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U.S. Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-ID-B030-2015-0017-EA

Pseudomonas fluorescens strain D7 Field Trial

November 2015

U.S. Department of the Interior
Bureau of Land Management
Boise District
Owyhee Field Office
Owyhee County, Idaho

NATIONAL SYSTEM OF PUBLIC LANDS

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CHAPTER 1: INTRODUCTION

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental impacts of the establishment of the *Pseudomonas fluorescens* strain D7 (or D7) biopesticide field study as proposed by the Owyhee Field Office (OFO). *Pseudomonas fluorescens* strain D7 is a registered strain of a naturally occurring soil bacterium that selectively kills germinating cheatgrass (*Bromus tectorum*, also called downy brome), medusahead rye (*Taeniatherum caput-medusae*), and/or jointed goatgrass (*Aegilops cylindrica*). The EA is a field office site-specific analysis of potential effects that could result with the implementation of the Proposed Action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making the determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27.

An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of Finding of No significant Impact (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record, including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts or effects.

Background

Invasive plants are defined as "non-native plants whose introduction does, or is likely to cause economic or environmental harm or harm to human health," based on the definition provided in Executive Order 13112[1]. Invasive plants are compromising the ability to manage BLM lands for a healthy native ecosystem. Invasive plants can create a host of environmental and other effects, most of which are harmful to native ecosystem processes, including: displacement of native plants; reduction in functionality of habitat and forage for wildlife and livestock; increased potential for soil erosion and reduced water quality; alteration of physical and biological properties of the soil; loss of long-term riparian area function; loss of habitat for culturally significant plants, high economic costs of controlling invasive plants; and increased cost of keeping systems and recreational sites free of invasive species.

This EA will analyze effects of application of D7 of two demonstration plots within Soda Fire on the Owyhee Field Office area. Results from this application would help inform incorporation of the biopesticide into an overall integrated pest management approach. Biopesticides are a certain type of pesticide derived from such natural materials as animals, plants, bacteria, and certain minerals. They are broken down into three major classes:

[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.

1. **Microbial pesticides** are microorganisms (e.g., a bacterium, fungus, virus, or protozoan) which consist as the active ingredient.
2. **Plant-Incorporated-Protectants (PIPs)** are pesticidal substances that plants produce from genetic material that has been added to the plant.
3. **Biochemical pesticides** are naturally occurring substances that control pests by non-toxic mechanisms.

The microbial pesticide *Pseudomonas fluorescens* strain D7 has been found in laboratory studies to inhibit root growth of cheatgrass, medusahead rye, and/or jointed goatgrass, common non-native annual species that invade sagebrush steppe habitats and negatively impact native vegetation communities (Tranel et al 1993, Gealy et al 1996, and Kennedy et al 2001). The biopesticide has been researched primarily in cropland applications to date to reduce cheatgrass competition in winter wheat fields. The Environmental Protection Agency registered D7 for use on fields of turf and grasses grown for seed, alfalfa, wheat, barley, triticale, oat, and rangeland (US EPA 2014).

In accordance with IB_2015_082 (attached), the Owyhee Field Office is proposed to treat approximately 50 acres of rangeland burned during the 2015 Soda Wildfire with *Pseudomonas fluorescens* strain D7 at the time of stabilization/rehabilitation seeding. The IB provided suggested protocol for field demonstration plots to better understand the effectiveness of D7 to reduce competition from annual species in a rangeland setting. (Attachment 1)

Purpose and Need for the Action

The need for action is to determine the effectiveness of the microbial pesticide *Pseudomonas fluorescens* strain D7 in controlling a number of invasive grass species. The purpose is to establish a field demonstration project involving the management of cheatgrass, medusahead rye, and/or jointed goatgrass with the microbial pesticide *Pseudomonas fluorescens* strain D7 on up to 50 acres in the Owyhee Field Office area. Two 25-acre plots are planned, one in the Blackstock Spring area and another in the Hardtrigger area. The objective is to demonstrate effectiveness at two sites on whether or not the *Pseudomonas fluorescens* strain D7 would provide suitable control of the targeted invasive species (cheatgrass, medusahead rye, and jointed goatgrass) when incorporated into an integrated effort including potential revegetation and the use of herbicides. Both proposed treatment units are within the Soda Fire (August 2015), and D7 application would be applied along with seeding as part of the fire rehabilitation (ESR: Emergency Stabilization and Burned Area Rehabilitation) efforts.

Public Participation, Scoping, and Issues:
The proposed action is 50 acres of treatment within a recently burned area, with minimal environmental effects expected. Therefore, commensurate with expected impacts, scoping was limited to the following:

- Clearances were completed for wildlife, fisheries, special status plants and animals, and archaeological resources.
- On October 15, 2015 BLM consulted with the Shoshone-Paiute Tribes through Wings & Roots on the ESR plan, which included the D7 treatments.
- The proposed project was posted on the on-line NEPA Register on October 27, 2015.

- The Blackstock Spring and Hardtrigger Allotments permittees were notified of the proposed action.
- The proposed action was presented at a Soda Fire field trip for non-government organizations on October 28, 2015.
- The proposed action was presented at a Soda Fire field trip for internal and other government agencies on November 4, 2015.

No issues (defined as a point of contention or controversy) were raised that were not sufficiently addressed in the proposed action and no action alternative.

Tiering to Existing Land Use Plan/Environmental Impact Statement:

This EA tiers to the analysis contained in the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement* (PEIS, BLM, 2007) for the herbicide active ingredients listed under the *Proposed Action*. It also tiers to the Owyhee Resource Management Plan/EIS (USDI BLM 1999b), as amended by the Approved Resource Management Plan Amendment for Idaho and Southwestern Montana (USDI BLM 2015c). This EA also tiers to the Boise District Normal Fire Emergency Stabilization and Rehabilitation Plan EA (USDI BLM 2005).

1. The Record of Decision for the Owyhee Resource Management Plan includes the following components (page ii):
   - Manage vegetation to achieve healthy rangelands.
   - Manage land uses and activities to ensure properly functioning watershed conditions.

   Using D7 for integrated management of invasive species works toward these goals.

2. The Owyhee Resource Management Plan calls for criteria to apply to individual program decisions, including (page 4):
   - Plant maintenance, watershed protection and stability, and wildlife habitat needs will be provided for.
   - Noxious weed control will be conducted in accordance with the integrated weed management guidelines and design features identified in the Northwest Area Noxious Weed Control Program EIS of 1985 [since superseded by PEIS 2007].

3. The Record of Decision for the Approved Resource Management Plant Amendments (ARMPA) (2015b) identifies key management responses (page 1-19):
   - Improve GRSG (greater sage-grouse) habitat by treating annual grasses.
   - Treat sites in PHMAs (priority habitat management areas), IHMAs (important habitat management areas), and GHMAs (general habitat management areas) that contain invasive species infestation through an integrated pest management approach.

4. The Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment (ARMPA 2015c) includes management decisions and

Required Design Features that are included in the Proposed Action (page 2-18). See Attachment 2.

5. The Rangeland Management program is responsible for upland health management, assessment, and restoration; rangeland improvement planning and implementation; allotment planning and administration; and resource monitoring. (PEIS 2007, page 2-3)

6. Vegetation treatments on public lands also include activities to control invasive species (such as downy brome/cheatgrass and medusahead rye) and noxious weeds (PEIS 2007, page 2-3). The goal of integrated vegetation management (the process utilized by the BLM) is to control invasive and unwanted vegetation, to prevent the spread of noxious weeds, to eradicate early-detected noxious weed species in areas where certain weeds have not yet become established, and to control weeds where they have become established. (PEIS 2007, page 2-3).

7. Though not tiered to the DRAFT PEIS 2015, the project meets the BLM's overarching goals for vegetation management are to improve biological diversity and ecosystem function, promote and maintain native and resilient plant communities, and reduce invasive vegetation and the risk of wildfire. Public lands are administered under the principles of multiple use and sustained yield. Thus, vegetation must be managed to protect and enhance the health of the land. (DRAFT PEIS 2015, pages 2-1).

Relationship to Statutes and Regulations:

Endangered Species Act

- The Endangered Species Act of 1973 (ESA) requires federal agencies to complete formal consultation with the U.S. Fish and Wildlife Service (FWS) for any action that "may affect" federally listed species or critical habitat. The ESA also requires federal agencies to use their authorities to carry out programs for the conservation of endangered and threatened species.
- Formal consultation was not required because no federally listed plants or animals or their critical occur in or near the project area, nor would any otherwise be affected by the proposed action.

National Historic Preservation Act

- No consultation under the National Historic Preservation Act is required because no cultural resources would be impacted by the proposed action.

Wilderness Study Areas (WSA)

- No Wilderness Areas, Wilderness Study Areas, or Lands with Wilderness Characteristics are within or adjacent to the proposed project area.
- The Wilderness Act (P. L. 88-577) in Sections 2 and 4 directs managers to protect and preserve wilderness character. Non-native invasive plants threaten the natural quality of wilderness character as defined by the act. Section 4(c) of the Wilderness Act prohibits motorized equipment or motorized/mechanical transport except where necessary to meet the minimum requirements for the administration of the area for the purpose of the Act.

A minimum requirements analysis is typically applied to projects that are considered under this provision of the Act.

Federal Land Policy and Management Act of 1976 (43 U/S.C. 1701-1712)

- This act states that the BLM must manage public lands according to the principles of multiple use and sustained yield. These principles are further qualified in the act by the statutory duty that the BLM prevent unnecessary degradation of the public lands.

Public Rangelands Improvement Act of 1987(43 U.S.C. 1901 et seq.)

- The act states the BLM must manage, maintain, and improve public lands suitable for livestock grazing so that they become as productive as feasible.

The Federal Insecticide, Fungicide, and Rodenticide Act, as amended (Public Law PL) 92-516

- The act requires all pesticide to be registered with the Environmental Protection Agency (EPA). The Federal Environmental Pesticide Control Act of 1972 amends the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, and requires the basis for registration to be whether or not a pesticide causes unreasonable adverse effects on man or the environment. The act also makes it illegal to use a registered pesticide in a manner inconsistent with its labeling. It also requires the certification of all personnel who supervise or apply restricted pesticides. The degree of certification must meet the classification requirements for proper storage, transportation, or disposal of pesticides. The responsibility for administering the act is vested in the EPA.

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

- This bill requires that each Federal Agency: (1) Designates a lead office and person trained in the management of undesirable plants; (2) Establish and fund an undesirable plant management program; (3) Complete and implement cooperative agreements with State agencies; and (4) Establish integrated management systems to control undesirable plant species.

Departmental Manual 517

- Departmental Manual 517 prescribes the Department's guidance for the use of pesticides on the lands and waters under its jurisdiction and for compliance with the Federal Insecticide, Fungicide, and Rodenticide Act, as amended.

Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 11001)

- Superfund Act, also known as the Emergency Planning and Community Right-to-know Act, provides that workers must be given information such as Material Safety Data Sheets and Technical Data Sheets on pesticides that they will be handling or applying.

Carlson Foley Act of 1968 (P.L. 90-583)

- This act provides for the authorization for reimbursement of expenses to State or local agencies for weed control on Federal lands.

CHAPTER 2: PROPOSED ACTION AND ALTERNATIVES:

Alternative 1 – No Action/Continue Present Management

No treatments would be established to study an integrated approach for the management of cheatgrass, medusahead rye, or jointed goatgrass involving the biopesticide *Pseudomonas fluorescens* strain D7.

Alternative 2 – Proposed Action:

The proposed action is part of a larger demonstration of D7 application across numerous field offices in several states, as guided by IB 2015-082. The proposed action would establish rangeland demonstration plots involving the incorporation of the biopesticide *Pseudomonas fluorescens* strain D7 into an integrated approach for the management of cheatgrass, medusahead rye, and/or jointed goatgrass involving the use of revegetation activities and herbicides. The study areas would not exceed 50 acres per field office, with the potential for more than one study area in the field office. The protocol for the individual treatments is included in IB 2015-082 (Attachment 1) and RDFs from the IDswMT ARMPA (Attachment 2).

In the Owyhee Field Office area, two study areas of approximately 25 acres each would be treated with D7 at the time of rehabilitation seeding following wildfire. See Maps 1-3. The two sites provide an opportunity to demonstrate effectiveness with different amounts of invasive grasses and elevation (and resultant differences in precipitation and soil moisture). Application of D7 and the seedings are planned for the fall of 2015 at two locations, as follows:

- In the Blackstock Spring area, a 25-acre demonstration plot would be drill seeded with a bunchgrass mix treated by coating grass seed with D7. This is within a larger drill seeding unit, providing adjacent control areas that would be drill seeded without the D7 treatment. The seeding would utilize a mix of introduced species (crested wheatgrass (*Agropyron cristatum*) and Siberian wheatgrass (*Agropyron fragile*)) and a cultivar of a native species, thickspike wheatgrass (*Elymus lanceolatus*). Aerial application of Wyoming sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and the forbs alfalfa (*Medicago sativa*), small burnet (*Sanguisorba minor*), and western yarrow (*Achillea millefolium*) without the D7 treatment is also planned for this area. Application of the herbicide imazapic is planned for the fall of 2016, after seeding establishment[2]. The proposed treatment unit is in the Blackstock Springs Allotment, Pasture 1, in T.1S, R.5W, Sec 20 SE ¼, at approximately 4,600 feet elevation.
- In the Hartrigger area, a 25-acre demonstration plot would be aerially seeded with a bunchgrass mix treated by coating grass seed with D7. This is also within a larger aerial seeding unit. This unit would utilize a different mix of introduced species (Siberian wheatgrass) and native cultivars (Sandberg bluegrass (*Poa secunda*) and bottlebrush squirreltail (*Elymus elymoides*)). Aerial application of Wyoming sagebrush and forb

[2] In order to differentiate effects of D7 with and without herbicide application, five to ten 20x20 foot tarps may be laid down during herbicide spraying within the unit to provide plots without herbicide.

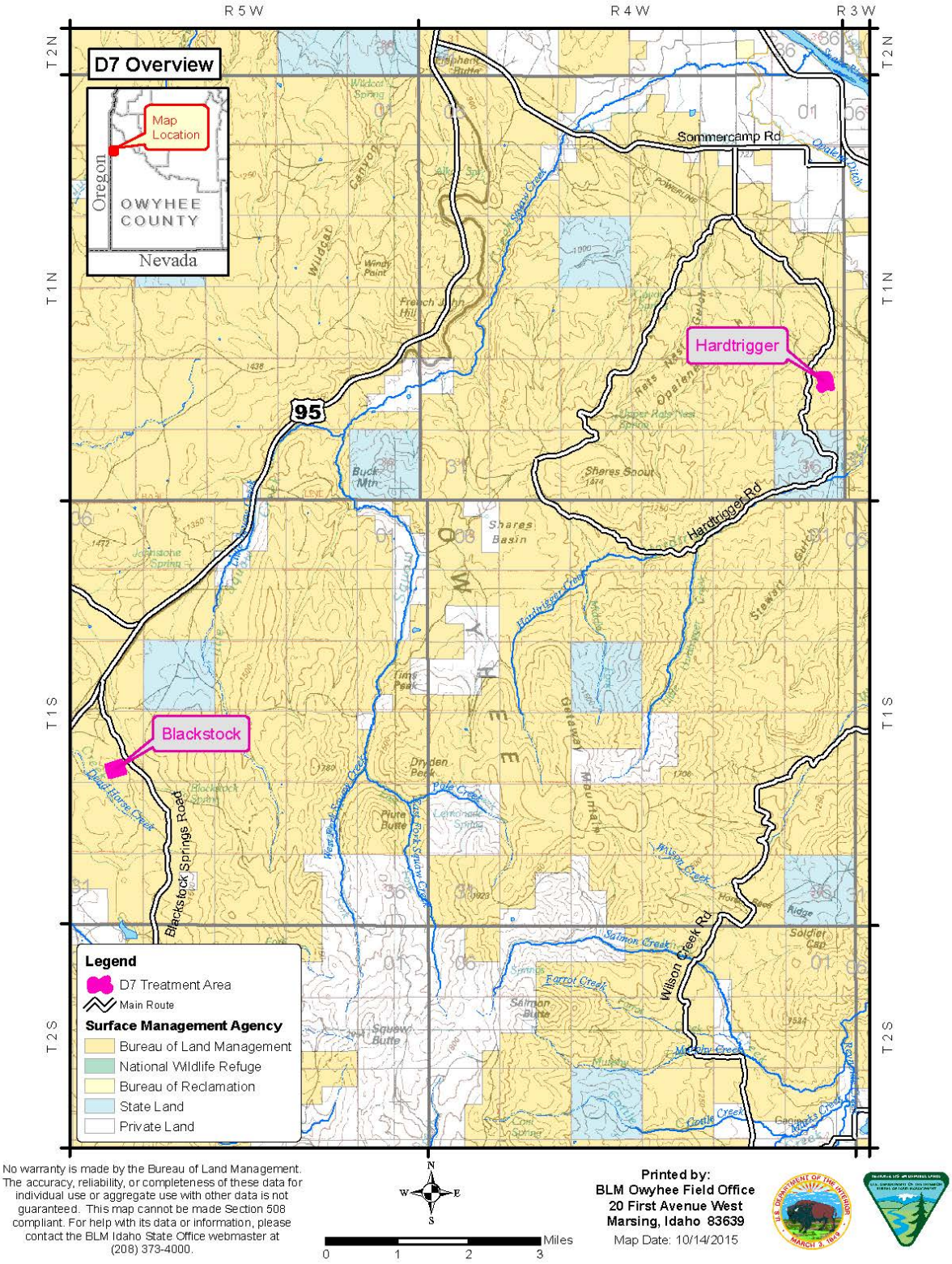
(alfalfa, small burnet, and western yarrow) without the D7 treatment is also planned for this area. No herbicide treatment is planned. The proposed treatment is in Pasture 3 of the Hardtrigger Allotment, in T.1N, R.4W, Sec 25 NE ¼, at approximately 3,000 feet elevation.

Grazing management within these units would continue as planned post-fire for the pastures, in accordance with the September 30, 2015 Soda Fire Emergency Stabilization and Rehabilitation Plan and post-fire grazing decisions. The areas would be rested for a minimum of two growing seasons or longer[3], with grazing resuming when specified vegetative objectives are met. When resumed, grazing management would be in accordance with terms and conditions of current grazing permits unless those permits are changed (for instance in regard to the season of use and/or number of animals/AUMs).

Monitoring of vegetation response to the D7 treatments would be conducted as specified in the IB 2015-082 (Attached). Additional monitoring, such as soil moisture and other values, is also planned in coordination with US Geological Survey research.

Required Design Features from the ARMPA (USDI BLM 2015c Appendix C) are consistent with the proposed action. See Attachment 2 for the Idaho Greater Sage-Grouse Implementation Plan Conformance Review for this project.

[3] The Approved Resource Management Plant Amendments (USDI BLM 2015c) states "All new seedings of grasses and forbs should not be grazed until at least the end of the second growing season, and longer as needed to allow plants to mature and develop robust rood systems which will stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management."



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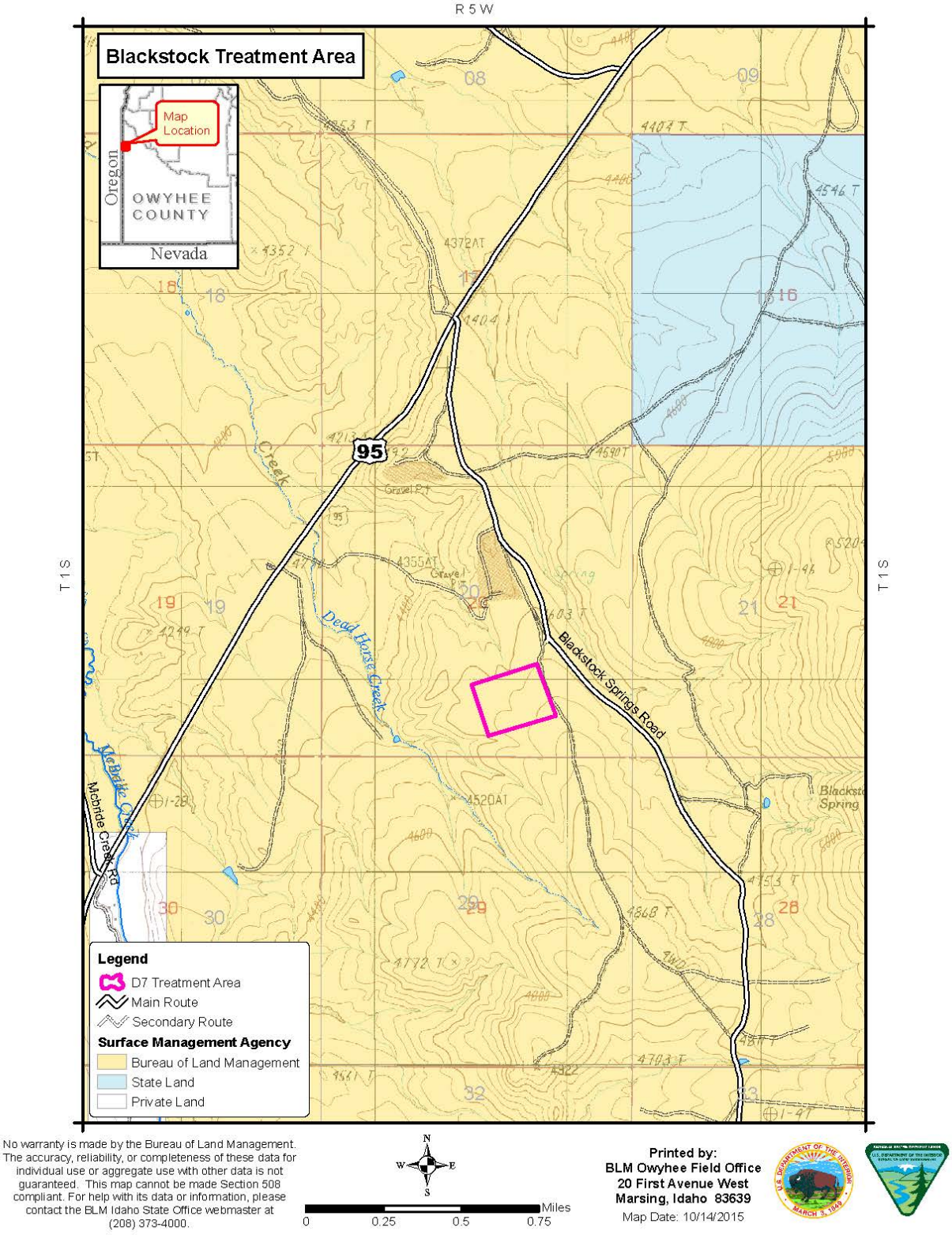
Map 1 - Overview



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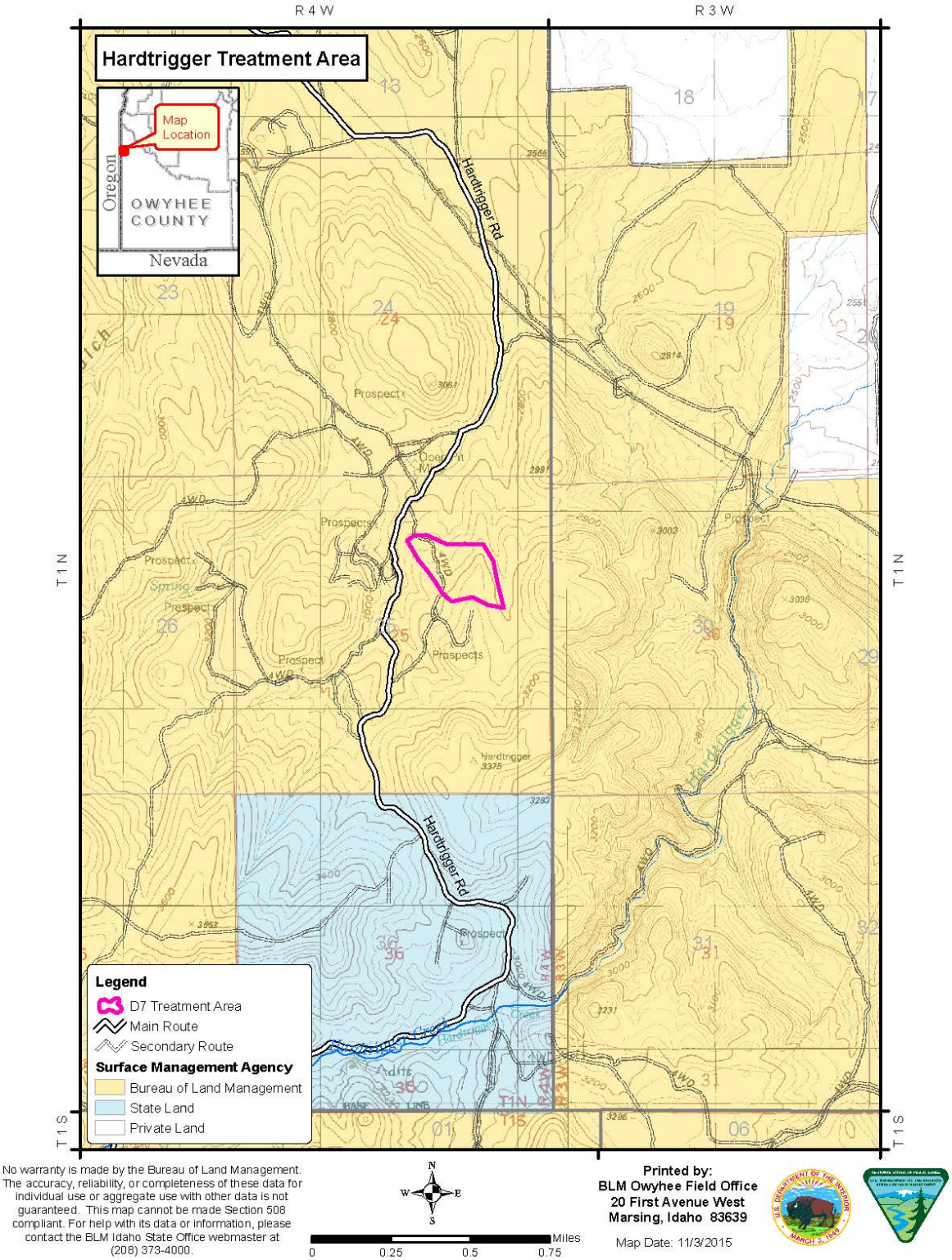
Map 2 – Blackstock Spring Treatment Area



Map 3 – Hardtrigger Treatment Area

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS:

The following issues are not analyzed because they are either: 1) not present in the project area or 2) are not affected by the project. This is due to, not only the size of the area (< 50 total acres), but also the nature of the project or due to resource avoidance criteria, as stated in the project protocol: Air Quality, Areas of Critical Environmental Concern, Cultural Resources, Environmental Justice (E.O. 12898), Farm Lands (prime or unique), Fish Habitat, Flood Plains, Migratory Birds, Native American Religious Concerns, Social and Economic, Waste, Hazardous or Solid, Water Quality, and Wetlands/Riparian Zones.

Environmental effects will include direct and indirect impacts of the Proposed Action and alternative. The impacts are analyzed to determine if the effects of an action are such that they trigger further analysis in an environmental impact statement. The No Action alternative is the baseline against which the other alternative is compared.

Cumulative impacts are impacts which result from the 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 persons undertake such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. If no direct or indirect impacts are identified, there will be no cumulative effects for that resource.

VEGETATION:

Affected Environment: Both the Blackstock Spring and Hardtrigger unit are within the Loamy 10-13" Wyoming sagebrush /bluebunch wheatgrass (*Pseudoroegneria spicata*) ecological site (USDA NRCS 2012). However, they differ in pre-fire vegetation composition, elevation, and precipitation and resultant soil moisture, with the Blackstock area being less weedy, and higher elevation and precipitation than the Hardtrigger unit.

Before the Soda Fire (August 2015), the Blackstock Spring unit consisted of primarily crested wheatgrass, bluebunch wheatgrass, and Sandberg bluegrass, with scattered Wyoming sagebrush, low sagebrush (*Artemisia arbuscula*), and rabbitbrush (*Ericameria nauseosa* and *Chrysothamnus viscidiflorus*). Cheatgrass occurred in fairly low density throughout, and medusahead was in scattered patches, along with Japanese brome (*Bromus* cf *japonicas*). Jointed goatgrass is recorded from along the nearby Blackstock Springs road, but not specifically within the proposed treatment unit. Forb diversity was fairly low. Most of the sagebrush was killed by the Soda Fire, and some of the perennial grass, but as of October 2015 some of the crested wheatgrass and Sandberg bluegrass were resprouting.

Pre-burn, the Hardtrigger unit consisted primarily of Wyoming sagebrush, Sandberg bluegrass, and cheatgrass, with few forbs. Vegetative cover was high (particularly by cheatgrass), but species diversity was low. The fire killed most of the shrubs, but much of the Sandberg bluegrass is expected to resprout.

No special status plant occurrences are known or expected from either unit. No riparian areas are within or adjacent to either unit (Blackstock Spring is about 0.9 miles from the one unit, and Hardtrigger Creek is about 0.7 miles from the other).

Environmental Effects:
The area of effects for direct and indirect effects to vegetation is limited to the actual treated units, because no effect of the treatments is expected outside of these units.

Impacts of Alternative 1:

Without application of D7, vegetation in the project area would be expected to be dominated by a mix of seeded and native plants, along with invasive annual grass. The Soda Fire ESR Plan projected a 75% probability of success for the drill seeding treatments in Idaho and a 65% probability of success for the aerial seeding of grasses. Specifically, the Blackstock Spring unit is expected to be dominated by crested, Siberian, and thickspike wheatgrasses (the species planned for seeding), along with Sandberg bluegrass, and eventually rabbitbrush and Wyoming sagebrush. Cheatgrass and medusahead are also expected to be present to subdominant in this area. In the Hardtrigger unit, the vegetation is expected to be dominated by Sandberg bluegrass, Siberian wheatgrass, and bottlebrush squirreltail (species planned for seeding), with eventually some rabbitbrush and Wyoming sagebrush establishment. Cheatgrass is expected to be co-dominant in this unit.

Impacts of Alternative 2 – Proposed Action:

With application of D7, vegetation in the treated areas is expected to be similar to that described in Alternative 1, except that the abundance of cheatgrass and medusahead is expected to be reduced, although not eliminated. The reduction in cheatgrass and medusahead is not expected immediately, but would become more apparent after three to five years as the bacteria multiply; Kennedy et al (2015) found no cheatgrass reduction the first spring in winter wheat, but in subsequent years the weed population was near zero.

According to IB 2015-082, D7 specifically targets cheatgrass, medusahead, and jointed goatgrass, therefore no direct effect to other vegetation is expected. In a growth chamber study, D7 significantly reduced growth on two of three tested cheatgrass accessions, but not on other species tested (Kennedy et al 2001). D7 reportedly works by colonizing the plant root intracellular spaces outside the Casparian strip. The bacterium does not enter the cell, and is therefore not mobile in the plant vascular system. Thus it is considered a nonparasitic bacterium (Kremer and Kennedy 1996); bacteria that reduce plant growth but are not parasites are considered exopathogens (Skipper et al 1996). D7 produces a weed suppressive compound in the intracellular spaces outside the cell wall, which inhibits root cell elongation (Gealy et al 1996). This compound decomposes readily and does not persist in the soil or the soil solution (Gurusiddaiah et al 1994). The compound produced by the bacteria is of a specific shape such that it inhibits certain lipid combinations in the root cell membrane which inhibit cell elongation; these combinations are specific to cheatgrass, medusahead, and jointed goatgrass. Because its compound works specifically on root cell elongation (Tranel et al 1993), the bacterium does not

injure standing plants or resprouting perennials, only seed and seedlings. The D7 is not expected to spread beyond the applied test plots, because it is not expected to survive in field soil for more than three years (Kennedy no date #1), although the reduction of annual grass is expected to be of longer duration.

With a decrease in cheatgrass and medusahead at these sites, perennial grasses, shrubs, and forbs are expected to have increased vigor due to reduced competition. Improved establishment of seeded species is expected. Decreased annual grasses would also be expected to reduce the fine fuel loading, resulting in a decrease in the risk of fire spread through these units.

No effects to special status plants would occur because none are known or expected from the proposed treatment units.

Cumulative Impacts:
The cumulative effects analysis area for vegetation is the D7 treatment units, because effects are not expected beyond the applied sites. Other potentially overlapping treatments at these sites include aerial shrub and forb seeding in both units, and imazipic herbicide application in the Blackstock Spring Unit, as described in the proposed action.

Alternative 1 is expected to have no effect to vegetation beyond baseline conditions, so no additional or cumulative impacts would occur beyond those present within the cumulative effects analysis area without application of D7. Within the Soda Fire area (including these treatment units), vegetation has been impacted most recently by the fire itself, which killed most of the shrub cover and at least some of the perennial grasses and forbs, thus producing an expected increase in invasive annuals. Expected additional effects from planned ESR seeding (drill seeding, aerial seeding) would be increased re-establishment of perennial vegetation. Effects from planned ESR herbicide treatment (such as the Blackstock unit) would be reduced emergence of cheatgrass and other invasive annual grasses in herbicide-treated units.

Cumulative effects on vegetation from Alternative 2 are expected to be minimal. The addition of the D7 trial to other effects on vegetation described under Alternative 1 is likely to have negligible cumulative effects. The expected reduction of annual grasses in the two test plots would have a positive effect on vegetation when considered cumulatively with other planned rehabilitation activities. Cumulative effects may include increased sagebrush and forb establishment within the D7 units due to decreased competition from annual grasses.

INVASIVE, NON-NATIVE SPECIES:

Affected Environment: As discussed in the Vegetation section, annual invasive grasses are present to abundant in the two test plot areas. At the Blackstock Spring unit, cheatgrass is widespread although of low density, and medusahead is patchy, while jointed goatgrass is recorded from nearby. At the Hardtrigger unit, cheatgrass is co-dominant and medusahead occurs occasionally; jointed goatgrass has not been reported for this area. At both sites, invasive

forbs such as Russian thistle (*Salsola tragus*), prickly lettuce (*Lactuca serriola*), yellow salsify (*Tragopogon* dubius), and bur buttercup (*Ceratocephala testiculata*) may also be present. No noxious weeds have been recorded from within the Blackstock treatment unit, although numerous infestation points of diffuse knapweed (*Centaurea diffusa*) are recorded (in 2006, 2012, and 2013; Boise District BLM records) from the gravel pit just to the north, and jointed goatgrass was widespread along the Blackstock Spring road in 2015 before the Soda Fire. The noxious weed rush skeletonweed (*Chondrilla juncea*) was observed at the Hardtrigger unit after the Soda Fire.

Environmental Effects:

Impacts of Alternative 1:

Without application of D7, invasive grasses and forbs are expected to increase over current conditions because competing perennial vegetation was removed by the Soda Fire. The expected increase of invasive, non-native species would depend on the amount of weed seed present in the seed bank (more present would result in more post-fire predominance) as well as the degree of recovery or establishment of competing perennial vegetation (with higher perennial competition resulting in less invasive annual plants).

Impacts of Alternative 2 – Proposed Action:

With application of D7, the abundance of cheatgrass and medusahead is expected to be reduced, although not eliminated, within the treatment units. As stated above, the reduction in cheatgrass and medusahead is not expected immediately, but would become more apparent after three to five years. The reduction in annual invasive grasses is expected to allow greater establishment of desirable perennial grasses. The application of D7 is not expected to have any effects on invasive forbs, because of species-specific biological mechanisms described in the Vegetation section.

Cumulative Impacts:
Cumulative impacts to invasive, non-native species would be the same as described in the Vegetation section.

SOILS:

Affected Environment: Soils in the two test plot areas are generally loamy, deep, and well-drained, based on the mapped ecological site (USDA NRCS 2012). Parent materials are generally rhyolite in the Blackstock Spring unit, and Snake River sediments in the Hardtrigger unit (USDI BLM 1999 pp III-5 and III-6). Because the Soda Fire has removed most of the ground cover within these sites, soils are susceptible to increased wind and water erosion (Germino 2015).

No specific information is available on the existing soil microbial biota at these sites, but it is expected to be similar to that of other sagebrush steppe areas, with a complex mixture of fungi, bacteria, and invertebrates (Sorensen et al 2013). Belnap et al (2005) found that invasion of cheatgrass into a native perennial grass (*Hilaria jamesii*) stand significantly reduced soil biotic abundance, especially microarthropods and nematoes, although they found no measurable effect

on soil function in terms of decomposition rates, nitrogen decomposition rates, plant cover, or soil nutrients. Other studies have also demonstrated shifts in soil microbial communities in *Bromus*-invaded plant communities (Germino et al. in press). Biotic soil crusts cover in the two treatment units is fairly low (based on cursory observations), limited by invasive grass litter cover and trampling, and is composed primarily of lichens and mosses.

Environmental Effects:

Impacts of Alternative 1:

Without application of D7, soils would be expected to continue in baseline conditions, as described in the affected environment. Soil erosion would continue to occur at levels depending on localized soil cover by vegetation or biotic crust. The soil biota would maintain its complex flora, although influenced by pre- and post-fire cheatgrass invasion. Germino et al (in press) indicate studies showing a degrease of fungi and invertebrates and increasing active soil bacteria with increased cheatgrass, and particularly a shift increasing generalist fungi compared to mycorrhizal fungus, with potential detrimental effects to the vascular plant community.

Impacts of Alternative 2 – Proposed Action:

With application of D7, slight changes to soil stability and productivity would be expected. No change to soil texture would occur. The anticipated reduction in annual grass is expected to result in a compensative increase in perennial grass, which would result in no loss in total plant cover, but more stable ground cover, higher soil holding capacity, and thus lower erosion. No effects to biotic soil crusts are expected, since no D7 effects on lichen or moss are anticipated.

The addition of D7 to the soil microbe community is not expected to have substantial effect on other soil microbes. The very small volume of D7 spores applied is not expected to produce a net increase in bacteria in general. *Pseudomonas fluorescens* is a naturally and widely occurring bacterium. The particular strain originates from other locations, but its addition is not anticipated to replace or disrupt other microbial species, although this has not been specifically studied (Skipper et al 1996; Kennedy no date #2). D7 grows best at cooler soil temperatures, corresponding with cheatgrass germination periods of fall and late winter; Ibekwe et al (2010) found growth inhibited at 37°C compared to lower temperatures. As a result, active populations of D7 are reduced in hot, dry summers as they enter a dormancy phase, and are not expected to overrun native soil bacteria (Kennedy et al 2013).

Cumulative Impacts:

The cumulative impacts analysis area for soils is the two individual treatment units. This is appropriate because effects to soils are not anticipated to extend beyond those units.

Alternative 1 is expected to have no effect to soils beyond baseline conditions, so no cumulative impacts would occur without application of D7.

Cumulative effects on soils from Alternative 2 are expected to be minimal, because direct and indirect effects are minor. Effects to the soil from the Soda Fire in both units include short-term loss of vegetative cover and potential for increased erosion. Drill seeding effects to soil in the Blackstock Spring unit include soil disturbance along drill rows and potential minor increased compaction from heavy equipment use (tractors, etc.) on moist or wet ground; the aerial seeding in the Hardtrigger unit would not have these disturbances. The addition of D7 and its effect on the soil microbe community to other soils effects in these units is not expected to have noticeable effects on soils in the treatment units.

WILDLIFE:

Affected Environment: The two proposed treatment units both occur with a greater sage-grouse designated Important Habitat Management Area. In addition, the Blackstock Spring unit is within a greater sage-grouse Important Biologically Significant Unit, and it occurs within about 0.3 miles of an active (pre-burn) lek. Based on previously conducted sage-grouse Habitat Assessment Framework transects completed near the units, pre-burn wildlife habitat consisted of an overstory of Wyoming sagebrush with a bluebunch wheatgrass/Sandberg bluegrass or Sandberg's bluegrass/cheatgrass understory. Currently, the majority of previously existing vegetation has been removed by the Soda Fire.

Other special status wildlife species that occur or could occur in the project area include golden eagles, bighorn sheep, and pygmy rabbits, in addition to multiple small mammal, migratory bird, and reptile species.

Environmental Effects:

Impacts of Alternative 1:

Without application of D7, no change to wildlife habitat besides the existing fire effects and effects of other ESR treatments is expected. The Wyoming sagebrush and grass stands would take substantial recovery time to eventually provide suitable habitat for sage-grouse and other wildlife species that require shrub and tall grass cover.

Impacts of Alternative 2 – Proposed Action:

No effect on special status wildlife species or their habitat is expected from application of D7. Studies submitted in support of the D7 registration indicated that there was no impact on the growth and development of daphnia, lemna, mites, ladybugs, honeybees, fish, birds, or mice, as specified through the EPA Registration process (USDI BLM 2015a Attachment 2).

Application of D7 in the fall, either by drill seeding (Blackstock Spring unit) or aerial seeding (Hardtrigger unit) would be outside of breeding and nesting season for special status birds, so no behavioral disturbance is expected. The application follows Required Design Features from the Approved Resource Management Plan Amendment for Idaho and Southwestern Montana (USDI BLM 2015c); see Attachment 2.

No effect to riparian areas is expected because there are none in or adjacent to the proposed project areas; thus there would be no effect to fisheries or riparian dependent wildlife. In addition, the *Pseudomonas fluorescens* D7 bacteria do not grow in water, including ditches, rivers, or streams (USDI BLM 2015a Attachment 2).

Cumulative Impacts:
Because no direct and indirect effect to special status wildlife or their habitat is expected from the proposed action, no cumulative impacts would occur.

CHAPTER 4: CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION:

List of Preparers:

Name	Title	Function
Beth Corbin	Botanist/Ecologist	Team Lead, Vegetation, Invasive Species, Soils
Brad Jost	Wildlife Biologist	Wildlife, Special Status Animals
Kelli Barnes	Archaeologist	Cultural Resources
Janelle Alleman	Fisheries Biologist	Fisheries
Jonathan Beck	Planning and Environmental Coordinator	NEPA Coordination

List of Agencies, Organizations, and Individuals Consulted:

- October 1, 2015 conference call with multiple BLM offices involved in D7 trials included Ann Kennedy (Washington State University – primary *Pseudomonas fluorescens* researcher); Richard Lee (BLM NOC Integrated Pest Management Specialist); and Ryan Bond, Michael Jacoby, Kurt Seevers, and Philip Northover (Verdesian Life Sciences, LLC – developer of D7 strain).
- On October 15, 2015 BLM consulted with the Shoshone-Paiute Tribes through Wings & Roots on the ESR plan, which included the D7 treatments.
- Internal BLM review of the EA by Steve Christiansen, Gina Rone, and Michele McDaniel
- Lara Aston (Research Scientist with Pacific Northern National Laboratory) about an August 2015 Experts' Workshop on scale-up trials using weed suppressive soil bacteria (including D7) in rangeland restoration.
- Marie-Anne deGraaff (Boise State University) – contacted about Great Basin soils.
- Matt Germino (USGS) – provided monitoring plan information, EA review, and additional references
- Nancy Shaw (USDA Forest Service, Rocky Mountain Research Station) – provided additional references
- Idaho GRSG Project Plan Conformance Review team from the BLM Idaho State Office reviewed the project for conformance with the GRSG Plan Amendment (ARMPA).

Public Participation:

- The proposed project was posted on the on-line NEPA Register on October 27, 2015.
- The Blackstock Spring and Hardtrigger Allotment permittees were notified of the proposed action.
- The proposed action was presented at a Soda Fire Field trip for non-government organizations on October 28, 2015.
- The proposed action was presented at a Soda Fire field trip for internal and other government agencies on November 4, 2015. Agencies included US Fish and Wildlife Service, US Geological Servey, DOI Solicitor's Office, and Idaho Department of Fish and Game.

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United State Environmental Protection Agency (US EPA). 2014. Biopesticides Registration Action Document for *Pseudomonas fluorescens* strain D7; Pesticide Chemical Code: 016418.

Attachment 1 -

IB 2015-082

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240-0036
http://www.blm.gov

September 23, 2015

In Reply, Refer To:
9011, 9012, 9014, 9015 (220) I

EMS TRANSMISSION 09/28/2015
Information Bulletin No. 2015-082

To: All Field Office Officials

From: Assistant Director, Resources and Planning

Subject: General Use of *Pseudomonas fluorescens* strain D7 for Research and Demonstration Field Work

This Information Bulletin contains information regarding the establishment of research and demonstration field studies involving the biopesticide *Pseudomonas fluorescens* strain D7 for the management of three invasive grass species, downy brome/cheatgrass (*Bromus tectorum* L.), medusahead rye (*Taeniatherum caput-medusae* [L.] Nevski), and jointed goatgrass (*Aegilops cylindrical* L.). Attached are four documents:

1. An Environmental Assessment (EA) template for use in preparing the appropriate site-specific NEPA documentation, in accordance with Washington Office (WO) Instruction Memorandum 2015-137.
2. Additional information concerning Pseudomonas fluorescens strain D7 which can be incorporated into the site specific EA.
3. The protocol identifying the process to be used for each of the four potential treatment options available for consideration.
4. The summary of the field project data collection requirements.

Pseudomonas fluorescens strain D7, a soil bacterium, is active during the late fall, winter, and early spring, which coincides with the germination and active growth of the invasive grass species targeted. At least 10 field studies, involving a maximum of 50 acres per field study, will be established during the fall of 2015. Sites will be identified using the criteria stated in the protocol.

The treatment scenarios available for consideration include the use of the bacterium under one of four different options, with the field office determining which option best fits into their proposed site:

1. Applied directly to the soil as a broadcast spray application,
2. Coated on seed and drilled into the site,
3. Coated on seed and broadcast across the site, or,
4. Mixed with the preemergence herbicide, imazapic, and applied directly to the soil.

In order to assist those involved with the project, conference calls and webinars will be set up among the participating field offices, WO, and the Integrated Pest Management Specialist at the National Operation Center (NOC), and will provide the technical support and assistance for the project.

If there are questions or concerns, please contact Gina Ramos by telephone at 202-912-7226, or by email at gramos@blm.gov, or contact Richard Lee by telephone at 303-236-1734, or by email at r5lee@blm.gov.

Signed by:
Michael H. Tupper
Acting, Assistant Director
Resources and Planning

Authenticated by:
Robert M. Williams
Division of IRM Governance,WO-860

4 Attachments:

1 - Site Specific EA Template - Pseudomonas fluorescens strain D7 Project (8 pp)
2 - Site Specific EA Template - Supporting Information (1 p)
3 - *Pseudomonas fluorescens* strain D7 Field Project Protocol (4 pp)
4 - *Pseudomonas fluorescens* strain D7 Field Project Data Collection Requirements (2 pp)

ENVIRONMENTAL ASSESSMENT

Pseudomonas fluorescens strain D7 Field Project

EA Number

BLM Field Office

Date Prepared

Table of Contents

CHAPTER 1: INTRODUCTION

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental impacts of the establishment of the *Pseudomonas fluorescens* strain D7 biopesticide field study as proposed by the _____ Field Office (FO). The EA is a field office site-specific analysis of potential effects that could result with the implementation of the Proposed Action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making the determination as to whether any "significant" impacts could result from the analyzed actions. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27.

An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No significant Impact (FONSI). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record, including a FONSI statement documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in _____ Resource Management Plan (*mo., day, year*).

Background

Invasive plants are defined as "non-native plants whose introduction does, or is likely to cause economic or environmental harm or harm to human health," based on the definition provided in Executive Order 13112[1]. Invasive plants are compromising the ability to manage BLM lands for a healthy native ecosystem. Invasive plants can create a host of environmental and other effect, 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 the soil; loss of long-term riparian area function; loss of habitat for culturally significant plants, high economic costs of controlling invasive plants; and increased cost of keeping systems and recreational sites free of invasive species.

This EA will analyze the incorporation of a biopesticide into an overall integrated pest management approach. Biopesticides are a certain type of pesticide derived from such natural materials as animals, plants, bacteria, and certain minerals. They are broken down into three major classes:

- **Microbial pesticides,** which consist of a microorganism (e.g., a bacterium, fungus, virus or protozoan) as the active ingredient.
- **Plant-Incorporated-Protectants (PIPs)** are pesticidal substances that plants produce from genetic material that has been added to the plant.
- **Biochemical pesticides** are naturally occurring substances that control pests by non-toxic mechanisms.

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[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.

Purpose and Need for the Action

The need for action is to determine the effectiveness of the microbial pesticide, *Pseudomonas fluorescens* strain D7, in controlling a number of invasive grass species. The purpose is to establish a field demonstration project involving the management of downy brome/cheatgrass (*Bromus tectorum* L.), medusahead rye (*Taeniatherum caput-medusae* [L.] Nevski), and/or jointed goatgrass (*Aegilops cylindrical* L.) with the microbial pesticide; *Pseudomonas fluorescens* strain D7 on _____ acres in the _____ area. The objective is to determine whether or not the *Pseudomonas fluorescens* strain D7 will provide suitable control of the targeted invasive species, downy brome/cheatgrass, medusahead rye, and jointed goatgrass, when incorporated into an integrated effort including potential revegetation and the use of herbicides.

Public Participation, Scoping, and Issues:

- Summarize any scoping activities undertaken and their results.

Tiering to Existing Land Use Plan/Environmental Impact Statement:

This EA tiers to the analysis contained in the *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement* (BLM, 2007) for the herbicide active ingredients listed under the *Proposed Action*. (At a minimum, the EA needs to tier to the RMP/EIS and to the Veg PEIS (2007). Be sure to identify specific sections of the two documents that are relevant to the project.)

- Is there any wording within the individual RMP that could be used to support the proposed action of evaluating an integrated approach for the management of an invasive species?
- The Rangeland Management program is responsible for upland health management, assessment, and restoration; rangeland improvement planning and implementation; allotment planning and administration; and resource monitoring. (PEIS 2007, page 2-3)
- Vegetation treatments on public lands also include activities to control invasive species such as noxious weed (of which downy brome/cheatgrass and medusahead rye have been identified as such). PEIS 2007, page 2-3. The goal of [the] integrated vegetation management, [the process utilized by the BLM], is to control invasive and unwanted vegetation, to prevent the spread of noxious weeds, to eradicate early-detected noxious

weed species in areas where certain weeds have not yet become established, and to control weeds where they have become established. (PEIS 2007, page 2-3).

- Though not tiered to the DRAFT PEIS 2015, the project meets the BLM's overarching goals for vegetation management are to improve biological diversity and ecosystem function, promote and maintain native and resilient plant communities, and reduce invasive vegetation and the risk of wildfire. Public lands are administered under the principles of multiple use and sustained yield. Thus, vegetation must be managed to protect and enhance the health of the land. (DRAFT PEIS 2015, pages 2-1).

Relationship to Statutes, Regulations, and Plans:

- Are there any statutes, regulations, or plans that need to be addressed which are relevant to the proposed action? Only list the ones that affect or guide the analysis is some form or fashion. Keep in mind we are dealing with a maximum of 50 acres/project – not a very large area, but the discussion will be based upon the statutes and the location of the project area.
- Examples identified for your consideration:
  - Endangered Species Act
    - Was consultation involved in the project?
    - Example:
    - The Endangered Species Act of 1973 (ESA) requires federal agencies to complete formal consultation with the U.S. Fish and Wildlife Service (FWS) for any action that "may affect" federally listed species or critical habitat. The ESA also requires federal agencies to use their authorities to carry out programs for the conservation of endangered and threatened species.
    - Formal consultation was completed on the _____ RMP and a _____ (date) Biological Opinion (BO number) was issued by the FWS.
    - Or
    - Formal consultation was not required because…
  - National Historic Preservation Act
    - Was consultation conducted? If not, explain why it wasn't needed.
  - Wilderness Study Areas (WSA)
    - The Wilderness Act (P. L. 88-577) in Sections 2 and 4 directs managers to protect and preserve wilderness character. Non-native invasive plants threaten the natural quality of wilderness character as defined by the act. Section 4(c) of the Wilderness Act prohibits motorized equipment or motorized/mechanical transport except where necessary to meet the minimum requirements for the administration of the area for the purpose of the Act. A minimum requirements analysis is typically applied to projects that are considered under this provision of the Act.
  - Federal Land Policy and Management Act of 1976
    - Federal Land Policy and Management Act of 1976 (43 U/S.C. 1701-1712) - The act states that the BLM must manage public lands according to the principles of multiple use and sustained yield. These principles are further qualified in the act by the statutory duty that the BLM prevent unnecessary degradation of the public lands.

- Public Rangelands Improvement Act of 1987
  - Public Rangelands Improvement Act of 1987 (43 U.S.C. 1901 et seq.) - The act states the BLM must manage, maintain, and improve public lands suitable for livestock grazing so that they become as productive as feasible.
- The Federal Insecticide, Fungicide, and Rodenticide Act, as amended (Public Law PL) 92-516
  - The Federal Insecticide, Fungicide, and Rodenticide Act, as amended (Public Law (P.L.) 92-516) - The act requires all pesticide to be registered with the Environmental Protection Agency (EPA). The Federal Environmental Pesticide Control Act of 1972 amends the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, and requires the basis for registration to be whether or not a pesticide causes unreasonable adverse effects on man or the environment. The act also makes it illegal to use a registered pesticide in a manner inconsistent with its labeling. It also requires the certification of all personnel who supervise or apply restricted pesticides. The degree of certification must meet the classification requirements for proper storage, transportation, or disposal of pesticides. The responsibility for administering the act is vested in the EPA.
- Federal Noxious Weed Act of 1974, as amended by Sec. 15, Management of Undesirable Plants on Federal Lands, 1990.
  - Federal Noxious Weed Act of 1974 (7 U.S.C. 2801-2813), as amended by Sec. 15, Management of Undesirable Plants on Federal Lands, 1990 - This bill requires that each Federal Agency: (1) Designates a lead office and person trained in the management of undesirable plants; (2) Establish and fund an undesirable plant management program; (3) Complete and implement cooperative agreements with State agencies; and (4) Establish integrated management systems to control undesirable plant species.
- Departmental Manual 517
  - Departmental Manual 517 - Prescribes the Department's guidance for the use of pesticides on the lands and waters under its jurisdiction and for compliance with the Federal Insecticide, Fungicide, and Rodenticide Act, as amended.
- Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 11001)
  - Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 11001), also known as the Emergency Planning and Community Right-to-know Act - Provides that workers must be given information such as Material Safety Data Sheets and Technical Data Sheets on pesticides that they will be handling or applying.
- Carlson Foley Act of 1968 (P.L. 90-583)
  - Carlson Foley Act of 1968 (P.L. 90-583) - Provides for the authorization for reimbursement of expenses to State or local agencies for weed control on Federal lands.

CHAPTER 2: PROPOSED ACTION AND ALTERNATIVES:

Alternative 1 – No Action/Continue Present Management

No treatments would be established to study in integrated approach for the management of downy brome/cheatgrass, medusahead rye, or jointed goatgrass involving the biopesticide *Pseudomonas fluorescens* strain D7.

Alternative 2 – Proposed Action:

Establishment of a field study involving the incorporation of the biopesticide *Pseudomonas fluorescens* strain D7 into an integrated approach for the management of downy brome/cheatgrass, medusahead rye, or jointed goatgrass involving the use of revegetation activities and herbicides. Study areas will not exceed 50 acres per field office, with the potential for more than one study area (or if there is more than one study area in the field office, identify the number) in the field office. Herbicide active ingredients identified for inclusion in the integrated effort, included, 2,4-D, clopyralid, dicamba, glyphosate, imazapic, and metsulfuron methyl. Attached is the protocol for the individual treatments, see Attachment 1.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS:

The following issues are not analyzed because they are either not present in the project area or are not affected by the project due to, not only the size of the area (< 50 total acres), but also the nature of the project or due to avoidance of the resource, as stated in the project protocol; Air Quality, Areas of Critical Environmental Concern, Cultural Resources, Environmental Justice (E.O. 12898), Farm Lands (prime or unique), Fish Habitat, Flood Plains, Migratory Birds, Native American Religious Concerns, Social and Economic, Waste, Hazardous or Solid, Water Quality, and Wetlands/Riparian Zones.

Environmental effects will include direct and indirect impacts of the Proposed Action and alternative. The impacts are analyzed to determine if the effects of an action are such that they trigger further analysis in an environmental impact statement. The No Action alternative is the baseline against which the other alternative is compared.

Cumulative impacts are impacts which result from the 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 persons undertake such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. If no direct or indirect impacts are identified, there will be no cumulative effects for that resource.

VEGETATION:

A. Affected Environment:
B. Environmental Effects:
    a. Impacts of Alternative 1:
    b. Impacts of Alternative 2 – Proposed Action:

C. Cumulative Impacts:

INVASIVE, NONNATIVE SPECIES:

A. Affected Environment:
B. Environmental Effects:
    a. Impacts of Alternative 1:
    b. Impacts of Alternative 2 – Proposed Action:
C. Cumulative Impacts:

SOILS:

A. Affected Environment:
B. Environmental Effects:
    a. Impacts of Alternative 1:
    b. Impacts of Alternative 2 – Proposed Action:
C. Cumulative Impacts:

WILDLIFE:

A. Affected Environment:
B. Environmental Effects:
    a. Impacts of Alternative 1:
    b. Impacts of Alternative 2 – Proposed Action:
C. Cumulative Impacts:

CHAPTER 4: CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION:

A. List of Preparers:
    a. List of those involved in the preparation of the document.
B. List of Agencies, Organizations, and Individuals Consulted:
    a. List of individuals consulted in accordance with the project.
C. Public Participation:
    a. Describe any scoping. If no scoping conducted with the public, you will need to have a public comment period before signing a decision.

CHAPTER 5: LITERATURE CITED:

Site Specific EA Template – Supporting Information

In order to assist with the preparation of the site specific EA, the following information is being provided regarding the environmental characteristics of the *Pseudomonas fluorescens* strain D7 bacterium:

- Colonizes the plant root intracellular spaces outside the Casparian strip, does not enter the cell, and is therefore, is not mobile in the plant vascular system.
- Produces the weed suppressive compound in the intracellular spaces outside the cell wall.
    - The compound decomposes readily and does not persist in the soil or the soil solution.
- The specificity is associated with the compound produced by the bacteria and it inhibition of certain lipid combinations in the root cell membrane which inhibit cell elongation, combinations associated with the three targeted invasive grass species.
- The bacterium does not grow in water – ditches, rivers, streams, etc.
- The bacterium is not able to injure standing plants, as it only suppresses seed and seedlings.
- Studies submitted in support of the registration indicated that there was no impact on the growth and development of; daphnia, lemna, mites, ladybugs, honey bees, fish, birds, or mice, as specified through the EPA Registration process.

Pseudomonas fluorescens strain D7 Field Project Protocol

Objectives and Focus of the Study:

- Evaluate the introduction of the bioherbicide, *Pseudomonas fluorescens* strain D7, into the integrated management of downy brome/cheatgrass, (*Bromus tectorum* L.), medusahead rye (*Taeniatherum caput-medusae* [L.] Nevski), and/or jointed goatgrass (*Aegilops cylindrica* L.).
- Project will involve the control of the invasive grasses, along with the subsequent restoration, and maintenance of the study site.

Site Identification:

- Requirements of the Proposed Study Site:
  - The selected site, aside from the impact of the target invasive annual grass species, is not an Area of Critical Environmental Concerns.
  - There are no Cultural Resources associated with the project site.
  - Site will not be associated with Fish Habitat or Flood Plains.
  - There are no Native American Religious Concerns linked to the project site.
  - There are no Social or Economic aspects associated with the project site.
  - There are no Threatened or Endangered Species identified with the project site.
  - The site will not involve any Waste issues, either Hazardous or Solid in nature.
  - The site will be located where there will not be any issues associated with Water Quality – Drinking/Ground.
  - The project site is not considered a Wetland or Riparian site.

- Characteristics of the "ideal" site:
  - Medium to low density of target grass species population.
  - Mixed stands of target grass species plus native, not total monoculture sites.
  - Avoid plowed or previously farmed sites.

Treatment Application Criteria:

- The four treatment options for consideration are listed below. In order to be effective, it is important to recognize that the site will need to be monitored and managed in such a way as to enhance the establishment of the desired vegetation, whether it is native vegetation or introduced through the revegetation aspect of the project.
- Each identified location will select one of the four treatments, listed below, based upon the site characteristics, target species, and ability to complete and monitor the project area.

Treatment Options to Consider and Associated Requirements

Treatment #1 – *Pseudomonas fluorescens* strain D7 applied directly to the soil:

- Fall of 2015:
  - Site preparation, use herbicide to manage any vegetation prior to applying bioherbicide.
  - Apply bioherbicide to site late fall/early winter, prior to ground freezing.
    - Do not apply to dry soil.
    - Apply when the air temperature is below 50° F and rain is imminent.

        - Results are enhanced with a moisture event of greater than 0.2 inches within 2 weeks following treatment
- Spring/Summer of 2016:
    - Monitor treatment site and control broadleaf pressure.
    - Evaluate site and determine whether or not a revegetation component needs to be incorporated into the treatment effort.
        - Unless the treatment site has a sufficient vegetation component, revegetation will be required.
- Fall of 2016:
    - During the fall/winter there may be evidence of the management pressure associated with the bacteria, if it became established.
- Spring of 2017:
    - Population of the targeted invasive grass species should show signs of a reduction in overall population numbers due to the biopesticide and revegetation (when incorporated into the site) pressure. Visual results of the bacteria suppressing the growth of the weed would be a reduction in grass weed populations, red color of leaves, lack of adequate rooting structures compared to control and small plants with few tillers and few seed.

Treatment #2 – *Pseudomonas fluorescens* strain D7 coated on seed and drilled into the site:

- Fall of 2015:
    - Site preparation, use herbicide to manage any vegetation prior to applying bioherbicide.
    - Drill seed coated with the bioherbicide to site mid to late fall.
        - Drill seeding at the optimum seeding depth (0.125" to 0.25") is ideal for seed-soil contact, and is especially critical if the downy brome/cheatgrass population of the study area is high; few perennials are evident; if there is any chance the area was disturbed in the past; or if the "ideal" situation listed above is not available.
- Spring/Summer of 2016:
    - Monitor treatment site and control broadleaf pressure.
    - Evaluate site and determine whether or not a revegetation component needs to be incorporated into the treatment effort.
        - Unless the treatment site has a sufficient vegetation component, revegetation will be required.
- Fall of 2016:
    - During the fall/winter there may be evidence of the management pressure associated with the bacteria, if it became established.
- Spring of 2017:
    - Population of the targeted invasive grass species should show signs of a reduction in overall population numbers due to the biopesticide and revegetation (when incorporated into the site) pressure. Visual results of the bacteria suppressing the growth of the weed would be a reduction in grass weed populations, red color of leaves, lack of adequate rooting structures compared to control and small plants with few tillers and few seed.

Treatment #3 – *Pseudomonas fluorescens* strain D7 coated on seed and broadcast across the site:

- Fall of 2015:
  - Site preparation, use herbicide to manage any vegetation prior to applying bioherbicide.
  - Broadcast seed coated with the bioherbicide to site mid to late fall.
- Spring/Summer of 2016:
  - Monitor treatment site and control broadleaf pressure.
  - Evaluate site and determine whether or not a revegetation component needs to be incorporated into the treatment effort.
    - Unless the treatment site has a sufficient vegetation component, revegetation will be required.
- Fall of 2016:
  - During the fall/winter there may be evidence of the management pressure associated with the bacteria, if it became established.
- Spring of 2017:
  - Population of the targeted invasive grass species should show signs of a reduction in overall population numbers due to the biopesticide and revegetation (when incorporated into the site) pressure. Visual results of the bacteria suppressing the growth of the weed would be a reduction in grass weed populations, red color of leaves, lack of adequate rooting structures compared to control and small plants with few tillers and few seed.

Treatment #4 – *Pseudomonas fluorescens* strain D7 is mixed with a preemergence herbicide, imazapic, and applied directly to the soil:

- Fall of 2015:
  - Site preparation, use herbicide to manage any vegetation prior to applying bioherbicide.
  - Apply premix of bioherbicide with the preemergence herbicide imazapic in the early to mid-fall.
- Spring/Summer of 2016:
  - Monitor treatment site and control broadleaf pressure.
  - Evaluate site and determine whether or not a revegetation component needs to be incorporated into the treatment effort.
    - Unless the treatment site has a sufficient vegetation component, revegetation will be required.
- Fall of 2016:
  - During the fall/winter there may be evidence of the management pressure associated with the bacteria, if it became established.
- Spring of 2017:
  - Population of the targeted invasive grass species should show signs of a reduction in overall population numbers due to the biopesticide and revegetation (when incorporated into the site) pressure. Visual results of the bacteria suppressing the growth of the weed would be a reduction in grass weed populations, red color of leaves, lack of adequate rooting structures compared to control and small plants with few tillers and few seed.

Additional Treatment Requirements:

- Herbicides available for use:
  - Site Preparation:
    - Glyphosate
    - Imazapic

  - Broadleaf weed control:
    - 2,4-D
    - Dicamba
    - Metsulfuron methyl
    - Clopyralid

  - Adjuvants available for consideration include, as dictated by the herbicide label:
    - Non-ionic Surfactants
    - Crop Oil Concentrates

    NOTE: Adjuvants may influence the survival of the bacteria in the soil, but little is known at this time. Typically, the use of imazapic is as a preemergence herbicide and would not require the addition of an adjuvant.

Pseudomonas fluorescens strain D7 Field Project Data Collection Requirements

Study Layout:

- There will be two areas established:
  - Treated Area
  - Untreated (Check)

Pre-treatment and Evaluation/Monitoring Data Collection:

- By taking advantage of the NRCS soil mapping, the ecological sites associated with the proposed treated area can be identified. It is within a uniform ecological site that the monitoring sites can be located.
- As described in the protocol, the management action associated with the *Pseudomonas fluorescens* strain D7 is associated with the root system of the targeted grass species. The data collected pre-treatment and during the study will be data on the relative abundance and vigor associated with the grass species.
  - In discussing the project with several individuals, it is suggested that we take advantage of the Line Point Intercept method for data collection.
    - Within your Study Area, identify the area of most uniformity with regards to the ecological site characteristics, which could be the entire study area.
      - Within the uniform ecological site area, establish three fixed points, which will serve as the basis for the line point intercept.
        - From the fixed location, run two 150 foot lines, at a 90° angle, using the fixed point as the midpoint of each line.
    - At three-foot intervals along the tape, collect the following data:
      - "Canopy hit" – the first species
      - "Subsequent hits" – additional species that come in contact with the flag pin. In order to evaluate the abundance and vigor of the downy brome, or other target grass species, it has been suggested that we record subsequent hits of a species already identified, i.e. there is more than one time the downy brome comes in contact with the flag pin at the data collection point.
      - "Soil surface hit" – the plant species, rock, or soil.
      - Note: The height of the canopy and subsequent hits is not being recorded, just the species that come in contact with the flag pin.

Application Data Collection:

- At the time of application of the biopesticide, either as a spray or seed impregnated application, the following data should be collected:
  - Air Temperature
  - Soil temperature
    - Surface
    - 2" depth
  - Relative Humidity
  - Wind Speed and Direction
  - Percent Cloud Cover
  - Target plant species growth stage

- Sprayer Related Information – for those treatments involving the use of a herbicide:
    - Sprayer Output – GPA
    - Nozzle Type
    - Application Pressure

Post Application Data Collection:

- The most critical piece of data to collect regarding the application of the *Pseudomonas fluorescens* strain D7 is the measurable precipitation following the application – the date and amount.

Attachment 2 –

Idaho Greater Sage-Grouse Implementation Plan Conformance Review

Idaho Greater Sage-Grouse Implementation Plan Conformance Review

GRSG Plan Amendment Conformance:

Conducted by Ammon Wilhelm, Bonnie Claridge, Jon Porter, and Paul Makela, Ethan Ellsworth, Natalie Cooper, Steve Jirik, and John Beck on November 6th, 2015

Project Name: D7 Trial

Project Type: Fuels and Invasive Weeds Treatment using a Microbial Pesticide

Location: The first proposed treatment unit is in the Blackstock Springs Allotment, Pasture 1, in T.1S, R.5W, Sec 20 SE ¼, at approximately 4,600 feet elevation.

The second proposed treatment is in Pasture 3 of the Hardtrigger Allotment, in T.1N, R.4W, Sec 25 NE ¼, at approximately 3,000 feet elevation.

Conservation Area: Idaho West Owyhee Conservation Area (MD SSS 1)

Designation: Important Habitat Management Area (MD SSS 2)

Area of Impact: The area of impact is located within two 25 acre parcels for a total of 50 acres of impact area. Twenty-five acres would be drill seeded and the other 25 acres would be aerially seeded with seed that was treated with the D7 microbial pesticide as described in Environmental Assessment: DOI- BLM-ID-B030-2015-0017-EA.

Adaptive Management:

The Idaho West Owyhee Conservation Area appears to have lost more than 20% of its IHMA due to the Soda Fire in 2015. As described in the ARMPA, when a Hard Trigger is tripped within a conservation area, all management decisions and allocations of PHMA are applied to IHMA within the respective conservation area (MD SSS 22). BLM is currently working through the process to determine if the habitat trigger has been tripped. However, because this type of project is not prohibited under either PHMA or IHMA, it can move forward without waiting for an official determination on whether a trigger has been tripped.

Disturbance Cap: Drill seeding and aerially seeding post-fire are not included in the disturbance types that are considered in the disturbance calculations as described in Appendix E p. 6-7, therefore the Disturbance Cap at either the Biologically Significant Unit scale or the project scale (MD SSS 27), and the Anthropogenic Disturbance Development Criteria for PHMA (MD SSS 30), do not apply.

Allocation: There are no allocation level designations regarding this type of project and there are specific management decisions allowing these types of actions. Therefore the allocation would be considered open.

Management Decisions Authorizing Activity:

MD VEG 2: Implement vegetation rehabilitation or manipulation projects to enhance sagebrush cover or to promote diverse and healthy grass and forb understory to achieve the greatest improvement in GRSG habitat based on FIAT Assessments, HAF assessments, other vegetative assessment data and local, site specific factors that indicate sagebrush canopy cover or herbaceous conditions do not meet habitat management objectives (i.e. is minimal or exceeds optimal characteristics). This may necessitate the use of prescribed fire as a site preparation technique to remove annual grass residual growth prior to the use of herbicides in the restoration of certain lower elevation sites (e.g., Wyoming big sagebrush) but such efforts will be carefully planned and coordinated to minimize impacts on GRSG seasonal habitats.

MD VEG 3: Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success (Richards et al. 1998). Non-native seeds may be used as long as they support GRSG habitat objectives (Pyke 2011) to increase probability of success, when adapted seed availability is low or to compete with invasive species especially on harsher sites.

MD VEG 11: Conduct integrated weed management actions for noxious and invasive weed populations that are impacting or threatening GRSG habitat quality using a variety of eradication and control techniques including chemical, mechanical and other appropriate means.

MD VEG 13: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.

MD FIRE 29: Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low or non-economical, nonnative seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and nonnative species, as appropriate, to provide for fuel breaks.

Applicable Required Design Features (MD SSS 22 and Appendix C)**:**

RDF 2 – No repeated or sustained behavioral disturbance (e.g., visual, noise over 10 dbA at lek, etc.) to lekking birds from 6:00 pm to 9:00 am within 2 miles (3.2 km) of leks during the lekking season.

This project would occur outside of the lekking season.

RDF 3 – Avoid mechanized anthropogenic disturbance, in nesting habitat during the nesting season when implementing: 1) fuels/vegetation/habitat restoration

management projects, 2) infrastructure construction or maintenance, 3) geophysical exploration activities; 4) organized motorized recreational events.

This project would occur outside of the nesting season.

RDF 4 – Avoid mechanized anthropogenic disturbance during the winter, in wintering areas when implementing: 1) fuels/vegetation/habitat restoration management projects, 2) infrastructure construction or maintenance, 3) geophysical exploration activities; 4) organized motorized recreational events.

This project would occur within the winter season and the project area is identified as wintering habitat for sage-grouse, however the soda fire removed essentially all the sagebrush from the project area and therefore it cannot function as winter habitat and the project will not affect wintering sage-grouse.

RDF 42 – Reduce annual grass densities and competition through herbicide, targeted grazing, tillage, prescribed fire, etc. (Pyke 2011).

This project is focused on reducing invasive annual grasses using a microbial pesticide.

RDF 44 – Utilize techniques to introduce desired species to the site such as drill seeding, broadcast seeding followed by a seed coverage technique, such as harrowing, chaining or livestock trampling, and transplanting container or bare-root seedlings.

The project will broadcast and drill seed desired perennial plant species within the project area.

RDF 48 – Utilize post-treatment control of annual grass and other invasive species.

This project is focused on reducing invasive annual grasses using a microbial pesticide.

RDF 49 –Utilize new tools and use of new science and research as it becomes available.

The D7 microbial pesticide is a newly available technology intended to reduce the competitive ability of invasive non-native species while not inhibiting desirable perennial species.

Mitigation Required:

This project is part of a larger Emergency stabilization and rehabilitation project for the Soda Fire and will occur within burned areas. As such the expected benefits

from seeding and reduction of invasive species should outweigh the impacts associated with drill seeding. No mitigation is required.

Conclusion: **Based on the above review, this project is in conformance with the Approved Sage-grouse Resource Management Plan Amendment (Sept 2015).**