pesticide Application Record (PAR) will be completed within **24 hours**. The PAR will be *kept for 10 years*.

2. **ALL** herbicide applications on BLM administered public lands are required to be applied by a certified commercial applicator(s).

   a. See current list of herbicide approved for application on Bureau of Land Management administered lands. Contact the BLM, Pinedale Field Office.

b. Weed list for Wyoming and Sublette County. www.wyoweed.org, or contact the BLM, Pinedale Field Office.

BLM Wyoming Sensitive/ Threatened & Endangered Species

1. Before a chemical pest control program may be initiated, a survey of the area for Threatened and Endangered Species/ BLM Wyoming Sensitive Species will be made (BLM Manual sec. 6840).

   a. Contact the Pinedale BLM Field Office for a list of plants that may be located in your Management Area.

Incorporate Weed Prevention and Control Measures

a. Use only certified weed-free hay, straw and/or any other materials used for erosion control and other reclamation activities (as required by the Jonah ROD).

b. Use only certified weed-free gravel and earthen materials for road surfacing and maintenance.

c. Cleaning of equipment and vehicles used in the construction drilling or reclamation activities prior to entering or leaving a management area. (Pressure washing or other means in a designated area).

d. Reseed all areas immediately following construction, drilling or other restoration activities. (Jonah ROD requires…"The initiation of interim reclamation will commence within 30 days after the last well scheduled on a pad is put into production." A-7 #1.)

e. Use only certified weed-free seed for the reclamation/restoration of areas disturbed by related development activities.

Initiate a Weed Education Policy

a. Develop cooperative education and awareness programs within your company in conjunction with State, County and Federal Agencies. (i.e.: Extension Agents, County Weed and Pest personnel and Local BLM Field Office Representative (s)).

b. Designate a Company representative, who is responsible for weed management and will be a liaison for the company with State, County and Federal Agencies.

c. Encourage contractors and employees to report new noxious/ invasive weed infestations to a designated company representative who is responsible for weed management.

d. Review and make available weed education material at onsite and pre-construction meetings and offices.

Weed Management Plans Will Include

1. **Prevention and Detection**: The most important component to controlling noxious weeds. Early detection and proper identification of a new weed infestation is critical to any successful weed management plan. This management plan will include *how* noxious/invasive weeds will be detected.

2. **Inventory and Mapping**: Maintaining accurate records aids in tracking weed infestations over time and will aid in the overall management decisions made over time in the weed management area. This will also include locations of any BLM Wyoming Sensitive Species. Provide an annual map with identified weed locations and associated control methods. *This map will be included with the annual reclamation reports provided to the BLM and JIO January 31 of each year.*

3. **Reporting**: Maintain a weed inventory, mapping (GPS) and pesticide application data for tracking weeds on public lands and other reporting as necessary, and then reported annually to the BLM, Pinedale Field Office. *****I*nclusion of an ArcGIS shape file with the report that contains polygons of weed infestations recorded with a GPS unit is required.*

4. **Weed Control**: After weeds have been inventoried and mapped they must be treated with the best available weed control techniques with consideration of any BLM Wyoming sensitive species. Contact the BLM, Pinedale Field Office for assistance.

5. **Long Term Monitoring and Retreatment**: Many weeds have seeds that remain viable in the soil for many years. Thus weed management must be viewed as a long-term process and commitment to the land in order to achieve positive management of the management area. A long term monitoring plan will be submitted as part of a weed management plan.

6. **Spread of Weeds from Pad to undisturbed BLM***:* Weeds can and will spread to locations located off of well pads and other construction/development areas to other leases, BLM lands, and other adjacent lands including private lands . A coordination plan between all entities involved, including various operators and agencies will be included as part of any weed monitoring program.

See attached Stipulations:

Invasive/Noxious Weed Stipulations for developments and reclamation on BLM Public Lands:

The Holder shall be responsible for total control of all invasive/noxious weeds species on any and all disturbed site(s) on public lands, including areas outside the development where weeds have established due to project installation and development.

The Holder will prepare a Noxious and Invasive Weed Control Plan for submission to the BLM to provide prescribed methods to prevent, mitigate, and control the spread of noxious weeds during and following construction of the project. The Holder will be responsible for preparing the plan. The plan needs to be applicable to the construction and operation of the project.

All vehicles and equipment used for project construction and developments need to be power or high pressure washed prior to entering the project area to ensure they are free of mud, dirt, and plant parts that may create a weed problem.

Gravel or materials used to surface or upgrade access roads and new road developments to oil and gas project sites needs to be acquired from a weed free gravel pit.

Guidelines in Partners Against Weeds, An Action Plan for the Bureau of Land Management needs to be followed as outlined in Appendix 4 as a prototype for weed prevention measures on public lands.

The Holder is responsible for consultation with the Authorized Officer and/or local authorities for acceptable weed control methods, and shall comply with the following:

Use of pesticides/herbicides shall comply with the applicable Federal and State laws. It is a violation of Federal Law to use any product in a manner that is inconsistent with its labeling. Pesticides/Herbicides shall be used only in accordance with their registered use within limitations imposed by the Secretary of the Interior. Prior to the use of the pesticides/herbicides, the Holder shall obtain from the Authorized Officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, a map showing the treatment areas, locations of storage and disposal of containers, and any other information deemed necessary by the Authorized Officer.

Only those chemicals (pesticides and herbicides) listed on the BLM approved label list are authorized for use on public lands. A Pesticide Use Proposal (PUP) must be submitted for each chemical used, and it cannot be used until approval has been obtained in writing from the BLM Authorized Officer. The report needs to include any surfactants or dyes used in the spraying operation.

Applicator(s) of chemicals used must have completed the pesticide certification training and have a current up to date Certified Pesticide Applicators License.
Pesticide/Herbicide Application Records for the areas and acres treated must be submitted to the BLM Kemmerer Field Office each year. This includes the following:

Brand or Product name,
EPA registration number,
Total amount applied (use rate pounds Active ingredients (A.I.) or pounds acid equivalent (a.e.) gallon,
Total amount in pounds of surfactants and/or dyes used during the spraying operations,
Date of application,
Weather,
Location of application,
Size of area treated,
Method of treatment (air/ground),
Name of applicator,
Certification number and dates,
Costs to treatment, and

The record information must be recorded no later than 14 days following the pesticide/herbicide application and must be maintained for 10 years.

The company will designate a contact person for the permittees so they can contact them if they have any problems during the drilling operations.

The company is responsible for contacting livestock permittees on assigned allotments so they are informed of work locations.

The company needs to ensure all that gates, cattleguards, and fences damaged are repaired as soon as possible to keep livestock within assigned allotments and pastures.

The company is responsible for all weed control including re-seeding, and re-habilitation of disturbed sites and roads.

The company needs to keep up on all maintenance of damaged roads and see that they are repaired as soon as possible to facilitate ongoing livestock operations.

The stipulations above pertain to the following documents:

Instruction Memorandum No. 99-178 clearly states that Invasive/Nonnative species are required to be considered and given through consideration -- especially weeds -- in all BLM Environmental Assessments (EA) and Environmental Impact Statements (EIS).

The Kemmerer Resource Management Plan* (signed April 29, 1986) states as follows:
"Weed and Pest Control - All noxious weed control will adhere to measures allowed in the Decision Record for the Rock Springs District Noxious Weed Control EA or applicable updated guidance. Cooperation with county weed and pest control programs will continue." This EA follows the final Environmental Impact Statement (EIS) for Vegetation Treatment on BLM Lands in the Thirteen Western States written in May 1991.

The BLM has to comply with the EIS for the 17 Western States, including Alaska as of October 5, 2007.

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*Note: The 1986 Kemmerer RMP is currently being updated and will require applicants to follow the Partners Against Weeds action plan to accomplish more efficient and better control of weeds on public lands.

The Partners Against Weeds - An Action Plan for the Bureau of Land Management (January 1996), in appendix 4, outlines a prototype for weed prevention measures and best known practices for roads, recreation, wilderness, road less areas, cultural resources, wildlife, range, timber, minerals, and fires.

Information Bulletin No.WY-98-016 - Weed Management Guidance.

The Bureau of Land Management Decision Notice and Finding of No Significant Impact written in 1996 and updated in1997 NEPA Document.

Instruction Memorandum No.WY-99-29 - Executive Order #13112 - Invasive Species.

Washington Information Bulletin No. 99-110 Submission of Pesticide Use Report - As directed in this bulletin in BLM Manual 9011-Chemical Pest Control, Part .13C and H-9011-1, Part C.3, "…the BLM is required to submit annual Pesticide Use Report to the Environmental Protection Agency to meet this requirement, each state must submit their Pesticide Use Report."

Information Bulletin No.WY-2000-25 - Annual Pesticide Use Report.
Instruction Memorandum No. 2006-073 is a National weed free policy that focuses on weed free seed, and straw and mulch as part of rehabilitation activities, this is now included in all oil/gas permitting.
For contact information call your local BLM field office at the number listed at the top of this document.