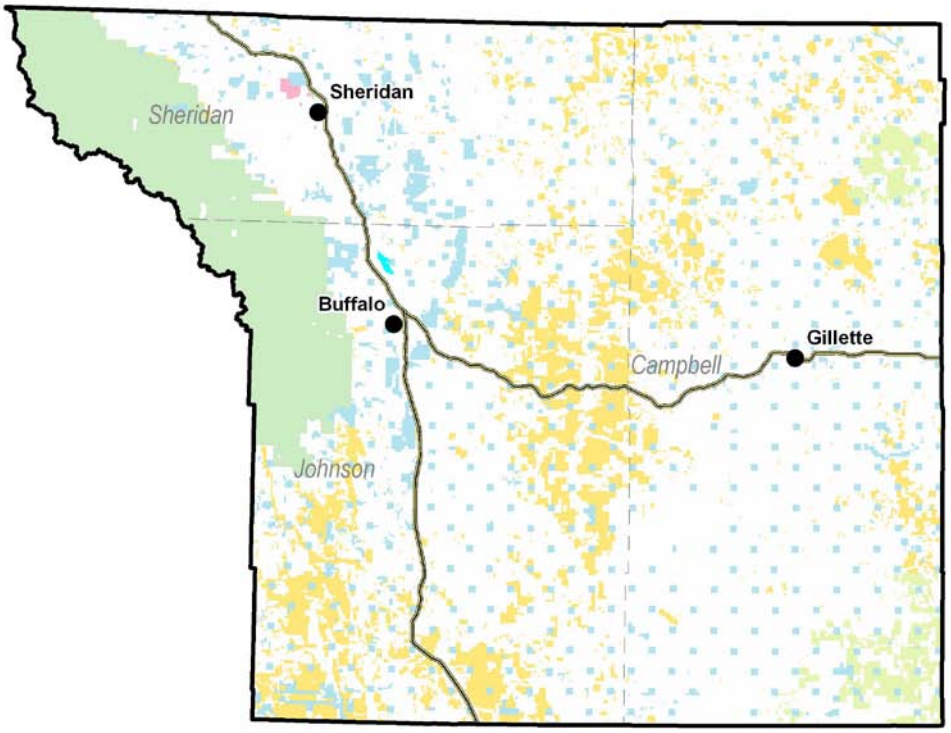
United States Department of the Interior
Bureau of Land Management

Environmental Assessment WY- 070-EA09-099

Invasive Species Management –Buffalo Field Office

Location: *The BLM Buffalo Field Office administrative area is located in north-central and north Wyoming. The BFO includes approximately 11.2 million acres of land in Johnson, Campbell, and Sheridan Counties.*



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Invasive Species Management – Buffalo Field Office
WY-70-EA09-99

1. PURPOSE & NEED

1.1. Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of invasive pest management as proposed by Buffalo Field Office (BFO) as well as those actions proposed by the entities that develop projects on Federal surface. Integrated Pest Management (IPM) is defined in DOI Department Manual 517 as "a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks."

1.2. Background:

Invasive species 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] expands this definition to include any invasive or noxious plant, insect, and other pests. Invasives, primarily plant species, compromise the ability to manage BLM lands for a healthy native ecosystem. Invasive species 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 significant plants; high cost (dollars spent) of controlling invasive species; and increased cost to maintaining transportation systems and recreational sites. Other pest species include forage destroying grasshopper species, Mormon crickets, and mosquitoes that carrying West Nile virus (WNV).

The Bureau of Land Management (BLM) proposes to manage invasive pests throughout the entire BFO (Appendix B, Map 1) by utilizing integrated pest management. The 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 and insects) that weaken or destroy vegetation or a pest species. Biological control is used to reduce the targeted plant or insect population to an acceptable level. Biological control can stress target plants and reduce competition with the desired plant species. Biological control is also used to destroy mosquito larvae to reduce populations that may transmit WNV to animals, birds and humans including sage grouse.

Cultural- The use of cultural control methods primarily refers the prevention of invasive plant establishment through the modification or elimination of land use practices by humans which may indirectly cause or aid in the spread of noxious weeds. There are generally five aspects to cultural control, which include: 1) prevention, 2) livestock manipulation, 3) wildlife manipulation, 4) soil disturbance activities and 5) public uses.

Chemical - Herbicides are chemicals that kill or injure plants. Insecticides are chemicals that kill or injure insects. Herbicides and insecticides can be categorized as selective or non-selective. Selective herbicides

[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.

kill only a specific type of plant, such as broad-leaved plants, while non-selective herbicides kill all types of plants; the same concept applies for selective and non-selective insecticides.

Physical - Manual treatment 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 mulch around desired vegetation to limit competitive growth.

1.3. Need for the Proposed Action

The BFO proposes to implement integrated pest management to address the introduction and spread of invasive pests, primarily plant species. Increased use of public land has contributed to habitat degradation as invasive species 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 species is relatively low in the BFO, thus providing an opportunity to aggressively treat new and existing infestations. Most of the BFO has not been inventoried for noxious and invasive species; thus, the actual number of acres needing treatment has not been established. The current treatment focus is on Wyoming state listed noxious weeds[2]; however, controlling other invasive species (halogeton, black henbane, mosquitoes, 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.

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

Table 1.1 Primary Infestations Identified in Buffalo Field Office

Species	Location
Leafy Spurge	North of Interstate 90 to the Montana state line. Primarily adjacent to the Powder River and major tributaries in all three counties.
Spotted Knapweed	In and around the City of Gillette and east along I-90 for about ten miles. Found along the Little Powder River in northern Campbell County and the Red Fork drainage in southwest Johnson County. Also found along I-90 and I-25 corridors.
Diffuse Knapweed	Found adjacent to the Powder River from the Natrona County line to I-90, adjacent to the Little Powder River from the Montana state line to just north of Gillette, and the south Bighorns west of I-90 and south of State Highway 190 to Barnum
Russian Knapweed	Powder River drainage from the Natrona County line to the Montana state line, including the South Fork of the Powder River, Salt Creek, Red Fork, and Crazy Woman Creek drainages. Also, the Little Powder River drainage from north of Gillette to the Montana state line.

[2] Wyoming Noxious Weed – Legal designation by the Wyoming Department of Agriculture

Species	Location
Scotch Thistle	The Powder River drainage from the Natrona County line to the Sheridan County line and the Crazy Woman Creek drainage. It is found in the area from east of the Powder River to the Campbell County line to south of the Sheridan County line. Also along State Highway 357 from Reno Junction to Midwest.
Salt Cedar	Throughout the BFO mainly in drainages and along reservoirs.
Russian Olive	Throughout the BFO mainly in drainages and along reservoirs.
Hoary Cress (white top)	Found at the top of Crazy Woman Creek drainage, and NE Campbell County including around the city of Gillette and the Little Powder River drainage.
Black Henbane	Throughout the BFO
Field Bindweed	Scattered throughout the BFO
Canada thistle	Throughout the BFO
Dalmatian Toadflax	Welsh Management Area, Sheridan County
Houndstongue	Through the BFO especially roadsides and disturbed areas
Musk Thistle	Mostly found along the face of the Big Horn Mountains; primarily in NW Johnson and SE Sheridan Counties.

The BFO also proposes to manage pest insects, primarily forage destroying grasshoppers (the majority belonging to the slant faced grasshopper category), Mormon crickets, pine bark beetle and mosquitoes. The focus of mosquito control will be those with the potential of carrying WNV.

1.4. Purpose of the Proposed Action

The BFO is proposing to treat invasive pests in accordance to the **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 species. 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 pest species by the use of integrated weed management.

Reducing the number of infested acres of invasive species meets the objective of sustaining biological communities. It would meet the objectives of the **Powder River Basin Final Environmental Impact Statement (PRB FEIS)** approved April 30, 2003, which includes 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.

Other objectives of the *Proposed Action* are to provide methods for invasive vegetation treatment on public lands within the BFO and to describe the conditions and limitations that apply to their use.

1.5. Conformance with BFO Land Use Plan

The proposed action and alternatives described below are in conformance with the Buffalo Resource Management Plan, approved April 25, 1985 and amended in 2001, as well as the Powder River Basin Final Environmental Impact Statement (PRB FEIS) approved April 30, 2003. They are consistent with vegetation objectives, goals, and decisions as stated on page 16 of the Buffalo Resource Management Plan. The objective is to control the introduction and proliferation of noxious and invasive species on public surface.

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)

- requires the preparation of Environmental Impact Statements (EIS) for federal projects that may have a significant effect on the environment
- 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

This document will be referenced in this EA to address the general effects on the environment of using non-herbicide treatment methods, including mechanical, manual, and biological control methods.

Federal Land Policy and Management Act (1976)

Directs the BLM to “take any action necessary to prevent unnecessary and or 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)

Carlson-Foley Act (1968)
Provides the authorization for reimbursement of expenses to State or local agencies for weed control on Federal lands.

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* – This manual 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* – This manual 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* – This manual and handbook outline policy and provide guidance for conduction pest control programs on public land.

BLM Manual 9015 – *Integrated Weed Management* – This manual addresses the BLM's policy relating to the management and coordination of noxious weed activities among activities of the BLM, organizations, and individuals.

Biological assessments for Blowout Penstemon and Ute Ladies' Tresses are found at the web address: http://www.blm.gov/wy/st/en/programs/plant_conservation/Plants/penstemon.html. Each of the listed plant species in Wyoming has specific habitat requirements and is only known to occur in a few locales. Blowout Penstemon occurs in Nebraska as well as Wyoming. Ute Ladies' Tresses is widespread and occurs in occurs in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington and Wyoming.

AIR QUALITY

The **Clean Air Act (1990) ,** as amended (42 U.S.C. 7401, 7642), requires 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 specify 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. It 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 nonfederal 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
- 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.

Biological Opinion (2007 update) ES-6-WY-07-F012 This document transmits the U.S. Fish and Wildlife Service's Final Biological Opinion for the Powder River Basin Oil and Gas Project, and its effects on the bald eagle and Ute ladies'-tresses orchid, in accordance with section 7 of the Endangered Species Act of 1973, as mended (50 CFR 402.14).

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. 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)). 40 CFR 1500.4(g) directs that the scoping process should be used "not only to identify significant environmental issues deserving of study but also to deemphasize insignificant issues narrowing the scope of the EIS process accordingly."

Significant issues directly influence the initiation, development, and technical design of the proposal; are disclosed in the analysis; and were used to develop alternatives to the proposed action. Issues are significant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflict.

Non-significant issues are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, or other higher level decision; 3) unrelated to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…"

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 field office-wide analysis and are incorporated either by tiering and/or by addressing specific issues of field office concern.
The following issues are relevant to the decision to be made in the BFO:

Vegetation
- Effects of treatment on invasive species and native vegetation

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

Sensitive, Threatened, and Endangered Species and Species of Special Concern
- Effects of herbicide use
- Effects of not using pesticide (lack of mosquito or grasshopper control)

Cultural Resources
- Effects of treatment on cultural resources including traditional Native American plant gathering areas.

1.8. Decision to be Made

This EA analyzes the effects of using herbicides and insecticides for treating vegetation and applying integrated pest management to control invasive species and health-threatening agents on public lands in the Buffalo Field Office. Decisions expected to be made through this EA process include:
- If the BLM approved herbicides identified in the PEIS and pesticides will be authorized for use on public lands in the Buffalo Field Office and under what circumstances?
- Which vegetation management practices could be used with applications of herbicides and pesticides and under what circumstances?

2. DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1. Introduction

This chapter describes and compares the alternatives considered for *Invasive Pest Management in the Buffalo Field Office*. It describes the *Proposed Action* and the *No Action* alternative and those 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 Action* alternative is not an appropriate option for invasive species management. However, the Council on Environmental Quality requires a *No Action* alternative as a benchmark comparison of the *Proposed Action* or other 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 (PEIS), (BLM, 2007).* The PEIS assessed five alternatives and selected Alternative B: **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). See PEIS ROD.

This EA tiers to *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (BLM, 2007)* and accepts the analysis for the approved use of 18 herbicide active ingredients listed under the *Preferred Action*, or **Alternative B**. It also tiers to the PRB FEIS and ROD (BFO BLM, 2003) specifically for compliance with the requirements for Federal fluid mineral development to apply site specific mitigation for IPM.

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 biological, mechanical, and physical control methods for invasive species.

A primary focus of this field office wide analysis is the discussion of invasive plant control methods that comply with the *PRB FEIS* and the *Buffalo Resource Management Plan*.

2.2. ALTERNATIVE A – PROPOSED ACTION

Invasive pest control would be accomplished by using an integrated pest management approach, utilizing a combination of manual/physical, biological, cultural, mechanical, 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 *Record of Decision's* preferred alternative approved the use of the following 18 herbicide active ingredients[3]: 2,4-D, bromacil, chlorsulfuron, clopyralid, dicamba, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, sulfometuron methyl, tebuthiuron, triclopyr, imazapic, diquat, diflufenzopyr (in formulation with dicamba), and fluridone. All of these herbicide active ingredients may also be used in the BFO. The use of herbicides will include ground and aerial treatments throughout the field office area, with no one treatment area more than 5,000 acres. In many cases, these treatments would be spot treatments of a few plants or small infestations of less than one acre.

The proposed action also includes the use of chemicals and biological control agents to manage mosquito populations. The use of bacteria in biological control has proved quite successful. Bacillus thuringiensis israelensis (Bti) has been widely effective as a larvicide. It was approved by the EPA in 1981 as effective on some 30 species of mosquitoes. The bacterium does not seem to harm other aquatic life or mammals, but results in a 90% to 100% kill on most types of mosquito larvae. When sprayed over water, it's eaten by larvae. Knockdown activity begins within a few hours, and total kill takes place within 24 hours. Bti will remain active in the water for up to three days; after this, it will die, too. It doesn't endanger the ecology of the area by persisting and reproducing and it's effective only on larvae.

Bti is applied either in liquid, granular, or briquette form. The amount applied to a given area varies with the density of vegetation, the number of larvae, and other environmental factors detailed on the product label. Generally, it's most effective when the larvae have just hatched.

[3] 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)*

Altosid is a registered larvicide that contains the active ingredient methoprene. It commonly comes in a briquette, pellet, or granular form and is designed to release effective levels of methoprene which is a insect growth regulator over a period of up to 150 days as the briquettes dissolves. Larvae in treated waters continue to develop normally to the pupal stage, at this stage they are affected by the chemical and die.

Also, the proposed action also includes the use of insecticides and biological control agents to manage grasshoppers. Grasshopper control methods could include the use of biological agents and insecticides. A biological control protozoan, *Nosema locustae*, has been primarily used by homeowners for small infestations. *Nosema* is slow acting and may not reduce grasshopper populations to non-economic numbers the year of application. Additionally, experimental treatments over large acreages have yielded variable success in reducing grasshopper numbers. Over the last several years, diflubenzuron, has emerged as the preferred chemical choice for grasshopper control. Diflubenzuron is not a pesticide that affects the nervous system like many other pesticides, but rather, it is a chitin inhibitor. Diflubenzuron inhibits hardening of the exoskeleton after a molt, causing the insect to die. An important benefit to diflubenzuron application is that it is not toxic to adult insects (pollinating bees and predators), birds, and mammals; however, it is toxic to immature aquatic insects. Diflubenzuron has a low persistence in soil, typically breaking down to low residual amounts in 30 days.

Other pesticides that have been traditionally used to control grasshoppers involve the use of carbaryl and malathion. Mortality from these pesticides is caused by injury to the grasshopper's nervous system. These chemicals are applied at very low volumes when used as sprays. Carbaryl can also be used as a bait, applied from the ground. A disadvantage of using these pesticides, as liquids, is that they are fewer targets specific and can injure beneficial insects. Because of their toxicity, carbaryl and malathion are not commonly used over large acreages for grasshopper control, but rather, for smaller infestations where immediate control is preferred. Moreover, all these products require a buffer when used streams, lakes, or other water bodies regardless of application method.

Treatment Methods

Proposed treatment methods may include hand pulling, cutting, mowing, hand/selective herbicide applications, aerial application, stem injection, spot herbicide spraying, broadcast herbicide spraying, and grazing. These treatment methods are summarized in Table 2.1. The timing for herbicide treatments would be dependent on the species, as well as any label restrictions, which vary by herbicide.

Table 2.1 Summary of Possible Treatment Methods[4]

Method	Description
Manual /Physical	
Hand pulling	Pulling or uprooting plants can be effective against some shrubs, tree saplings, and herbaceous invasive species. Annuals and tap-rooted plants are particularly susceptible to control by hand pulling. It is not as effective against many perennial invasive species 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.
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.

[4] 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)

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	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 (insects, pathogens, nematodes, mites)	Classical biological control agents can be introduced to an invasive plant infestation to directly damage plant tissue. Although invasive species 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 species are well established and where short term control is not a management objective. Biological control does not eradicate invasive species 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 and insecticides 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 species 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 Application	Herbicides and insecticides applied aerially by helicopter or fixed-wing aircraft. Aerial application has the advantage of treating large areas or areas of difficult terrain. In some areas, especially where ground-based treatments would be ineffective or too costly to implement, including remote areas, areas with varying topographic relief, and large expanses of woodland and forest, aerial application may be used. Aerial application of herbicides may transport herbicides through drift, allowing airborne herbicides to move beyond the intended target. The primary factors that influence drift are droplet size, wind speed, humidity, formulation of the herbicide height of emission, equipment and application techniques, and the size of the area treated with the herbicide. The factor that has the greatest influence on downwind movement is droplet size. Procedures that can be employed to reduce drift include: 1) using a lower spray nozzle height, 2) using the lower end of the pressure range, 3) increasing the spray nozzle size, 4) using drift-reducing nozzles, 5) using drift control additives, and 6) using sprayer shields. For herbicide treatments, less energy would be used to conduct aerial treatments than ground treatments for each acre treated.

Integrated Pest Management[5]

Although the first preference for invasive plant control is non-herbicide, non-ground disturbing methods, this EA focuses on herbicide and insecticide treatments. The BLM has treated invasive species with non-herbicide methods for many years. These treatment methods, used exclusively, however, have not effectively treated 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 species proposed for treatment in the BFO. An effective strategy for invasive plant control is to

[5] *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)*

incorporate cultural practices to reduce the likelihood of plant establishment. The *PRB FEIS* addresses practices that can be used prevent the introduction of invasive species (*pgs. 4-158 to 4-162*). Some 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 motorized vehicle travel through noxious weed infested areas; and 4) require certified noxious weed-free seed vegetation products including but not limited to, straw, hay, sand, and gravel. Another important element of preventing the establishment of invasive species is utilizing an early detection/rapid response (EDRR) 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.

For some invasive plant infestations, the integrated pest management approach may be the most effective approach for treatment. No single management technique is effective for all invasive plant control situations. Multiple management actions may be required to meet control objectives. The strategy of using an integrated selection of management techniques has been developed for use in a variety of invasive plant control situations.

Integrated pest management is an approach for selecting methods for preventing, containing, and controlling invasive species in coordination with other resource management activities to achieve desired vegetation condition. Integrated pest management seeks to combine two or more treatment methods that would interact synergistically to provide better control than any one action might provide alone, while minimizing adverse impacts to non-target organisms. This contrasts with the traditional approach of using a single control action, such as the application of herbicides, to treat all invasive plant problems which may not always be the most effective method.

Integrated pest management 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. Integrated pest management requires an ecologically based, interdisciplinary approach. Selection of treatment is based on information such as the biology of particular invasive plant species, site location, other species present, habitat, proximity to water, and size of the infestation. Multiple treatments may be required to appropriately treat the invasive species and meet the treatment strategies for each treatment area. Treatments may be repeated as needed on an annual basis and may change over time as the mixture of invasive species present and/or site conditions change.

Site Restoration

After treatments take full effect, 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.

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, identification of any issues of concern, and the name of the certified applicator. For herbicides, only those formulations on the BLM approved list may be used and applied at the typical rates which were recommended in the PEIS pages 4-56 to 4-62.[6] Additionally, for biological control introductions, a *Biological Control Agent Release Proposal* must be approved prior to any releases to the environment.

Minimizing Herbicides Effects

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(Final PEIS), (BLM 2007),* includes *Standard Operating Procedures (*Appendix C*) and Conservation Measures.*[6] Additional *Mitigation Measures* were also developed to address risks to environmental and human resources from the use of specific herbicides (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. The 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 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 – No Use of Herbicides - No Action

Under Alternative B, the BLM and proponents 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 and proponents would be able to treat vegetation using fire, mechanical, manual, and biological control methods. These methods alone would be less effective in the control of invasive species and potentially impact a larger area of native vegetation in order to control infestations. For more information on this alternative, see the Final PEIS at page 2-14.

2.4. ALTERNATIVES CONSIDERED, BUT NOT ANALYZED FURTHER

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.

Prescribed Fire

The use of prescribed fire to control invasive species was not considered in this EA. Many of the invasive species considered in this proposal would respond positively to burning, thus exacerbating the existing situation. 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 would be completed.

Biological, Cultural, Herbicide, Manual, or Physical Control Alone

As directed by various guidance documents, including the Department of Interior, *Integrated Pest Management Policy*[7]; 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.

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[6] 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)*

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

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1. INTRODUCTION

This chapter describes key aspects of the environment likely to be affected by the *Proposed Action* and *No Action* alternative (Issues). Also described are the environmental effects (direct, indirect, and cumulative) that would result from undertaking the *Proposed Action* or *No Action* alternative.
This EA references detailed information on the direct, indirect, and cumulative effects of integrated pest management found in the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (BLM 2007)* and the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Report (BLM 2007)*, respectively.

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.

The primary target for the majority of integrated pest management is vegetation. The weeds are trying to out-compete the desirable species for the moisture and nutrients available. The following section identifies the target invasive species and discusses the impacts of the alternatives on the desirable or native species.

3.1.1. INVASIVE PLANT SPECIES

A summary of specific information on invasive plant species addressed in the analysis is provided below.[8] These species could be present in the field office area as described.

Black Henbane (*Hyoscyamus niger L.*)
An erect, bushy annual or biennial, leaves alternate, coarsely toothed, shallowly lobed, very hairy, foliage has 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. Medium taproot, seeds tiny and black, hundreds in 1-inch long pineapple-shaped or vase-shaped seed capsules. All parts of this plant are toxic.
Location: Throughout the BFO
Wyoming Noxious Weed: No

Brome Species *(Bromus tectorum, B. japonicus)*
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 BFO
Wyoming Noxious Weed: No

[8] 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, the Colorado Weed Management Association, and *Weeds of the West*, 9th edition, Whitson, Ed. 2006.

Buffalobur (*Solanum rostratum*)
This native annual grows to 2 feet high, has leaves 2 to 5 inches long with deep lobes and is covered with spines. Yellow, 5-lobed flowers, common throughout the summer, are about 1 inch wide. The berry is enclosed by an enlarged calyx and contains many seeds. Seeds are black, wrinkled and flattened. It is common on disturbed wastelands and prairies. It is most common on sandy soils, but grows on most soils.
Location: Throughout the BFO
Wyoming Noxious Weed: No

Canada Thistle *(Cirsium arvense*)
This plant is a tall, erect, spiny herbaceous plant, grows to 4 feet tall, and 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: Throughout the BFO
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, ditch banks, in pastures and waste areas. It generally prefers riparian areas that have moist, fertile soils with high nitrogen contents.
Location: Throughout the BFO
Wyoming Noxious Weed: Yes

Common Cocklebur (*Xanthium strumarium*)
Cocklebur is an annual, 2 to 4 feet tall with the stem erect, branched, ridged, spotted and very rough. Leaves are alternate, triangular or heart-shaped, rough on both sides and long petioled. Flower heads are small, in axils of upper leaves; male and female flowers are separate. Fruits are 1 inch long, woody, with hooked prickles and two curved spines at the tip. Dark brown seeds are flattened and pointed on tips. Native to North America, cocklebur is common in cultivated fields as well as waste areas. Both the seeds and seedlings contain a substance toxic to livestock. Flowering may occur from July to September.
Location: Throughout the BFO
Wyoming Noxious Weed: No

Common Mullein (*Verbascum Thapsus*)
This biennial produces a large, thick rosette of fuzzy leaves the first year and a single, stout, erect stem, 2 to 6 feet tall, the second year. The leaves are alternate, overlapping one another, light green, and densely woolly. Flowers are sessile, borne in long terminal spikes, sulfur yellow, 5-lobed and more than an inch in diameter. Fruits are 2-chambered with numerous small, angular, brownish seeds, 1/32 inch long. This weed, a native of Asia, was introduced from Europe and is common throughout temperate parts of North America. Difficult to control because of the large number of seeds produced. Flowering and seed production occur from June to August.

Location: Throughout the BFO
Wyoming Noxious Weed: No

Dalmatian Toadflax *(Linaria dalmatica macedonica)*
A member of the Figwort family, this plant was introduced as an ornamental from Europe, and is now rapidly invading dry rangeland from 5,000 to 6,500 feet elevation. 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: Welch Management Area, Sheridan County
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***:** Found adjacent to the Powder River from the Natrona County line to I-90, adjacent to the Little Powder River from the Montana state line to just north of Gillette, and the south Bighorns west of I-90 and south of State Highway 190 to Barnum
Wyoming Noxious Weed: Yes

Dyer's Woad *(Isatis tinctoria)*
This plant is a member of the mustard family. It is a winter annual, biennial or short-lived perennial, and grows 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. Dyer's 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's woad produces allelopathic chemicals.
Location: None at the present time.
Wyoming Noxious Weed: Yes

Field Bindweed *(Convolvulus arvensis)*
This species is a member of the morning glory family, is a creeping perennial, and 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: Scattered throughout the BFO
Wyoming Noxious Weed: Yes

Halogeton *(Halogeton glomeratus)*
This succulent annual forb can produce 200-400 pounds of seed per acre. Plants produce 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 BFO
Wyoming Noxious Weed: No

Hoary Cress (*Cardaria draba)*
A perennial forb is in the mustard family and 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: Found at the top of Crazy Woman Creek drainage, and NE Campbell County including around the city of Gillette and the Little Powder River drainage.
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***:** Throughout the BFO especially along roadsides and in disturbed areas.
Wyoming Noxious Weed: Yes

Kochia (*Kochia scoparia*)
Annual, 1 to 6 feet tall, stems much branched, round, slender, usually soft-hairy, but occasionally smooth, often red-tinged. Leaves alternate, lance-shaped, entire ½ to 2 inches long, upper surface usually smooth, lower surface usually covered with soft hairs; leaf blades with 3 or 5 prominent veins. Flowers are inconspicuous, sessile in the axils of upper leaves and form short, dense, bracted spikes. Kochia is a native of Asia and is now found throughout North America. It is readily grazed by livestock, and sometimes contains high nitrate levels and can be toxic. Flowering and seed production may occur from July to October.
Location: Throughout the BFO
Wyoming Noxious Weed: No

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: North of Interstate 90 to the Montana state line. Primarily adjacent to the Powder River and major tributaries in all three counties
Wyoming Noxious Weed: Yes

Musk thistle *(Carduus nutans)*
An herbaceous biennial plant that grows to 6 feet tall which 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: Front range along the Bighorn Mountains and northwestern Johnson County and western Sheridan County
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 at the present time
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 germinateable 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 aggressively by both seeds and root sprouts. Mechanical 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: Little Sage Creek, Sugar Creek, Rawlins, Dixon, Hay Reservoir, and Herrick Lane
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: None at the present time.
Wyoming Noxious Weed: Yes

Puncturevine (*Tribulus terrestris*)
Puncturevine is an annual, prostrate or somewhat ascending, mat forming with trailing stems, each ½ to 5 feet long. Leaves opposite, hairy, divided into 4 to 8 pairs of leaflets, each about ¼ to ½ inch long and oval. Flowers are yellow, borne in the leaf axils. Fruits consist of 5 sections which, at maturity, break into tack-like structures with sharp, sometimes curving spines, each section 2- to 4- seeded. The hard, spiny burs may be injurious to livestock. The seed will remain dormant in the soil for 4 to 5 years, making eradication difficult. Flowering and seed production occur from July to October.
Location: Throughout the BFO
Wyoming Noxious Weed: No

Rush Skeletonweed (*Chondrilla juncea*)
Rush skeletonweed is a perennial, 1 to 4 feet tall. Starting at the stem base for 4 to 6 inches, stems usually have downwardly bent coarse hairs; smooth stems above. Leaves form in a basal rosette, sharply toothed, and wither as the flower stem develops. Leaves of the stem are inconspicuous, narrow and entire. Flowering heads are scattered on branches, with 7 to 15 yellow, strap-shaped flowers. Seeds are pale brown to nearly black, about 1/8 inch long. Rush skeletonweed is an introduced Eurasian species generally inhabiting well-drained, light-textured soils. Soil disturbance aids establishment. Cut surfaces of the leaves and stems exude a milky latex. Flowering and seed production occur from mid-July through frost.
Location: Throughout the BFO
Wyoming Noxious Weed: No

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: Powder River drainage from the Natrona County line to the Montana state line, including the South Fork of the Powder River, Salt Creek, Red Fork, and Crazy Woman Creek drainages. Also, the Little Powder River drainage from north of Gillette to the Montana state line.
Wyoming Noxious Weed: Yes

Russian Olive *(Elaeagnus angustifolia L.)*
Russian olive is a perennial tree or shrub that is native in Europe and Asia. The plant has olive-shaped fruits, silver color at first then becoming yellow-red when mature. Russian olive can reproduce by seed or root suckers. Seeds can remain viable for up to 3 years and are capable of germinating in a broad range of soil types. Spring moisture and slightly alkaline soil tend to favor seedling growth. The plants extensive root system, sprouts root suckers frequently. The stems can reach up to 30 feet in height with branches and trunks that have 1 to 2 inch thorns. Leaves are 2 to 3 inches long, alternate, narrow, have simple blades, and are untoothed. The lower surface is silvery white with dense scales, while the upper surface of the leaf is light green in color. Flowers are 4 small sepals in light yellow clusters, fragrant, and appear May through June. Russian olive twigs are flexible, reddish, and have surfaces coated with gray and scaly pubescence, becoming smooth. Once thought to be a beneficial windbreak tree, it since has been deemed detrimental to the environment. Russian olive can grow in a variety of soil and moisture conditions, but prefers open, moist riparian zones. It is shade tolerant and can be found along streams.
Location: Throughout the BFO in drainages and reservoirs.
Wyoming Noxious Weed: Yes

Russian Thistle (*Salsola iberica*)
A rounded, bushy, much branched annual, ½ to 3 feet tall, reproducing by seed. Stems are usually red or purple striped. Leaves are alternate. Inconspicuous green flowers are borne in axils of upper leaves, each flower accompanied by a pair of spiny bracts. Seeds are spread when mature plants break off at ground level and are scattered by the wind as tumbleweeds. Rapid germination and seedling establishment occur after only brief and limited amounts of precipitation. It is one of the most common and troublesome weeds in the drier regions of North America.
Location: Throughout the BFO
Wyoming Noxious Weed: No

Saltcedar *(Tamarix ramosissima)*
Saltcedar 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. Saltcedar 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. Saltcedar is native to Eurasia and Africa and was introduced into the western United States as an ornamental in the early 1800s.
Location: Throughout the BFO in drainages and reservoirs.
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: The Powder River drainage from the Natrona County line to the Sheridan county line and the Crazy Woman Creek drainage. It is found in the area from east of the Powder River to the Campbell Country line to south of the Sheridan County line. Also growing along State Highway 357 from Reno Junction to Midwest.
Wyoming Noxious Weed: Yes

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: In and around the City of Gillette and east along I-90 for about ten miles. Found along the Little Powder River in northern Campbell County and the Red Fork drainage in southwest Johnson County. Also found along I-90 and I-25 corridors.
Wyoming Noxious Weed: Yes

Wild Licorice (*Glycyrrhiza lepidota*)
Wild licorice is a perennial, reproducing from deep, spreading roots or seeds. Stems 1 to 2 feet tall, erect, simple or with upper erect branches. Leaves are alternate, pinnately compound with 11 to 19 deeply

veined lanceolate leaflets with glandular dots when mature. Flowers are in short axillary spikes on long peduncles, corolla with narrow standard and blunt keel, green-white to white. Seed pod about ½ to ¾ inches long, bur-like, covered with stout, hooked prickles. Widely distributed native plane commonly found in moist, sandy soils of meadows, pastures, river banks, and waste areas.
Location: Throughout the BFO
Wyoming Noxious Weed: No

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***:** None at the present time.
Wyoming Noxious Weed: Yes

3.1.1.1. ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action
Direct and Indirect Effects
The *Proposed Action* identifies treatment of invasive species annually with a combination of manual, mechanical, cultural, and herbicide treatments. This alternative would result in control of most invasive species where herbicide treatment is conducted, and control and/or eradication of invasive plant populations where biological or manual treatment is proposed, resulting in reduced invasive plant infestations in terms of both number and size of infestations.

This proposal also includes the treatment of water structures, both livestock watering sites and energy related water disposal sites, for mosquito control to reduce the risk of West Nile virus. For environmental, sensitive species and human health protection, application of any pesticide applied will be in accordance with the specific pesticide label requirements.

For the most part, impacts resulting from fluid mineral development and resulting infestation are included in site specific environmental analyses. Mitigation is always identified and disclosed in these analyses, including site specific measures to reduce any undesirable effects of integrated pest management.

Alternative B – No Action
Direct and Indirect Effects
A lack of control efforts, would allow invasive species to continue to spread and increase, eventually becoming impossible to eradicate. Seeds from weed populations will continue to be transported to and infest new sites throughout the area. Invasive species will increasingly impact native ecosystems, affecting floral and faunal diversity, including sensitive species, as well as surface water availability. Native plant diversity and wildlife habitat quality will be significantly reduced over time due to increasing dominance by invasive species. No existing invasive species or populations would be controlled, eradicated, or reduced under this alternative.

There is a high risk that seeds or propagative parts from invasive species will migrate off site, resulting in increased infestations and subsequent mechanical and chemical treatments over a wider area adjacent to

BLM land. Increased populations and subsequent spread onto non-BLM lands will result in greater herbicide use over the long term, vs. eradication of weed sources on the BLM now. 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.

No application of insecticide or larvicides would be approved. Mosquito infestations would be unabated. The risk of West Nile virus contagion would increase in human, livestock (equine) and sensitive species. If the BLM does not authorize mosquito control programs using pesticides, local or state government agencies or other mosquito control authorities may not be able to effectively combat outbreaks of WNv in a coordinated effort. In this scenario, WNv outbreaks could develop and spread unimpeded, in some localized areas. Although it would be difficult to determine, not cooperating in mosquito treatment programs potentially could result in human health illness, including deaths.

3.1.1.2. Cumulative Effects

Vectors (livestock, vehicles, recreationists, water, wind, wildlife) and disturbances (roads, natural gas development, grazing, interstate pipelines, fuel treatments, water developments, recreation developments, etc.) will continue to be present in the BFO. These factors have contributed in the past and currently 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). Small acreage developments on adjacent lands, streams and watersheds that traverse differing lands owners and, interstate corridors can contribute to the introduction of 'new' species and new locations of current invasive species over time. 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 Action* alternative, existing infestations will continue to spread unchecked, gaining increasing vegetative dominance over the long term, contributing significantly to the cumulative effects of past and present invasive plant infestations. The *Proposed Action* alternative would have less cumulative effects overall than the *No Action* alternative.

3.2. NATIVE VEGETATION

3.2.1. Affected Environment

Vegetation resources within the BFO 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. A detailed description of vegetation distribution and vegetation types within the BFO can be found in Chapter 3 (Affected Environment) of the *PRB FEIS* (pp. 3-99 to 3-103).

Vegetation communities currently containing invasive species are varied, including short-grass prairie, mixed-grass prairie, wet meadow, herbaceous riparian areas, sagebrush shrubland, other shrubland, shrubby riparian, coniferous forest, forested riparian, agricultural, urban/disturbed, barren, and water. 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 as well.

Riparian areas, short-grass prairie, mixed-grass prairie, and sagebrush shrubland areas are currently most at risk of degradation due to invasive species. Several of the more aggressive tenacious invasive species 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. They are highly important areas for native plant and wildlife diversity.

The greatest threat to short-grass prairie, mixed-grass prairie, and sagebrush shrubland communities may result from ecological interactions with non-native annual grasses, such as 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.

3.2.2. ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action

Direct and Indirect Effects

Manual /Physical Control

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.

Mechanical Control

Mechanical applications including mowing and cutting will generate some of the impacts associated with manual control. However, mowing can also stimulate growth in some perennial species increasing the rate of infestation. The change of the environment through the removal of the overstory may encourage invasive plant growth and/or stress native species.

Biological Control

Grazing animals, such as sheep or goats, eat both weeds and desirable species. Both species 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 uninfested sites.

Biological control agents can provide good control on target invasive species. Insects would be the preferred biological control agents as they have high host specificity. They are not intended for eradication of invasive species, but rather to reduce the vigor and productivity of invasive species 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. Under the review process, biological control agents undergo an extensive screening and testing process by USDA Animal and Plant Health Inspection Service before an organism can be released. Despite these safeguards, there is always a risk that the release of an agent into a habitat in which it does not occur could result in unforeseen ecological repercussions.

Chemical Control
Some of the herbicides proposed for treating invasive species are selective for particular kinds of plants. The ability to damage or kill only certain plant species or families but not others makes an herbicide selective. The use of selective herbicides such as picloram, dicamba, and 2,4-D may injure non-target broadleaf species on sites where weed control activities occur. In general, plants in the asteraceae (composite), fabaceae (legume), polygonaceae (buckwheat), and apiaceae (parsley) families will be affected by picloram. Dicamba and 2,4-D will affect these species, in addition to plants in the brassicaceae (mustard) family. Metsulfuron methyl will affect plants in the legume, composite, and mustard family, and clopyralid affect plants in the composite, legume, and buckwheat family. Application of these herbicides may reduce abundance of plants within these families especially within areas where higher herbicide rates are necessary to control persistent weeds such as leafy spurge and Russian knapweed.

The risk of herbicide applications to non-target plants is minimized with the use of hand application (back pack) compared to ground application equipment and ground application as compared to aerial application. 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); although drift can be controlled with application during no to minimal wind conditions and bigger droplet size. 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.

Aerial application is utilized in the field office for those species that inhabit large acreages in a variety of terrain. Topography and expanse of infestations makes them almost unattainable for treatment by motorized vehicles with booms including ATV's, and hand/back pack application. Buffer zones around water sources are 100 feet unless a greater distance is specified on the label.

This alternative 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 species are more resistant to manual treatments. Under this alternative, invasive species will be controlled selectively throughout the field office area, resulting in improved quality of native vegetation communities in these areas. Additional areas should experience some habitat improvement, with at least partial control, and containment of further spread. Manual 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 and Russian thistle.

Alternative B – No Action
Direct and Indirect Effects
There would be no risk of herbicide damage to native plants under this alternative.
The anticipated continued increase in invasive plant populations in the BFO 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. Some areas would continue to be weed infested, with reduced native plant diversity and habitat quality. These areas would likely increase over time across the BFO, 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 BFO 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.

3.2.3. Cumulative Effects

Under the *Proposed Action*, expanded use of herbicides to treat invasive species may harm or kill non-target plants. For example, more persistent herbicides, such as picloram, could move readily to non-target plants through root translocation or runoff. A treatment schedule for persistent infestations that may 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 and mechanical treatments could also harm native plants. Manual and mechanical treatments could also alter the composition and structure of native plant communities, as released growing space previously occupied by invasive species is made available. Certain native plants would be able to outcompete other native plants for this growing space. The growing space could also be re-invaded by invasive species. Active restoration would help in preventing re-invasion of invasive species following treatment.

Over several years time, the cumulative effects of not treating invasive species would be biologically significant and 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 BFO and spreading rapidly in riparian zones in stream and river corridors. Without additional treatment options (herbicide use), populations of invasive species, 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, mechanical, cultural, and herbicide treatments would have an insignificant 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 Action* 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 significant existing threats to native communities, i.e. invasive species, would continue to the greatest degree under this alternative.

This proposal contributes an insignificant amount to the cumulative level of risk to native plant communities from herbicides in the region.

3.3. SOIL PRODUCTIVITY

3.3.1. Affected Environment

Soils across the BFO are quite variable. They vary in texture, depth, salt content, organic matter content, and parent material. These areas are distinguished by varying amounts of precipitation, elevation, soil temperature, and soil parent material. Most soils in the BFO support vegetation that is used by livestock and that also serves as wildlife habitat. Soil characteristics and environmental factors that affect soil productivity include organic matter content, salt content, amount of precipitation, soil temperature, aspect, soil depth, and soil parent material. For more information regarding the soils in the BFO, refer to PRB FEIS pages 3-80 to 3-89.

3.3.2. ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action

Direct and Indirect Effects

Manual/Physical and Mechanical

Mechanical 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 mechanical 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 treatment of invasive species removes vegetation, loosens soil and creates a potential source for wind and water erosion and stream sedimentation, the planned amount of treatments in the BFO is very limited and site specific. There is a low risk that treatment would result in adverse effects to soil quality. Replacement of invasive species with native plants would maintain soil quality in the long-term. Implementation of appropriate project designs would result in maintaining water quality and not causing an adverse effect. Mechanical 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 species would have negative effects on soil properties. Invasive species 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.

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 species. 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.

Herbicide treatments would benefit soil by removing invasive species and other unwanted vegetation and allowing restoration of native vegetation and return of natural fire regimes. In many situations, herbicides are the only, or the most effective, method for controlling invasive vegetation. For many of the small or spot treatments of invasive weeds along roadways in the BFO, manual or physical treatments may not be most cost effective and efficient treatment option.

Alternative B – No Action
Direct and Indirect Effects
Invasive species would have negative effects on soil properties. Invasive species 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.

3.3.3. 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 species 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*. 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 species themselves and other

influences. In the long term, restoration of healthy native plant communities proposed in this EA will have beneficial impacts on soils.

3.4. WATER QUALITY

3.4.1. AFFECTED ENVIRONMENT

Within the BFO, the Powder, Tongue, Little Powder, and Belle Fourche Rivers drain watersheds to the Yellowstone and Missouri Rivers. These rivers flow into the Mississippi River system and eventually into the Gulf of Mexico. Water quality within the BFO is influenced by the type of rock and soils with which the water has been in contact, the vegetation, any groundwater interaction, and pollutants discharged into water bodies from point and non-point sources. Human-induced impacts can cause changes in thermal and turbidity conditions in water bodies and increases in salinity, heavy metals, and nutrients from irrigation or other discharges; all which affect natural water quality in this region. Water quality impacts within the BFO may be associated with agricultural runoff, road maintenance, removal of upland and 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 BFO is highly variable, in part reflecting the complex geologic history of the region. In most areas within the BFO, the shallow groundwater is suitable for livestock. However, these waters can be only marginally suitable or even unsuitable for domestic or irrigation uses, mainly due to high sodium adsorption ratio (SAR) and total dissolved solids (TDS) concentrations. Groundwater tends to deteriorate as the distance from recharge sources and the ground surface increases.

3.4.2. ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action

Direct and Indirect Effects

Manual/Mechanical/Cultural/Biological

Proposed manual, mechanical, and cultural treatment measures such as pulling, mowing, weed whacking, or grazing by goats are not likely to cause much soil disturbance or therefore increase the potential for measurable surface erosion/sedimentation. Hand-pulling involves manually pulling the invasive plant/roots out of the ground. When invasive species 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.

Chemical Control

Invasive species can create conditions that modify water quantity and quality. Directly or indirectly, invasive species can affect streambank stability, increases sediment and turbidity, decreases shading thereby increasing stream temperature, dissolved oxygen, and pH. Invasive species 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. In addition, equipment used in invasive plant treatment has the potential to disturb or displace soil, making the soil more vulnerable to erosion. Herbicide treatments do not kill all invasive species immediately. Repeated treatments over several successive years are 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 BFO currently uses the following herbicides in riparian and aquatic habitats—2,4-D, glyphosate, imazapyr, triclopyr, for the majority; and may use diquat and fluridone in these areas as well. The remaining herbicides proposed for use 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.

Alternative B – No Action
Direct and Indirect Effects
The most pronounced effect of the *No Action* alternative on aquatic organisms and ecosystems is the continued existence and spread of invasive species that could out-compete native vegetation. Severe infestations of some invasive species 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.

3.4.3. 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 manual, mechanical, or cultural treatments of invasive species.

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.

3.5. WILDLIFE

3.5.1. AFFECTED ENVIRONMENT

This environmental analysis incorporates wildlife information from the PRB FEIS (2003) by reference.

3.5.1.1. Big Game

Big game species within the Powder River Basin include elk, pronghorn antelope, mule deer, and white-tailed deer; moose are found in the Big Horn Mountains. Discussions of big game habitat and population trends are available in the PRB FEIS (3-115 to 3-143).

3.5.1.2. Aquatics

Aquatic invertebrate communities, which can be indicators of the quality of aquatic environments (Peterson 1990), are discussed in the PRB FEIS (pp. 3-153 to 3-154). Perennial streams within northeastern Wyoming were sampled by USGS between 1980 and 1981, and generally supported invertebrate communities that included taxa adapted to flowing water. Ephemeral stream communities generally were composed of taxa adapted to standing water (Peterson 1990).

Table 3.1 below lists the fish that occur in the Upper Powder River subbasin and their WGFD Native Species Status (NSS) designation, if applicable. WGFD has identified Species of Greatest Conservation Need (SGCN) within the state, all of which are given NSS designations. Seven of the species that may occur in the Upper Powder River subbasion are designated as either NSS 1, 2, or 3 species. Species in these designations are considered to be species of concern, in need of more immediate management attention, and more likely to be petitioned for listing under the Endangered Species Act (ESA). For these species, WGFD recommends that no loss of habitat function occur. WGFD allows for some modification of the habitat, provided that habitat function is maintained (i.e., the location, essential features, and species supported are unchanged). NSS 4-7 refers to populations that are widely distributed throughout

their native range and are stable or expanding. Habitats are also stable. There is no special concern for these species.

Table 3.1 Fish that occur in the Upper Powder River Subbasin

Wyoming Native Species Status	Species	Wyoming BLM Sensitive
NSS1	Sturgeon chub	Yes
NSS2	Goldeye	No
	Sauger	No
NSS3	Black bullhead	No
	Flathead chub	No
	Mountain sucker	No
	Plains minnow	No
NSS4	Channel catfish	No
	Northern redhorse	No
	Quillback	No
	River carpsucker	No
	Stonecat	No
NSS6	Fathead minnow	No
	Plains killifish	No
NSS7	Longnose dace	No
	Sand shiner	No
	White sucker	No
None	Common carp	No
	Rock bass	No
	Shovelnose sturgeon	No

Amphibian and reptile species (herpetiles) occur throughout the Basin. WGFD conducted a baseline inventory of herpetiles along the Powder River and its major tributaries from 2004-2006 (Turner 2007).

WYNDD has completed the first year of a three-year herpetile study in the Power River Basin in order to detect impacts from CBNG development (Griscom et al. 2009). Herpetiles expected to occur in the Powder River Basin, according to these studies, are listed in Table 3.2 (Turner 2007, Griscom et al. 2009). Eight of the species listed are classified by WGFD as SGCNs, all with a rating of NSS4, indicating that they are widely distributed throughout their native ranges, and populations are stable. Of the species listed in Table 3.14, WYNDD reported that, for 2008 surveys, boreal chorus frogs were the most abundant amphibian in the PRB and were located in a variety of habitats. The second most abundant amphibian was Woodhouse's toad, which occurred along rivers, temporary ponds, and in CBNG reservoirs. Plains spadefoot and Great Basin toads were the least common species, occurring primarily in temporary ponds fed by rainstorms. Relatively few observations were made for reptile species. Bullsnakes and sagebrush lizards were most commonly seen. Turtles were rarely observed, due to their almost exclusive occurrence in deep backwaters. Two of the herpetiles listed in Table 3.2, northern leopard frog and Columbia spotted frog, are Wyoming BLM sensitive species.

Table 3.2 Herpetile species expected to occur in the Powder River Basin (Turner 2007,Griscom et al. 2009)

Species	Verified by Survey*	WGFD Status	Wyoming BLM Sensitive
Tiger salamander	Yes	NSS4	No
Northern leopard frog	Yes	NSS4	Yes
Milk Snake	No		No

Species	Verified by Survey*	WGFD Status	Wyoming BLM Sensitive
Columbia spotted frog	Yes	NSS4	Yes
Bullfrog	Maybe	NSS4	No
Spiny softshell	Yes		No
Northern prairie lizard	No		No
Boreal chorus frog	Yes	NSS4	No
Great plains toad	Yes	NSS4	No
Woodhouse's toad	Yes	NSS4	No
Plains spadefoot toad	Yes	NSS4	No
Short-horned lizard	Yes		No
Sagebrush lizard	Yes		No
Eastern yellowbelly racer	Yes		No
Prairie rattlesnake	Yes		No
Western hog-nosed snake	Yes		No
Bullsnake	Yes		No
Terrestrial garter snake	Yes		No
Plains garter snake	Yes		No
Common garter snake	Yes		No
Snapping turtle	Yes		No
Painted turtle	Yes		No
Notes:* As reported in Turner (2007) and Griscom et al. (2009).			

Aquatic species identified within the Powder River Basin and their watersheds of occurrence are discussed in the PRB FEIS (3-153 to 3-171).

3.5.1.3. Migratory Birds

Migratory birds of management concern are identified in the PRB FEIS (3-150 to 3-153) with discussion on population trends.

3.5.1.4. Raptors

Range, distribution, and population summaries of the most common raptors within the Powder River Basin are provided in the PRB FEIS (3-141 to 3-148).

3.5.1.5. Threatened and Endangered and Sensitive Species

3.5.1.5.1. Threatened and Endangered Species

See tables 3.3 and 3.4 below.

3.5.1.5.1.1. Ute's Ladies Tresses Orchid

Orchid habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. The orchid is only known to occur in four locations in Wyoming: Converse County along a tributary of Antelope Creek, an irrigated field in Niobrara County, along Bear Creek in Goshen County, and Horse Creek in Laramie County. The PRB FEIS discusses the orchid on page 3-177.

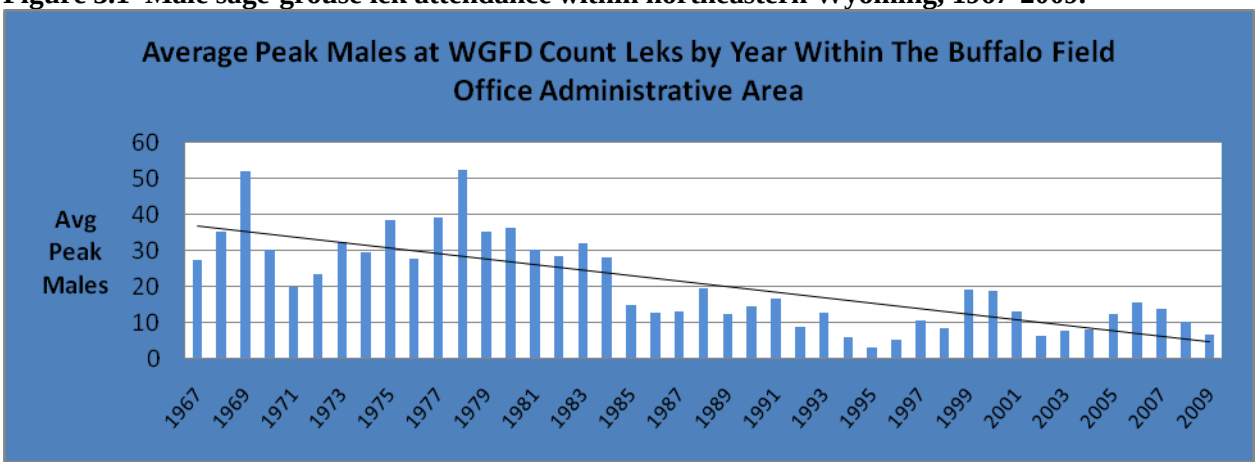
3.5.1.5.1.2. Greater sage grouse

On March 23, 2010, the US Fish and Wildlife Service (USFWS) issued a decision that sage-grouse are warranted for listing under the Endangered Species Act. Invasive plants were identified as a major threat (USFWS 2010). Greater sage grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas. They depend upon substantial sagebrush stands for nesting and winter

survival. More information on sage grouse habitat needs and population trends is provided in the PRB FEIS (3-194 to 3-199).

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (Figure 3.) (WGFD 2005).

Figure 3.1 Male sage-grouse lek attendance within northeastern Wyoming, 1967-2009.



The greater sage-grouse occupies sagebrush habitats throughout the BFO at low densities. 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. Holloran and Anderson (2005), in their Upper Green River Basin study area, reported that only 45% of their sage-grouse hens nested within 1.9 miles of the capture lek. Moynahan and Lindberg (2004) found that only 36% of their sage-grouse hens nested within 1.9 miles of the capture lek. Habitat conditions, and, thus, sage-grouse biology, within the BFO are more similar to Moynahan's north-central Montana study area than the Upper Green River area.

Cheatgrass, mustards, and Russian thistle are generally the principal invasive species that occur widespread throughout greater sage-grouse habitat throughout their entire range. Cheatgrass, in particular, is a major threat to greater sage-grouse habitat range-wide and in the BFO, 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. Cheatgrass will out compete native plants during spring months because it is the first vegetation to green up, then cure out which provides fuel for wildfire.

3.5.2. ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action

Direct and Indirect Effects

See table above for Threatened and Sensitive species impacts

Manual/Physical Control

For treatments near the *Proposed Action* limit of 5,000 acres, manual or physical manipulations could make habitats less suitable for sage brush obligate species, requiring 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, mechanical or cultural treatments. Most of these birds would return to the nest if only flushed once or twice because nest fidelity is high. There are a few species where disturbance may cause a nest failure for that year.

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.

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 BFO, the following herbicide active ingredients pose some risk to greater sage-grouse:[9]

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

Risk Levels are defined as follows:
high – death or damage to vital organs
moderate – change in body weight, susceptibility to predation, decreased reproduction
low – no long term effects

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., 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 significantly 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 sage brush obligate species 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.

The *Proposed Action* would rehabilitate sagebrush habitat by eradicating, controlling and containing invasive species, as well as decreasing WNv impacts to sage-grouse. 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 which could improve species diversity and habitat quality for all sagebrush obligate species. Without control activities, invasive species would likely continue to exist and spread throughout their current range and continue to threaten the long-term stability of the sagebrush ecosystems.

[9] Details on risk assessment are found in the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, (BLM 2007)*

Alternative B – No Action
Direct and Indirect Effects
Invasive species such as cheatgrass, salt cedar, pepperweed, hoary cress, halogeton, would likely continue to spread throughout important habitats and could continue to slowly reduce habitat quality. Manual – no physical disturbance of habitats therefore no direct impacts to wildlife species or their habitats. However over time invasive species will likely replace native plants thereby degrading habitat quality potentially resulting in population declines of some wildlife species.

3.5.3. 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 BFO could contribute to some cumulative effects, but data is lacking that would permit any quantitative estimates of cumulative exposure or risk. For instance, since greater sage-grouse move and migrate, they could be exposed to herbicides on adjacent lands or along their migration routes. They could be exposed to the same herbicide on multiple ownerships, or a combination of different herbicides. Greater sage-grouse could also be exposed to other chemicals, such as insecticides, rodenticides, fungicides, and others.

Habitat, presence, and potential project effects on Threatened and Endangered Species were analyzed and a summary is provided below.

Table 3.3 Summary of Threatened and Endangered Species Habitat and Project Effects.

Common Name (scientific name)	**Habitat**	**Presence**	**Project Effects**	**Rationale**
Endangered				
Black-footed ferret (*Mustela nigripes*)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NS	NE	Species is not suspected to occur in area
Blowout penstemon (*Penstemon haydenii*)	Sparsely vegetated, shifting sand dunes	NP	NE	Depositional sands/dunes not present.
Threatened				
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	Riparian areas with permanent water. Wet meadows.	K	NLAA	Species is known to occur in areas that will be avoided, however over spraying may occur. Biological agents will be monitored to avoid orchid herbivory.
Proposed				
Mountain plover (*Charadrius montanus*)	Short-grass prairie with slopes < 5%	K	NLJ	Known nesting habitat will be avoided. Unknown nests could be disturbed.
Candidate				
Greater sage-grouse (*Centrocercus urophasianus*)	Basin-prairie shrub, mountain-foothill shrub	K	NLAA BE	Sagebrush may be impacted, but not targeted. Nesting could be disturbed in the short-term by applicators. Reduction of flashy fuels and invasive plants will improve or maintain habitat quality.

Presence
K - Known, documented observation within project area.
S - Habitat suitable and species suspected, to occur within the project area.
NS - Habitat suitable but species is not suspected to occur within the project area.
NP - Habitat not present and species unlikely to occur within the project area.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Project Effects **LAA** - Likely to adversely affect **NE** - No Effect BE – Beneficial Effect **NLAA** - May Affect, not likely to adversely affect individuals or habitat. **NLJ –** Not likely to jeopardize species existence.				

Table 3.4 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (*Rana pipiens*)	Beaver ponds and cattail marshes from plains to montane zones.	K	NI	Habitat is inside of no spray buffer
Columbia spotted frog (*Ranus pretiosa*)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	K	NI	Habitat is inside of no spray buffer
Fish				
Sturgeon chub (*Macrhybopsis gelida)*	Swift, rocky riffles throughout the Powder River.	K	NI	
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	K	NI	Habitat will be avoided with buffer distance applied
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	K	MIIH	Sagebrush cover will be affected.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	K	NI	Nesting habitat will be avoided inside of buffer
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	K	NI	Sagebrush cover will not be affected.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	K	MIIH	Grasslands, and rocky outcrops may be affected.
Greater sage-grouse (*Centrocercus urophasianus*)	Basin-prairie shrub, mountain-foothill shrub	K	NI	Sagebrush cover will not be affected.
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	K	NI	Sagebrush cover will not be affected.
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	K	MIHH	Grasslands, meadows may be impacted
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	K	NI	Nesting habitat will be avoided
Peregrine falcon (*Falco peregrinus*)	Cliffs	K	NI	Nesting habitat will be avoided
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	K	NI	Sagebrush cover will not be affected.
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	K	NI	Sagebrush cover will not be affected.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	K	NI	Habitat will be avoided
Western Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	K	MIHH	Nesting habitat may be impacted
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	K	NI	Nesting habitat will be avoided
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	K	NI	Habitat in buffer zone
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIHH	Prairie dog towns will be impacted.
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	K	NI	Habitat will not be treated
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	K	NI	Habitat will not be treated
Spotted bat (*Euderma maculatum*)	Cliffs over perennial water.	K	MIHH	Digestion of contaminated insects may occur.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Swift fox (*Vulpes velox*)	Grasslands and prairie dog colonies	K	MIHH	Burrows will not be treated, however digestion of contaminated insects may occur.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	NP	NI	Project area outside of species' range.
Plants				
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Project area outside of species' range.
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Project area outside of species' range.

Presence
K - Known, documented observation within project area.
S - Habitat suitable and species suspected, to occur within the project area.
NS - Habitat suitable but species is not suspected to occur within the project area.
NP - Habitat not present and species unlikely to occur within the project area.

Project Effects
NI - No Impact.
MIIH - May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species.
WIPV - Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.
BI - Beneficial Impact

3.6. CULTURAL RESOURCES

3.6.1. Affected Environment

A majority of the Buffalo Field Office has not been inventoried for cultural resources on the Class III level, however based on the results of a Class I cultural survey, significant cultural resources are present. Known cultural resources of the BFO date from 12,000 years B.P. (Before Present) to the present within a framework of prehistoric and historic contexts. The prehistory of the region is divided into the Paleoindian (12,000-7,500 B.P.), Early Archaic (7,500-5,000 B.P.), Middle Archaic (5,000-3,000 B.P.), Late Archaic (3,000-1,500 B.P.), Late Prehistoric (1,500-500 B.P.) and Protohistoric/Historic (500-100 B.P.) culture periods. Commonly discovered prehistoric sites include campsites, rock art, stone circles, rockshelters, and artifact scatters

The historic context of the region overlaps with the Protohistoric period, but is defined by Euroamerican exploration and settlements in the area over the last 200 years. Historic sites are associated with the major historic themes of the region which include: military and scientific explorations, historic trails, oil and gas drilling, minerals mining, homesteading and ranching.

Some cultural resources are considered sacred sites or traditional resources which Native Americans and other groups consider important to their traditional culture. These locations can include archeological sites, topographic features, and plant gathering areas. A Traditional Cultural Property (TCP) has special heritage value and is defined as one that is "eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998). The only identified TCP within the Buffalo Field Office, at this time, is the Pumpkin Buttes. For more information regarding the cultural resources in the BFO, refer to PRB FEIS pages 3-206 to 3-227.

3.6.2. ENVIRONMENTAL CONSEQUENCES

Alternative A – Proposed Action

Direct and Indirect Effects

The Wyoming BLM/SHPO protocol (2006 – Appendix B #24) states that some herbicide application is exempt from case by case review if the field office cultural specialist determines the exemption is justified. Specifically, herbicide application may occur without cultural review in areas where it would be unlikely to affect rock art or traditional Native American plant gathering areas. Presently, known traditional Native American plant gathering areas have not been identified in the BFO. However, should they be identified in the future, integrated pest management will be evaluated on a site specific basis. Any activity that causes surface disturbance or removal of vegetation can adversely affect cultural resources. Archaeological sites and features can be affected by mechanical treatments from vehicle mounted sprayers, as well as heavy equipment used for mowing. Likewise, increased grazing as a biological application can lead to livestock concentration areas (such as those that form near water sources, supplemental feeding areas, fence corners, etc.) and livestock trail formation may result in impacts to cultural resources.

To ensure that the BLM meets its responsibilities under the NHPA, the BLM cultural resource specialist would determine if specific areas should be excluded from treatment. If significant cultural resources are in or near the area of potential effect, the cultural resource specialist would determine if impacts are expected and develop appropriate procedures to avoid or mitigate the impacts in accordance with the BLM-SHPO Protocol.

Alternative B – No Action
Direct and Indirect Effects
Under the No Action alternative, there would be no direct impact to cultural resources from any treatment option. Indirectly a change from native vegetation to invasive species may affect potential biotic heritage resources. Additionally, invasive species may change soil productivity leading to increased erosion, resulting in more exposure of artifacts and a potential increase in collection and vandalism. Cheatgrass conversion may lead to increase in wildfire occurrence which may also indirectly affecting cultural resources through damage resulting from suppression equipment use.

3.6.3. CUMULATIVE IMPACTS

The loss of archaeological resources has happened in the past and will happen in the future. One cumulative effect is that over time fewer archaeological resources will be available to learn about past human life-ways, to study changes in human behavior through time, and to interpret the past to the public. Recording and archiving basic information about archaeological sites in the proposed project areas serve to partially mitigate potential cumulative effects to cultural resources.

4. MITIGATION MEASURES

Standard mitigation to insure the success of the *Proposed Action* includes the following:

1. compliance with statutory mandates and other BLM program guidance pertaining to vegetation management;
2. compliance with vegetative management goals outlined in the Buffalo RMP and the PRB FEIS;
3. utilizing integrated pest management;
4. coordination with other local, state, federal agencies, private landowners, and industry;
5. requiring soil and vegetation disturbances be minimized in all BLM actions;
6. requiring preventative measures to reduce invasive plant introductions in all BLM actions; and education and outreach.
7. compliance with label requirements for herbicide use;
8. following the *Conservation Measures, Standard Operating Procedures, Mitigation Measures*, addressed in the V*egetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, Record of Decision (BLM 2007);*
9. post treatment monitoring;
10. restoration if applicable;
11. compliance with the Pesticide Use Proposal Standard Conditions of Approval found in Appendix E.

5. RESIDUAL EFFECTS

Implementation of any action alternative may cause some adverse environmental effects that cannot be effectively mitigated or avoided. 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. MONITORING AND/OR COMPLIANCE

The monitoring framework for the *Proposed Action* is in accordance with the *Record of Decision, Appendix D (Monitoring*) of the V*egetation 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

- Require an Integrated Pest Management plan for development on Federal surface.
- Ensure contracts and agreements include appropriate prescriptions and that herbicide ingredients and application rates meet label requirements and that all applicable *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 BFO, 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. CONSULTATION AND COORDINATION

List of all Persons, Agencies and Organizations Consulted for Purposes of this EA

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
U.S. Fish & Wildlife Service (US FWS)	Information on Consultation, under Section 7 of the Endangered Species Act (16 USC 1531)	Biological Opinion ES-6-WY-07-FO12 Biological Opinion ES-6-WY-06-F003

List of BLM Preparers:

Name	Title	Resource
Scott Jawors	Wildlife Biologist	Wildlife

Name	Title	Resource
Clint Crago	Archeologist	Cultural Resources
Kathy Brus	Natural Resource Specialist	Restoration
Janelle Gonzales	Rangeland Management Specialist	Range Management
George Soehn	HPD Resource Advisor	Review
Shirley Green	Energy Assistant	Review

8. BIBLIOGRAPHY

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U.S. Department of the Interior 2003, Bureau of Land Management. Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment. April 30, 2003.

APPENDIX A

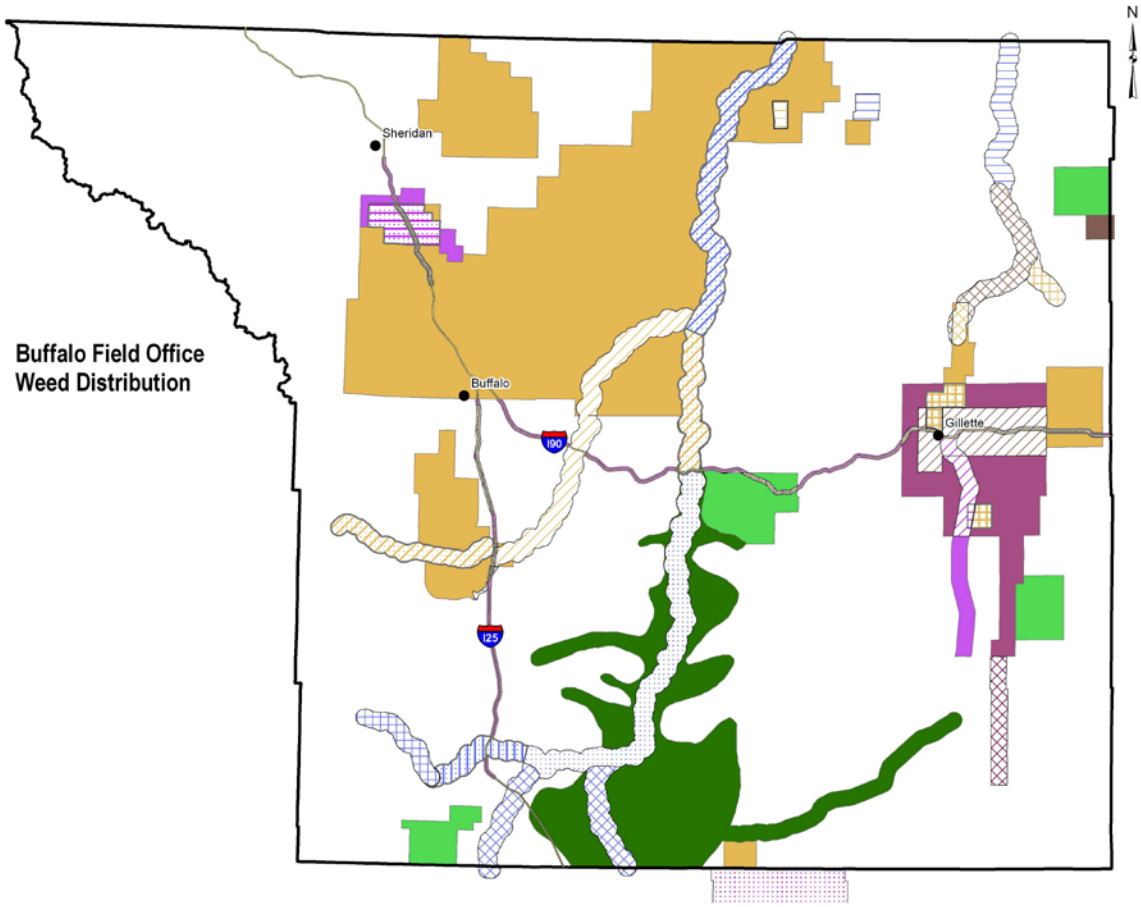
Key Issues Identified During the Scoping of the V*egetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement*

Program Purpose and Need
1. Focus on long-term ecosystem sustainability and biological diversity; clearly define restoration objectives 2. Need to address all invasive species, not just weeds 3. Evaluate land use impacts, such as grazing and fire suppression, on the decline of ecosystem health 4. Focus on addressing the causes rather than treating the symptoms 5. Address how PEIS will impact Resource Management Plans and other local planning 6. Work closely with agencies, conservation groups, and private landowners on vegetation management
Proposed Action
1. Ensure that adequate funds are available to treat enough land and monitor treatment success 2. Consider all treatment methods 3. Naturally-occurring fires should be allowed to burn and restored to public lands 4. Use newer, less toxic herbicides where feasible, and limit use or avoid use of herbicides 5. Describe how herbicides were chosen and evaluated in the PEIS 6. Describe where acres will be treated and method of accounting for acres that receive multiple treatments
Other Potential Alternatives
1. Reduce or eliminate the use of herbicides; apply from the ground rather than from the air 2. Fuels reduction should only occur in WUI or where there is a threat of significant wildfire 3. Treat more acres; treat fewer acres 4. Develop a no-grazing alternative; develop a no-logging alternative; develop a no-OHV alternative 5. Develop restrictions on motorized vehicle use on public lands 6. Develop an alternative based on an ecosystem management approach
Restoration Goals and Best Management Practices
1. Identify restoration objectives and focus on preventative measures to eliminate the causes of land degradation 2. Restoration efforts should focus on restoring natural disturbance regimes and ecosystem processes 3. Improve management of public lands for multiple use and maximum public benefit 4. Use native plants and certified native seed, where practical, for revegetation 5. Restrict grazing on lands that are being rehabilitated or that have not been impacted by livestock 6. Monitor success of treatments and establish performance measures to determine treatment success 7. Include public education as part of the vegetation treatment program

Environmental Consequences

1. Address the impacts on air quality from prescribed burning
2. Address the impacts of herbicides on water quality
3. Assess the role of fire in contributing to weed growth
4. Evaluate the effects of herbicide treatments on non-target species
5. Address the role of grazing in controlling weeds and other invasive vegetation and hazardous fuels
6. Vegetation treatments should focus on restoring habitat and natural ecological processes
7. Address the impacts of treatments on species of concern
8. Describe how treatments will occur in wilderness areas
9. Address the impacts of prescribed fire on powerline operations and safety
10. Evaluate the impacts to subsistence crops used by Native Americans and Alaska Natives
11. Address the risks to humans and fish and wildlife from use of herbicides and smoke from prescribed fire
12. Address how will vegetation treatments will affect the local economy

APPENDIX B - Maps



Buffalo Field Office
Weed Distribution

Legend

Primary Weeds

- Dalmation Toadflax
- Diffuse Knapweed
- Henbane
- Leafy Spurge
- Russian Knapweed and Salt Cedar
- Scotch Thistle
- Skeleton Leaf Bursage
- Spotted Knapweed
- Whitetop

Weed Combos

- Dalmation Toadflax and Skeleton Leaf Bursage
- Field Bindweed, Leafy Spurge
- Leafy Spurge and Scotch Thistle
- Leafy Spurge, Dalmation Toadflax
- Leafy Spurge, Diffuse, Russian, Spotted Knapweed
- Leafy Spurge, Russian Knapweed, Whitetop
- Leafy Spurge, Spotted Knapweed, Dalmation Toadflax, Whitetop
- Leafy Spurge, Whitetop, Russian Knapweed
- Russian Knapweed, Bindweed
- Russian Knapweed, Leafy Spurge, Salt Cedar
- Russian Knapweed, Leafy Spurge, Scotch Thistle
- Russian Knapweed, Scotch Thistle
- Russian Knapweed, Spotted Knapweed, Salt Cedar
- Russian Knapweed, Spotted Knapweed, Scotch Thistle
- Russian and Diffuse Knapweed
- Spotted Knapweed, Dalmation Toadflax
- Spotted Knapweed, Dalmation Toadflax, Leafy Spurge
- Spotted Knapweed, Diffuse Knapweed
- Spotted Knapweed, Diffuse Knapweed, Russian Knapweed
- Spotted Knapweed, Leafy Spurge
- Spotted and Scotch Thistle
- Spotted some Diffuse Knapweed
- Spotted, Leafy Spurge, Russian
- Whitetop, Dalmation Toadflax
- Whitetop, Russian Knapweed

For more current information detailing up to date wildlife, monitoring and weed information, please refer to the Wyoming Geographic Information Science Center at http://www.uwyo.edu/wygisc/

APPENDIX C

Standard Operating Procedures from the V*egetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement* adapted for the Buffalo Field Office

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 propagules to prevent the spread of existing weeds and new weed infestations, where possible. • 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. • When possible, 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, use and maintain 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 propagules 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, if possible. Treat weed-infested sources to eradicate weed seed and plant parts, and strip and stockpile contaminated material before any use of pit material. • 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, where possible. • Clean all equipment before leaving the project site if operating in areas infested with weeds, where possible. • 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, based 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, uninfested material in a weed-free condition. • Revegetate 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 revegetation. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary. • Stockpile topsoil and replace it on disturbed areas (e.g., road embankments or landings). • 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. • Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). • Make helicopter applications at target airspeed 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.

	• 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 revegetation 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 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 phenology 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 stormwater runoff and water turbidity. • Review hydrogeologic 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 revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Use native or sterile species for revegetation 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 revegetation 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 See Handbook H-4120-1 (Grazing Management)	• Whenever possible and whenever needed, schedule treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. • If directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application. • 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 lessees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Notify lessees of livestock grazing, feeding, or slaughter restrictions, if necessary. • Provide alternative forage sites for livestock, if possible.

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 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 Act	• 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 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) revegetating 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. • Revegetate 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 Values	• Consider surrounding land use before selecting aerial 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 lessees 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 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, storage and container disposal. • 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 Biological Assessment*.
Fish and Other Aquatic Organisms	• Limit the use of diquat in water bodies that have native fish 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 • Avoid using the adjuvant R-11® in aquatic environments, and either 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.
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 human risks.
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 area of 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

Pesticide Use Proposal Standard Conditions of Approval

The following are Conditions of Approval (COAs) which will apply to any Pesticide Use Proposal approved by the Authorized Officer in the Buffalo Field Office.

I. General

1. Applicators will have a current State of Wyoming Pesticide Applicators License. All personnel involved in herbicide application must be State or EPA trained and certified. All individuals involved in handling or application will be instructed regarding safety and spill procedures.
2. The Applicator will submit for approval, a Pesticide Use Proposal which details the proposed action.
3. Pesticide Application Records shall be completed within 24 hours after completion of application. The applicator will keep the original on file for 10 years. A copy will be sent to the BFO office within 48 hours of the application. The PAR Form is attached.
4. Only chemicals approved for use on BLM surface located in Wyoming will be used.
5. All label directions and precautions for application and disposal will be followed. Any variances must be presented to and approved by the BLM Authorized Officer prior to application.
6. Applicators will not apply herbicides at rates higher than the application rates allowed on the EPA manufacturers herbicide labels specifications submitted with the PUP.
7. Application operations will be suspended when any of the following conditions exist on the treatment area:
   a. Wind velocity exceeds 6 miles per hour for applications of liquids or 15 miles per hour for the application of granular herbicides, or as specified on the label.
   b. Precipitation is occurring or is imminent within 24 hours.
   c. Snow, ice or frost covers the treatment area.
   d. Fog significantly reduces visibility.
8. Equipment used to apply or mix herbicides shall not be rinsed, cleaned or drained into any water source. Excess herbicide or fluid will be disposed at authorized facilities.
9. Chemical spills shall be handled in accordance with label direction. Any spills occurring on Federally managed property will be immediately reported to the BLM BFO Authorized Officer.
10. Vehicles must remain on authorized routes when accessing project areas. ATV use shall be limited to authorized routes and treatment areas, no off-road casual use.
11. Any variation from the approved pesticide use proposal (such as use of chemical not listed) will require a formal request and subsequent approval from the BLM Authorized Officer.
12. Grazing Lessee will be notified at least 24 hours prior to application.

II. Water Resources including Wetlands and Riparian Areas

1. Protective buffer zones will be observed along riparian areas, along streams, rivers and wetlands, as provided in the label information. Only those chemicals which are designated for wetland application may be considered for those areas.
   Buffer Zones for Federal Surface Applications, except where label instructions are more restrictive:
   - 100 ‘ for aerial application
   - 25’ for motorized application
   - 10’ for hand application.

<u>Ute Ladies’-tresses Orchid</u>

1. Biological control of noxious plant species will be prohibited within 1.0 mile from known orchid habitat until the impact of the control agent has been fully evaluated and determined not to adversely affect the plant population. BLM will monitor biological control vectors.

2. Except in cases of extreme ecological health (insect or weed outbreaks/infestations), herbicide treatment of noxious plants/weeds will be prohibited within 0.25 miles of known populations of the orchid and insecticide/pesticide treatments will be prohibited within 1.0 mile of known populations of the orchid to protect pollinators.
    - Where insect or weed outbreaks have the potential to degrade area ecological health inside the buffers listed above, at the discretion of the BLM's authorized officer and with concurrence by the USFWS, the following will apply: where needed, and only on a case-by-case basis, a pesticide use proposal or other site specific plan will address concerns of proper timing, methods of use, and chemicals. Pesticides specifics to dicots will be preferred where these are adequate to control the noxious weeds present.
    - Aerial application of herbicides will be carefully planned to prevent drift in areas near known populations of the orchid (outside of the 0.25 mile buffer).

Wildlife

1. If any dead or injured threatened, endangered, proposed, or candidate species is located, the U.S. Fish and Wildlife Service's Wyoming Field Office (307-772-2374) and law enforcement office (307-261-6365) and BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours (T&C1).
2. Observations of any threatened, endangered, proposed, or candidate species within the project area shall be reported to the BLM Buffalo Field Office (307-684-1100).
3. If any dead or injured sensitive species is located, the BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
4. To reduce disturbance to nesting raptors, herbicide application may only take place during the raptor nesting season (February 1 to July 31) within one half mile of active raptor nests with coordination and approval of the BLM biologists and when the chicks are between the downy and flight practicing stages.
5. Weed treatment may occur within a 0.5 to 1.0 mile radius of active bald eagle nests between May 15 and June 15. Operators must contact the authorizing agency who will coordinate with and receive written confirmation from the Service before application of this measure.
6. Additional measures may be necessary if site-specific project is determined by a Bureau biologist to have an adverse effect on a Threatened , Endangered Proposed, or Candidate species or their habitat.

DECISION RECORD
FOR
Buffalo Field Office Invasive Species Management EA
ENVIRONMENTAL ASSESSMENT –WY-070-EA09-099

DECISION:
BLM's decision is to adopt Alternative A of the attached Buffalo Field Office Invasive Species Management Environmental Assessment (EA). Alternative A has been analyzed in the attached EA and found to have no significant impacts on the human environment, beyond those described in the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, Record of Decision (BLM, 2007) or the Powder River Basin Final Environmental Impact Statement (PRB FEIS) thus an EIS is not required.

Site-Specific Mitigation Measures:
Site-specific Conditions of Approval and Standard Operating Procedures have been applied to this analysis to mitigate the impacts described in the Environmental Consequences sections of the attached EA. For a complete description of all site-specific COA's associated with this approval, see section Appendix E and Appendix C for the Standard Operating Procedures.

COMPLIANCE WITH LAWS, REGULATIONS, LAND USE PLANS, AND POLICIES:
This approval is in compliance with all Federal laws, regulations, and policies. This includes, but is not limited to, the Federal Land Policy and Management Act, the National Historic Preservation Act, the Threatened and Endangered Species Act, the Migratory Bird Treaty Act, the Clean Water Act, the Clean Air Act, and the National Environmental Policy Act.

Approval of this alternative is in conformance with the *Powder River Basin Oil and Gas Project Environmental Impact Statement and Proposed Plan Amendment* (PRB FEIS), *Record of Decision and Resource Management Plan Amendments for the Powder River Basin Oil and Gas Project* (PRB FEIS ROD), and the Approved Resource Management Plan (RMP) for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office (BFO), (1985/2001).

This approval is also subject to the individual proponent compliance with all said mitigation, as well as the mitigation and monitoring requirements contained within the Powder River Oil and Gas Project Final Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003.

RATIONALE:
The decision to authorize the selected alternative, as summarized above, is based on the following:

1. Any applicator, in their pesticide use proposal, has committed to comply with all applicable Federal, State and Local laws and regulations.

2. The selected alternative will not result in any undue or unnecessary environmental degradation.

3. It is in the public interest to approve this integrated pest management proposal, as these actions will comply with the direction of Executive Order 13112, Invasive Species and the Carlson-Foley Act of 1968, the Plant Protection Act of 2000 and the Federal Noxious Weed Act of 1974.

4. Mitigation measures were selected to alleviate environmental impacts and meet the project's purpose and need. Mitigation is discussed in the environmental consequences section of the attached EA. For a complete description of all site-specific COA's associated with this approval, see Appendix E in the attached EA.

ADMINISTRATIVE REVIEW AND APPEAL: Under BLM regulations, this decision is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received.

Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: _____ Date: 10/26/10

FINDING OF NO SIGNIFICANT IMPACT
FOR
Buffalo Field Office Invasive Species Management EA
ENVIRONMENTAL ASSESSMENT –WY-070-EA09-099

FINDING OF NO SIGNIFICANT IMPACT:

On the basis of the information contained in the EA, and all other information available to me, it is my determination that: (1) the implementation of Alternative A will not have significant environmental impacts beyond those already addressed in PRB EIS or the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement and the Record of Decision (BLM, 2007) to which the EA is tiered; (2) Alternative A is in conformance with the Buffalo Field Office Resource Management Plan (1985, 2001); and (3) Alternative A does not constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary and will not be prepared.

This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR '1508.27), both with regard to the context and to the intensity of the impacts described in the EA.

CONTEXT:

Along with livestock grazing, mineral development (coal, oil and gas, bentonite, and uranium) is a long-standing and common land use within the Powder River Basin. The surface disturbance associated with mineral development enables invasion of undesirable vegetation over most of the basin where coal bed natural gas or oil wells have been installed. In addition to the well site, pipeline and utility corridors disturbance, which was estimated in the PRB FEIS to be over 200,000 acres, provide opportunity for noxious weed infestation throughout.

INTENSITY:

The implementation of Alternative A will result in beneficial effects in suppression of unwanted species invasion throughout the BFO area. Design features and mitigation measures have been included within Alternative A to prevent significant adverse environmental effects.

The preferred alternative does not pose a significant risk to public health and safety.

Relevant scientific literature and professional expertise were used in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to integrated pest management. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks.

Integrated pest management was identified as mitigation and analyzed in the PRB FEIS; the selected alternative does not establish a precedent for future actions with significant effects.

There are no cultural or historical resources present that will be adversely affected by the selected alternative. No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected. The selected alternative will not have any anticipated effects that would threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Field Manager: _____ Date: 10/26/10