CONFERENCE OPINION

PARADIGM FUEL BREAKS PROJECT

01EIF00-2015-FC-0260

U.S. FISH AND WILDLIFE SERVICE
IDAHO FISH AND WILDLIFE OFFICE
BOISE, IDAHO

Supervisor Michael Cassier

Date APR 2 0 2015

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1. BACKGROUND

1.1 Introduction

The U.S. Fish and Wildlife Service (Service) has prepared this Conference Opinion (Opinion) of the effects of the Paradigm Fuel Breaks Project on *Lepidium papilliferum* (slickspot peppergrass) and its proposed critical habitat. In a letter dated January 9, 2015, and received by the Service on January 9, the Bureau of Land Management (Bureau) requested formal consultation with the Service under section 7 of the Endangered Species Act (Act) of 1973, as amended, for its proposal to carry out the proposed action on Federal and State lands. The Bureau determined that the proposed action may affect, and is likely to adversely affect slickspot peppergrass and its proposed critical habitat. Similarly, in a letter dated March 10, 2015, and received by the Service on March 10, the Natural Resources Conservation Service (NRCS) requested formal conference on their determination under section 7 of the Act that the proposed Paradigm Fuel Breaks Project may affect, and is likely to adversely affect slickspot peppergrass and its proposed critical habitat on private lands. On March 10, 2015, the Service requested and the Federal action agencies agreed that the Bureau Assessment and the NRCS Assessment could be addressed in a single Opinion as the proposed Paradigm Project and its potential effects on slickspot peppergrass and its proposed critical habitat are expected to be similar whether implemented on Federal, State, or private lands. As described in this Opinion, and based on the Bureau's Biological Assessment (USBLM 2015, entire), as updated by the Bureau on February 4, 2015, and the NRCS Biological Assessment (NRCS 2015, entire), and other information, the Service has concluded that the action, as proposed, is not likely to jeopardize the continued existence of slickspot peppergrass or to destroy or adversely modify proposed critical habitat for the species on Federal, State, or private lands.

1.2 Consultation History

The Bureau has identified the Paradigm Fuel Breaks action area as a high priority for vegetation treatment and hazardous fuels reduction to reduce the risk of large wildfires and allow for progression to a more natural and resilient vegetation condition. Consultation history of the proposed Paradigm Fuel Breaks Project is provided in detail below.

November 30, 2009	The Service completed formal consultation for the Jarbidge Resource Management Plan (RMP), the Kuna Management Framework Plan (MFP), the Cascade RMP, and the Snake River Birds of Prey National Conservation Area RMP on the effects of land use plan programs on slickspot peppergrass (14420-2010-F-0019).
December 7, 2009	The Service's decision to list slickspot peppergrass as threatened became effective.
May 10, 2011	Proposed critical habitat for slickspot peppergrass was published in the Federal Register.
August 8, 2012	The United States District Court for the District of Idaho ordered that the final rule listing slickspot peppergrass as a threatened species

	under the Act be vacated and remanded for further consideration consistent with the court's decision. With this court decision, the Service considered the status of the species under the Act to be proposed for listing as Endangered.
December 7, 2012	The Bureau completed "Vegetative fuel break planning guidance for the long term protection of the sagebrush steppe and slickspot peppergrass habitats of Southwestern Idaho".
December 14, 2012	The Service completed the Idaho Fish and Wildlife Office's draft guidance for planning and evaluating fuel breaks in Idaho for *Lepidium papilliferum (*slickspot peppergrass).
November 21, 2013	The Service received a preliminary draft of the Paradigm Fuel Breaks Project Biological Assessment (Assessment) for review and comment.
December 31, 2014	The Service provided review comments on the preliminary draft Paradigm Fuel Breaks Project Assessment to the Bureau.
February 12, 2014	The Service published two Federal Register Notices, one of which addressed the Court's request that a specific definition of foreseeable future for slickspot peppergrass be provided. The second Federal Register Notice amended the original May 10, 2011 critical habitat proposal to include recently discovered slickspot peppergrass locations that met critical habitat designation criteria.
February 28, 2014	The Service provided the Bureau with public review comments on the draft Environmental Assessment (EA) for the Paradigm Fuel Breaks Project, which included a request to meet and discuss the proposed Project.
March 13, 2014	The Service met with the Bureau to discuss the Paradigm Fuel Breaks Project EA, including the need for a robust monitoring plan to address fuel break effectiveness and potential movement of prostrate kochia from fuel breaks into slickspot peppergrass EOs and proposed critical habitat.
April 29, 2014	The Service met with the Bureau to provide detailed information on Service expectations for components of a robust monitoring plan for the Paradigm Fuel Breaks Project.
July 29, 2014	The Bureau, NRCS, and the Service met to discuss the Paradigm Fuel Breaks Project, including NRCS participation on that portion of the Project proposed for private lands, and Project monitoring options on all land ownerships.
August 18, 2014	The Bureau's Boise District met with Service Level 2 representatives to discuss the pending 2014 Conservation Agreement (CA) between the Bureau and the Service for slickspot peppergrass and its implications for proposed *Kochia prostrata* (prostrate kochia, forage kochia) greenstrip fuel breaks in the Paradigm Fuel Breaks Project area.

September 15, 2014	The 2014 CA between the Bureau and the Service was signed. The CA included requirements for a 1.5 mile buffer between prostrate kochia use areas and slickspot peppergrass Element Occurrences (EOs).
November 25, 2014	The Bureau met with the Service to provide an overview of the updated preferred alternative for the Paradigm Fuel Breaks Project.
December 2, 2014	The Bureau provided the Service with the draft final version of the proposed Paradigm Fuel Breaks Project Assessment for review and comment.
December 10, 2014	The Service provided the Bureau with comments regarding the Bureau's draft final Paradigm Fuel Breaks Project Assessment.
January 9, 2015	The Service received the Bureau's final Paradigm Fuel Breaks Project Assessment with a request to initiate formal consultation.
January 21, 2015	The Boise District Level 1 Team met to discuss how Service comments on the December 2, 2014 draft final BA were addressed in the January 9, 2015 final Paradigm Fuel Breaks Project Assessment.
February 4, 2015	NRCS provided the draft NRCS Assessment to the Service, requesting a review of the document prior to submission for formal conference. The Bureau provided the Service with the final updated version of the January 9, 2015 final Paradigm Fuel Breaks Project Assessment. The Service provided the Bureau with written confirmation that the updated document contained adequate information to for completion of section 7 conference. The Service also requested a 30-day time extension for completion of the Bureau's Paradigm Fuel Breaks Project formal conference.
February 5, 2014	The Bureau approved the Service's request for a 30-day time extension for completion of the Paradigm Fuel Breaks Project formal conference.
March 5, 2015	The Service provided the NRCS with comments regarding the NRCS's draft Paradigm Fuel Breaks Project Assessment.
March 10, 2015	The NRCS provided the Service with the final NRCS Paradigm Fuel Breaks Project Assessment and a request for formal conference. The Service requested and the Bureau and NRCS agreed that the Bureau Assessment and the NRCS Assessment could be addressed in a single Opinion that examined the effects of the proposed Paradigm Project on Federal, State, and private lands.
April 2, 2015	The Service provided the Bureau and NRCS with the draft Paradigm Fuel Breaks Project Conference Opinion for agency review and comment.
April 9, 2015	The Bureau and NRCS provided the Service with agency comments on the draft Opinion, which were incorporated into the final Opinion, as appropriate.

2. CONFERENCE OPINION

2.1 Description of the Proposed Action

This section describes the proposed Federal action, including any measures that may avoid, minimize, or mitigate adverse effects to listed species or critical habitat, and the extent of the geographic area affected by the action (i.e., the action area). The term "action" is defined in the implementing regulations for section 7 as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." The term "action area" is defined in the regulations as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

2.1.1 Action Area

The proposed Paradigm Fuel Breaks Project is located in Elmore County, Idaho. The Paradigm Project area encompasses approximately 293,891 acres of Federal, State, and private lands (Figures 1 and 2). The northern boundary of the Project is Blacks Creek Road north of Interstate 84, located approximately 7.5 miles east of Boise, Idaho. The Project area extends south and east from Blacks Creek Road to Sugar Bowl and King Hill Road north of Glenns Ferry, Idaho on the eastern boundary of the Four Rivers Field Office. The northeastern boundary is Mayfield/Foothill Road from Blacks Creek to Mountain Home, then a series of roads; Immigrant, Red Rock, Rye Grass, Rye Grass Cutoff and Alkali Roads, to King Hill Road. The southwestern and southern boundary follows the railroad tracks to Hammett, then Interstate 84 to Glenns Ferry. Within the Project area, 251,145 acres are located within the boundaries of the Bureau's Four Rivers Field Office; the remaining 42,746 acres are located within the boundary of the Bureau's Morley Nelson Snake River Birds of Prey National Conservation Area (NCA). Within the Project area, 116,429 acres (about 40 percent of the total Project area) are privately owned. Both the Bureau and the NRCS Assessments analyzed potential effects of the proposed Paradigm Project on EOs located within 10 miles of the Project boundary; therefore, the Project action area includes EOs located within a 10 mile radius of the Project boundary.

2.1.2 Proposed Action

The Bureau and NRCS are proposing to develop a network of self-sustaining, low maintenance fuel breaks[1] using existing routes (primarily roadways and rail lines, but also fence lines in some areas) (Figures 1 and 2). The Paradigm Fuel Break Project incorporates many of the provisions set forth in the January 5, 2015 Secretarial Order on Rangeland Fire Prevention, Management

[1] NRCS policy defines "fuel break" as a method used to reduce or modify fuels within forested areas, while a "fire break" is a "strip of bare or vegetated land planned to retard fire" on all lands, including of rangelands such as within the Paradigm Project area. For the purposes of this Opinion, when the term "fuel break" is used, it is synonymous with "fire break" when referring to the NRCS portion of the Project proposed for private lands.

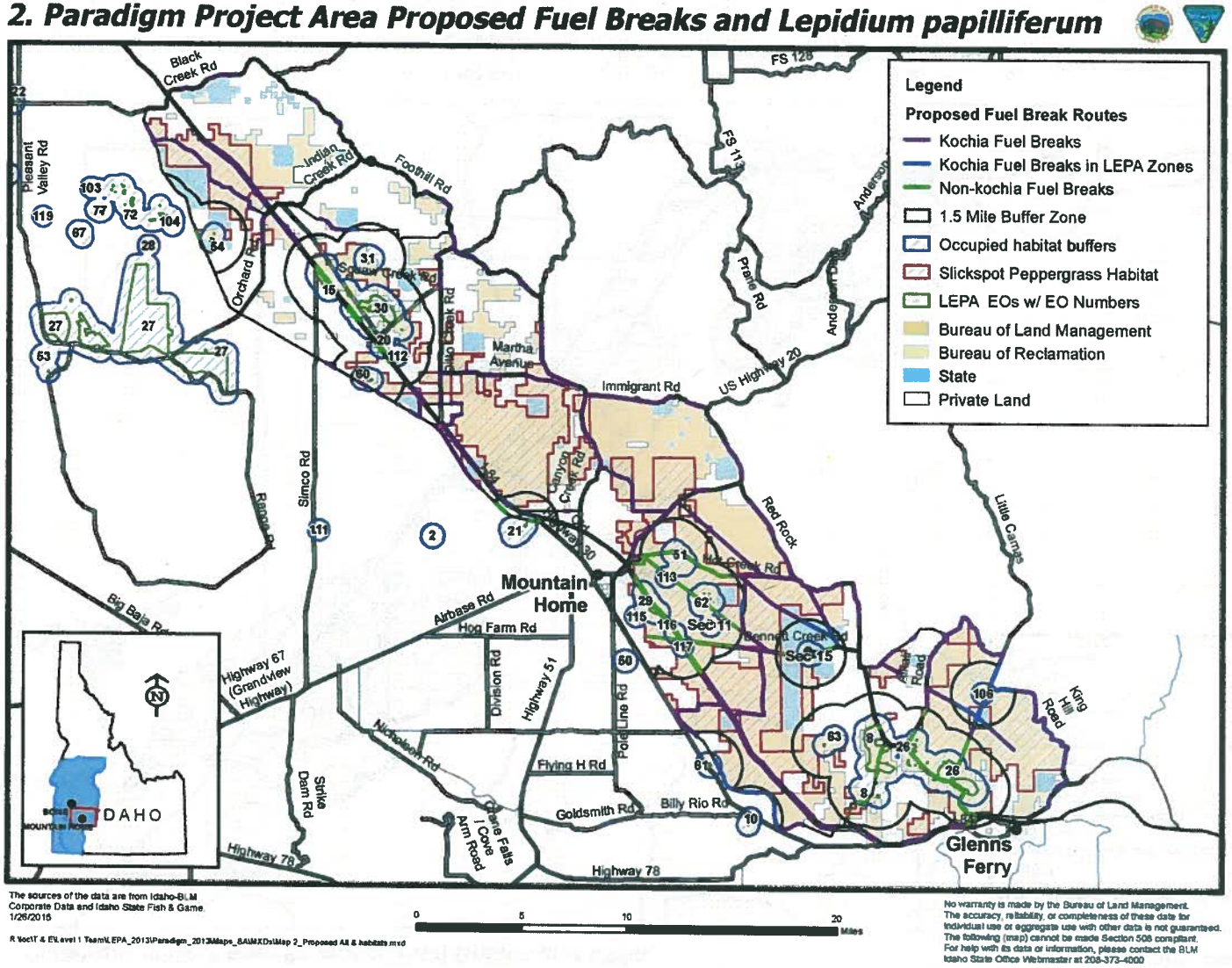

Figure 1. Slickspot peppergrass and proposed treatments on Federal and State lands within the Paradigm Fuel Breaks Project area.

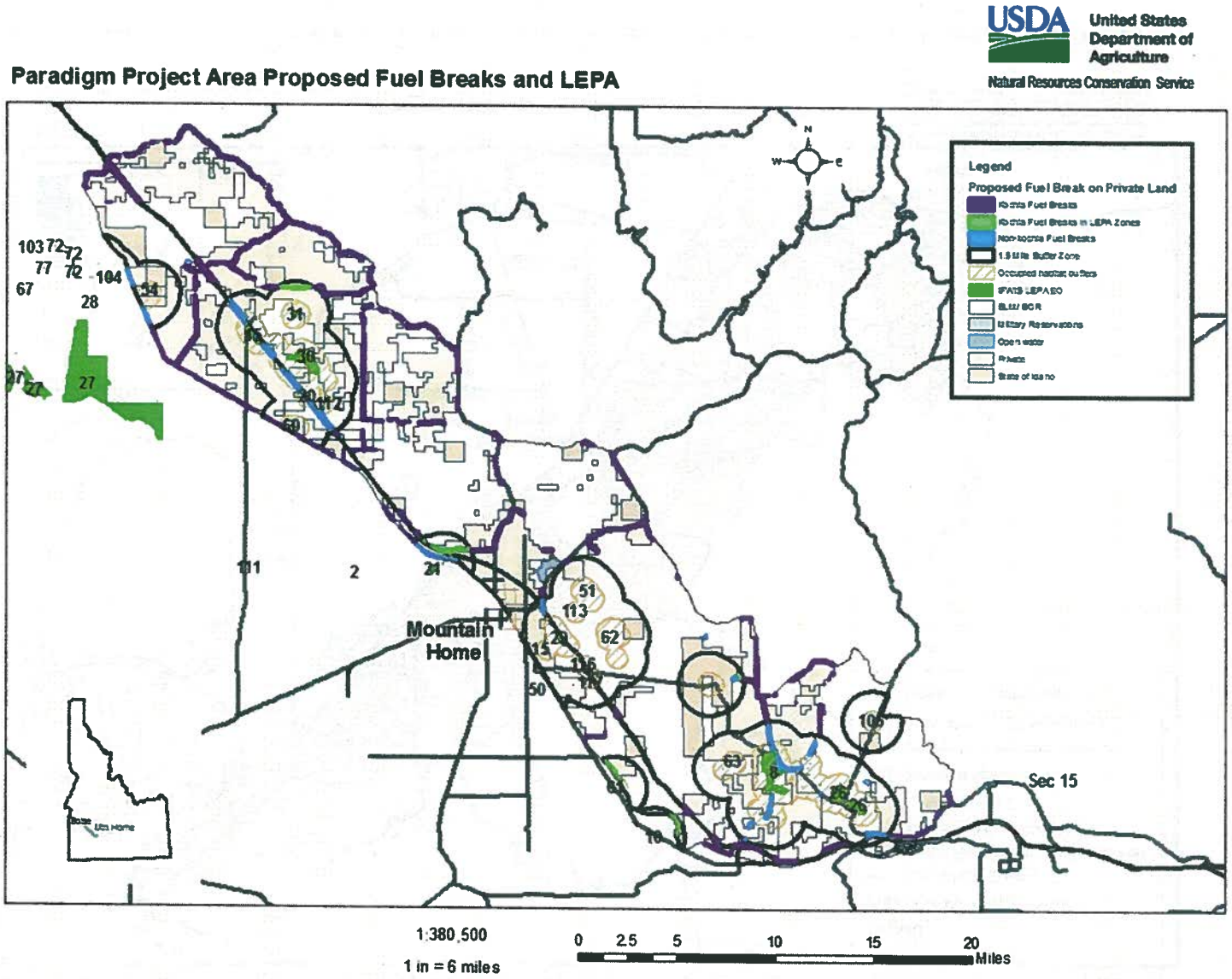

Figure 2. Slickspot peppergrass and proposed treatments on private lands within the Paradigm Fuel Breaks Project area.

and Restoration (No. 3336), including: working collaboratively with other government and non-government entities, using a landscape-scale approach; reducing the likelihood, size, and severity of rangeland fires, reducing cheatgrass spread, and facilitating the long-term restoration of fire-impacted sagebrush steppe communities (USDOI *in litt.* 2015, entire). The Project is expected to be implemented over a 5 to 6 year time span, with monitoring and maintenance continuing into the future. The expected duration of this Project on Bureau and State lands is a minimum of 50 years (USBLM 2015, p. 9). The term of the Project on private land is expected to go through the NRCS practice lifespan for fire breaks, which is 5 years. Although the practices may continue beyond that period, NRCS cannot commit to any funds beyond the contract obligation with each land owner or the lifespan of the practice (NRCS 2015, pp. 8-9). The Service expects that greenstrip fuel breaks implemented on private lands will likely remain functional over a period similar to that provided by the Bureau for fuel break treatment on Federal and State lands (at least 50 years), provided that they are not removed due to development or other landowner actions, and that periodic fuel break maintenance continues to occur, as needed.

The developed fuel breaks would accomplish the following goals:

- Enhance firefighter and public safety by reducing the amount of fires that ignite near roadways and burn large acreages;
- Provide additional and improved anchor points for fire suppression tactics;
- Reduce the size of fires that burn across the Project area by compartmentalizing the Project area into more defensible sections;
- Reduce the number of roadside fires that burn into the adjacent rangelands;
- Facilitate protection of remaining intact big sagebrush communities, particularly those areas associated with greater sage-grouse habitat.
- Facilitate protection of remaining slickspot peppergrass EOs and intact habitats.
- Provide protection to future habitat rehabilitation and restoration treatments.

In 2011, Boise District Fire and Fuels staff evaluated transportation routes in the project area to determine suitability for development of fuel breaks for use during fire suppression. Effectiveness of the Paradigm Project is dependent on implementing a network of fuel breaks across the landscape regardless of landownership to strategically compartmentalize the 293,891-acre proposed Project area to minimize the risk of large scale wildland fires (Figure 1). Through this process, a 356-mile network was identified for fuel break development on Bureau, Bureau of Reclamation (BOR), and State-managed lands in the Paradigm Project area (Figure 1), which is addressed in the Bureau's Assessment (USBLM 2015, entire). The Bureau also identified an additional 213-mile network for fuel break development on privately-managed lands within the same area (Figure 2), which is addressed in the NRCS Assessment (NRCS 2015, entire).

While most fuel breaks will be developed along established roads, others may be developed along the Union Pacific rail line (hereafter referred to as the railroad tracks) or along fences where the community of Tipanuk abuts public lands. Maintenance will be performed on both existing and newly-constructed fuel breaks to assure they are functioning properly.

Implementation of fuel breaks will occur in phases and will start with 100 miles of 150 foot-wide fuel breaks per year for the initial phase with width expansion of these fuel breaks, if needed, occurring in a second phase after the first phase is complete. At this rate, the initial phase will take three years to accomplish and the second phase two to three years, totaling five to six years

for full implementation. For analysis purposes, both the Bureau's and the NRCS's Assessments used the maximum treatment footprint of 300-foot-wide fuel breaks.

The mileage and description of each of the three fuel break types proposed within the Project area are as follows:

- **"Kochia fuel breaks"** include proposed prostrate kochia greenstrip fuel break routes that are located outside the 1.5 mile buffer around slickspot peppergrass Element Occurrences (EOs)[2]. The up to 422 miles total of "kochia fuel breaks" proposed within the Project area include the 248 miles of "kochia fuel breaks" proposed on Federal and State lands (USBLM 2015, p. 9), as well as the up to 174 miles of additional "kochia fuel breaks" that may be implemented on private lands[3] (NRCS 2015, p. 8).
- **"Non-kochia fuel breaks"** include proposed fuel break method alternatives to prostrate kochia greenstrip fuel breaks routes located within the 1.5 mile buffer surrounding slickspot peppergrass EOs. The up to 113 miles total of "non-kochia fuel breaks" proposed within the Project area include the 82 miles of "kochia fuel breaks" proposed on Federal and State lands (USBLM 2015, p. 9), as well as the up to 31 miles of additional "non-kochia fuel breaks" that may be implemented on private lands (NRCS 2015, p. 8).
- **"Kochia fuel breaks in 1.5 mile buffer - slickspot peppergrass zones"** include proposed prostrate kochia greenstrip fuel break routes within the 1.5 mile buffer surrounding slickspot peppergrass EOs. The up to 32 miles total of "kochia fuel breaks in 1.5 mile buffer - slickspot peppergrass zones" proposed within the Project area include 26 miles proposed on Federal and State lands (USBLM 2015, p. 9), as well as the up to an additional 9 miles that may be implemented on private lands (NRCS 2015, p. 8). The Bureau and NRCS rationales for use of prostrate kochia greenstrip fuel breaks within 1.5 miles of slickspot peppergrass EOs are provided in the Bureau and NRCS Assessments (USBLM 2015, pp. 38-44; NRCS 2015, pp. 36-41) as well as under the "Rationale for Proposed Kochia Fuel Breaks within 1.5 mile Kochia Buffer" heading of this Opinion (see pp. 21-35).

The Bureau proposed fuel break route locations within the Project area based on historical fire ignitions (Figure 3) and suppression opportunities. The Paradigm Project will primarily use prostrate kochia in greenstrip fuel breaks due to the ability of this plant to establish in harsh environments that occur in the Project area and compete with invasive annual grasses and forbs, especially *Bromus tectorum* (cheatgrass), *Halogeton glomeratus* (halogeton), *Taeniatherum caput-medusae* (medusahead) and *Sisymbrium altissimum* (tall tumblemustard) (Harrison et al. 2000, pp. 7-9, 19). Kochia greenstrip fuel breaks will be the primary fuel break method

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[2] For a definition of "element occurrence", see Appendix F of this Opinion.

[3] The amount of private landowner participation in the proposed Paradigm Fuel Breaks Project is unknown, therefore, within their Assessment, the NRCS analyzed maximum amount of area with treatments identified by the Service with the greatest conservation concern for slickspot peppergrass that could be impacted by private landowner participation (NRCS 2015, p. 8). Thus, the maximum area of private landowner participation using treatments of highest Service concern for slickspot peppergrass conservation within the proposed Paradigm Fuel Breaks Project are also considered within this Opinion.

proposed for use on Federal and State lands; kochia will also be considered as an option for use in greenstrip fuel breaks located on private lands.

Fuel break widths will vary between 100 and 300 feet, depending on environmental constraints such as adjacent vegetation, geography, soil type, and/or to mitigate resource concerns identified during resource surveys. For example, a fuel break will be narrowed or shifted to avoid important resources or rocky areas. Where rights-of-way exist within the Project area, treatments will begin at the outer edge of the right-of-way. As previously described, the Bureau will implement fuel breaks on Federal and State-managed lands. Private landowners within the Project area that develop fuel breaks on their own land can tie into the proposed Paradigm fuel break routes, or they may choose to work with the NRCS for financial assistance to develop fuel break options where proposed Paradigm fuel break routes cross private lands.

For private lands in the Project area, during the conservation planning process, NRCS develops project alternatives and analyze those alternatives to allow the private landowner to make an informed decision. NRCS Practice Standard (394) Firebreak will be used to implement site specific projects analyzed on privately managed lands. The NRCS Firebreak Standard can be found on the Idaho NRCS webpage under technical resources, Field Office Technical Guides (FOTG), Section 4, Idaho Conservation Practice Standards. The methods for implementing fuel breaks as outlined in the Methods section below will be discussed with each landowner. NRCS will analyze several fuel break implementation alternatives based on the most appropriate scenario for the site specific conditions. Due to the inability of NRCS to determine what the chosen alternative will be for the private landowner, the NRCS Assessment was based on actions that could result in the greatest adverse environmental effect. Based on concerns from the Service, the NRCS Assessment's analysis focused on prostrate kochia as the primary plant species chosen for use in greenstrip fuel breaks.

Since 1980, more than 170,000 acres have burned within the 293,891-acre Project area (action area). Roughly 80 percent of the fire starts were human-caused, the majority occurring adjacent to Interstate 84 and State Highway 20 (Figure 3). These roadside fires are dangerous for both firefighters and the public. Fires ignited along travel routes, as well as lightning-caused fires within and adjacent to the Project area, have contributed to conversion of the big sagebrush, perennial grasses, and forb communities, to invasive annual plant dominated communities.

Several ranches and small communities in the Project area are at risk from wildfire, including houses, outbuildings, and businesses on the periphery of Mountain Home. The Bureau often focuses its fire suppression efforts around these wildland urban interface areas. For instance, during the 2012 Benwalk Fire, suppression crews ignited backfires in the vegetation adjacent to restaurants and hotel parking lots at the Mountain Home Interstate 84 exit to protect the structures from advancing flames. Additionally, groups that use public lands, such as ranchers and recreationists, have been impacted by the recurrence of wildfire within and around the Project area.

Fuel breaks will create areas with reduced risks and higher levels of safety to initiate tactical suppression operations in areas with a history of a high number of ignitions. Increased levels of safety will also be achieved in fuel breaks created around areas that have not burned or where intact sagebrush communities still exist (Figure 4). Fuel breaks alone will not be expected to contain a wildfire, but will be designed to slow the progression of wildfire and provide increased safety during suppression actions. Effective fuel breaks will compartmentalize the area and

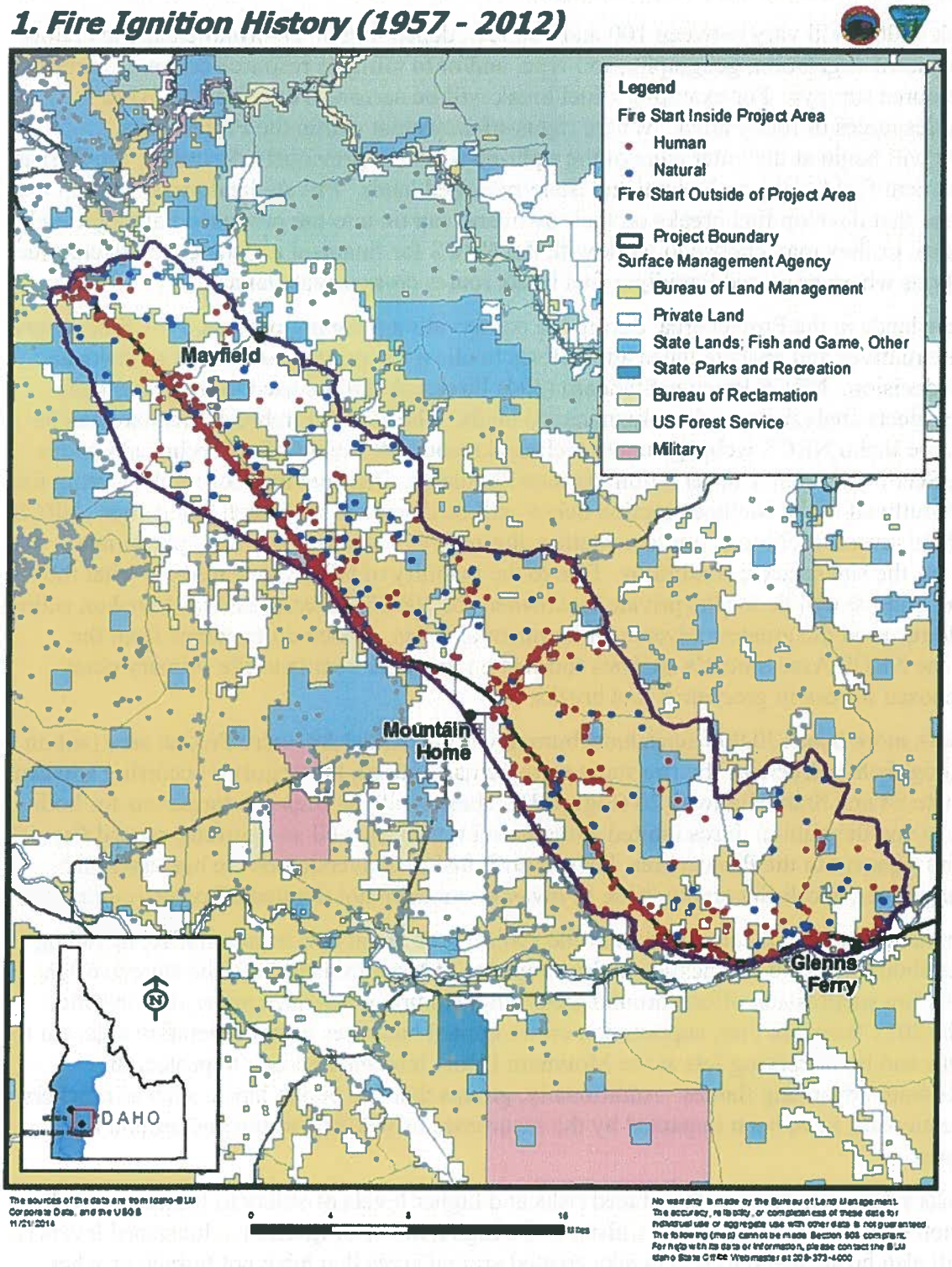

Figure 3. Historic fire ignitions in the vicinity of the proposed Paradigm Fuel Breaks Project area.

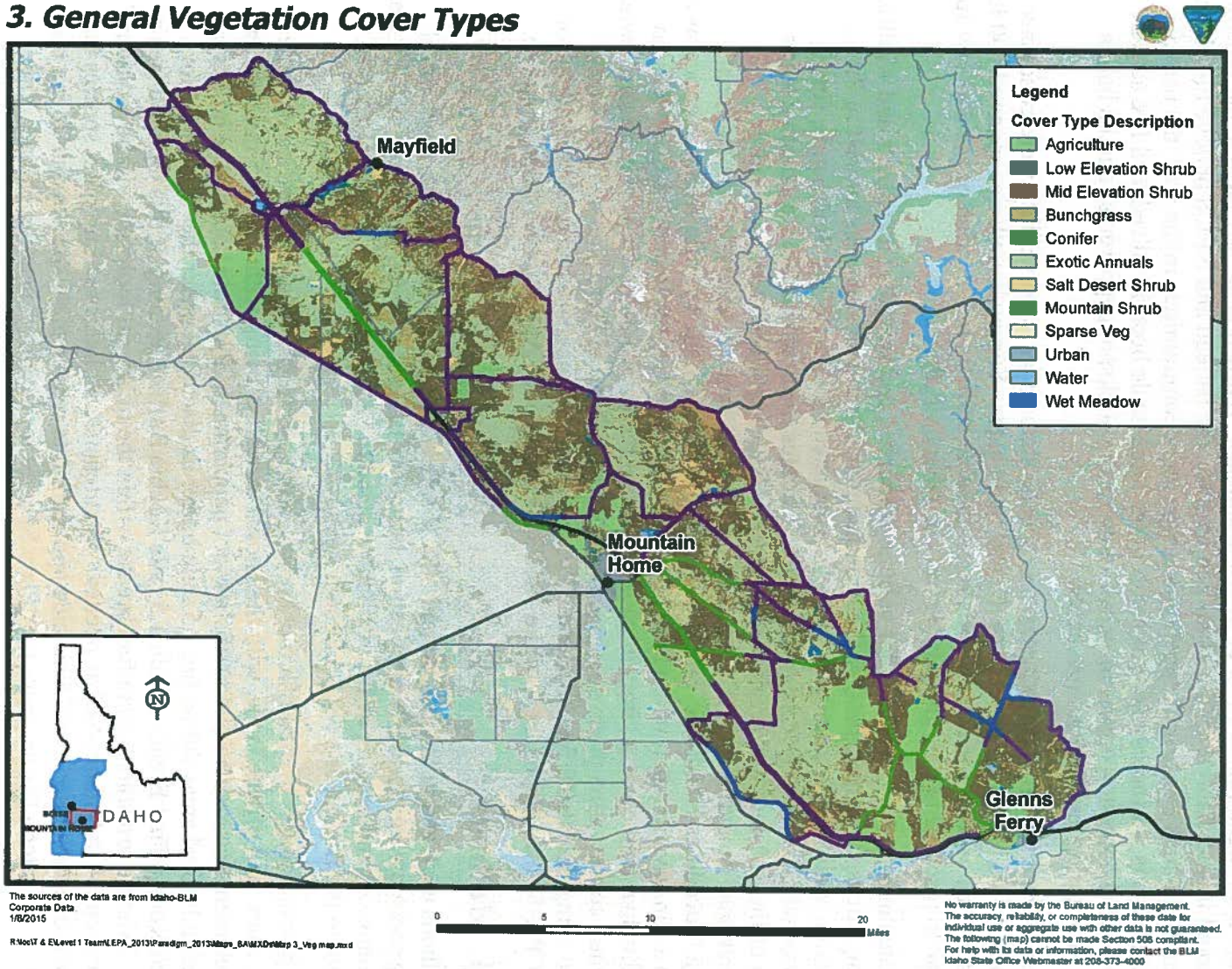

Figure 4. General vegetation cover types in the proposed Paradigm Fuel Breaks Project area.

increase opportunities for firefighters to contain wildfires across the landscape. This will reduce the risk of impacts to human life and property, and resources including greater sage-grouse, slickspot peppergrass, and the Oregon Trail. Fuel breaks will also increase the potential to preserve and protect high value native plant communities and habitat at high risk from fire.

The current fire return interval in the Project area is not conducive to rehabilitating or restoring perennial plant communities, and recent attempts at rehabilitation have not been successful, mostly due to drought, repeat fires, or invasive annuals. While it is acknowledged that prostrate kochia could impact habitat for slickspot peppergrass, the Bureau and NRCS believe that, based on current fire trends and loss of sagebrush steppe plant communities in the area, the use of prostrate kochia is warranted and will result in the large-scale benefits of reduced fire activity and increased suppression opportunity, with low risk to slickspot peppergrass and its habitat through Monitoring and Control protocols.

Resource surveys for cultural resources, and special status plants and wildlife were conducted for proposed fuel breaks on Bureau, BOR, and State lands. Survey boundaries spanned 400 feet from center line of routes to accommodate for possible shifts in the location of the 300-foot fuel break due to resource issues, geology, terrain, or other considerations.

On private lands, resource surveys for cultural resources, and special status plants and wildlife (including slickspot peppergrass) will be conducted as landowners express interest in Project participation with NRCS. Similar to surveys conducted on Federal and State lands, survey boundaries will span 400 feet from center line of routes to accommodate for possible shifts in the location of the 300-foot fuel break due to resource issues, geology, terrain, or other considerations. In addition, NRCS will comply with the procedures outlined in National Planning Procedures Handbook Title 180 Part 600 to identify site specific resource concerns and develop a conservation plan with facilitative conservation practices to address those concerns with individual land owners. Implementation of fuel breaks would occur as private land owners follow their conservation plans developed by NRCS. Effects of these plans will be further analyzed using the NRCS Environmental Evaluation (EE) procedure and documented on form NRCS-CPA-52 (see Appendix E of the NRCS Assessment or Appendix E of this Opinion).

2.1.2.1 Methods

The methods analyzed in the Bureau and NRCS Assessments included disking, mechanical thinning and mowing, herbicide application, targeted livestock grazing, prescribed fire for seed bed preparation, and seeding of fire resilient vegetation. All methods will be implemented according to the Bureau and NRCS Design Features.

The proposed action is to establish fuel breaks using prostrate kochia to the extent possible on Federal, State, and private lands, with the known exception being within the 1.5 mile buffer around element occurrences (EOs) of slickspot peppergrass. Prostrate kochia fuel breaks are proposed in limited areas within the 1.5 mile buffer as discussed under the "Rationale for Proposed Kochia Fuel Breaks within 1.5 mile Kochia Buffer" heading of this Opinion (see pp. 21-35). Existing prostrate kochia fuel breaks within the treatment footprint will be monitored for effectiveness and maintained as needed. Maintenance includes seeding plant species that meet the fuel break criteria, and herbicide application to reduce plant species that do not meet the fuel break criteria (listed under the "Plant Species for Seeding" heading below). Other

methods as described below will be used to develop non-prostrate kochia fuel breaks within the 1.5 mile buffer, Occupied Habitat, and EOs.

During the conservation planning process for private lands, NRCS develops project alternatives and analyzes those alternatives to allow the private landowner to make an informed decision. NRCS will analyze several fuel break implementation alternatives based on the most appropriate scenario for the site specific conditions. Due to the inability of NRCS to determine what the chosen alternative will be for the private landowner, the NRCS Assessment was based on the fuel break treatment that could result in the greatest adverse environmental effect on slickspot peppergrass. Based on concerns expressed by the Service, NRCS analyses were based on prostrate kochia greenstrips being the fuel break method chosen for use on private lands.

Areas not suitable for use of prostrate kochia greenstrip fuel breaks will incorporate one or more of the following methods:

- Disking/bare ground
- Mechanical thinning and mowing
- Herbicide treatment
- Targeted grazing (on a limited and site specific basis for development and maintenance of fuel breaks)
- Prescribed fire
- Seeding low-statured perennial plants other than prostrate kochia

Disking

Disking on Federal, State, and private lands will be accomplished using a rubber-tired tractor or bulldozer with a series of disks to remove vegetation, exposing bare mineral soil. Disking may be used to establish containment lines on prescribed fires in preparation for seeding, or to create and maintain bare soil fuel breaks. Bare soil fuel breaks will be up to 100 feet wide and would disturb soil approximately nine inches deep. Bare soil fuel breaks will require annual or bi-annual re-disking or herbicide application treatments to remove vegetation that becomes established from the soil seed bank. Disking for seedbed preparation will be followed by seed application (and possibly herbicide treatment, then seeding). Bare soil fuel breaks will be provided as an alternative for land owners to consider on privately managed lands.

Mechanical Thinning and Mowing

Thinning on Federal, State, and private lands will be considered in areas with larger shrubs, such as sagebrush, where there is a need to maintain the native vegetation and visual integrity, or in sensitive areas where minimal ground disturbance is desired. Shrubs will be selectively thinned using chainsaws and removed from the site, or pile burned when required conditions for burning are met, such as when soils are wet or frozen.

Mowing will be accomplished using a mower attached to a rubber-tired tractor. Vegetation will be mowed to a height of 6 to12 inches. Areas treated by thinning and mowing will likely be followed by herbicide treatments to control invasive annual grasses and forbs or noxious weeds.

Herbicides

Only herbicides on the List of Approved Herbicide Formulations and Adjuvants (USBLM 2014 IB 2014-69, entire as cited in USBLM 2015, p. 11) are proposed for use (see Appendix A). As

additional alternative herbicides are approved for use by the Bureau in the future, they may be used on Federal, State and private lands as part of the Paradigm Project following coordination and mutual agreement with the Service. Analysis of proposed herbicide treatments to control targeted species on Federal and State lands is tiered to the *Vegetation Treatments Using Herbicides on BLM lands in the 17 Western States Programmatic Environmental Impact Statement* (PEIS) (USBLM 2007, entire). The Record of Decision (ROD) for the Final PEIS identified herbicide active ingredients approved for use on Bureau lands and Standard Operating Procedures for the application of herbicides.

NRCS is not authorized to make herbicide recommendations to private landowners. However, each landowner contracted with NRCS for fuel break implementation will receive a site specific analysis of listed potential hazards. Windows Pesticide Screening Tool (WIN-PST) will be used to provide qualitative environmental hazard ratings for each herbicide and the dominant soil type in the landowner's project area. All WIN-PST information given to the landowner will follow NRCS planning criteria and recommend mitigation to reduce identified risks. The herbicides being evaluated in the Paradigm Fuel Break Environmental Assessment (DOI-BLM-ID-B010-2011-0060-EA) are listed in Appendix A of this Opinion. If the use of herbicides is needed on private lands, the landowners will be required to select one of the herbicides listed in Appendix A of this Opinion.

Herbicide treatments will be used to prepare an area for seeding by eliminating competition and biomass, for fuel break maintenance to remove plants that do not meet desirable fuel break characteristics, or to control noxious weeds.

Herbicides designed for uptake through root systems will be applied to the soil to reduce competition from other plants, prevent germination, and remove mature plants to maintain the effectiveness and integrity of established fuel breaks. Contact (foliar) herbicides applied to live plant tissue will be used to control established plants and reduce competition in preparation for seeding a fuel break. Ground based application methods will be employed rather than utilizing aircraft due to the spatial restrictions of the treatment areas.

Targeted Livestock Grazing

Targeted grazing by cattle, sheep, and/or goats will be used on Federal, State, and private lands to reduce the amount of plant biomass where other methods are not feasible, such as in steep or rocky areas. Launchbaugh and Walker (2006, p. 3) define targeted grazing as: "The application of a specific kind of livestock at a determined season, duration, and intensity to accomplish specific vegetation management goals." The term 'targeted' refers to the specific plant or landscape that is the aim of controlled grazing practices. Using livestock in this manner would require fencing to confine the animals to the treatment area. This treatment must take place during the growing season of the target plant/area, which would vary depending on temperatures and precipitation. Targeted grazing could also be used for seeding/seedbed preparation in areas dominated by medusahead via consuming and breaking down the thick mats formed by this species.

Prescribed Fire

In areas dominated by annual grasses and forbs prescribed burning will be used to remove dense mats of accumulated biomass, especially associated with medusahead, to reduce the amount of herbicide needed, and to maximize herbicide exposure to soil or foliar contact. On Federal,

State, and private lands, prescribed fire will be restricted to the treatment area using existing roads, Class A foam[4], or disking a 25-foot wide fuel break around the edge of the proposed seeding area. On Federal, State, and private lands, prescribed fire will typically be used in late fall, winter, or early spring when favorable conditions for containment and burning coincide.

Bureau implementation of prescription burning within the proposed Project area will conform to a burn plan detailing the required conditions and expectations. NRCS does not intend to use prescribed fire on private lands without the assistance and implementation from qualified fire experts. However, the private landowner has the ultimate responsibility to determine who (if anyone) will assist with the prescribed fire plan. Implementation of prescription burning on private lands will conform to a burn plan detailing the required conditions and expectations by each party as well as have the signature of the NRCS State Range Conservationist. Other entities may assist and be involved in the prescribed fire on private lands, but this is not required.

Seeding

On Federal, State, and private lands, plants used to create vegetated fuel breaks must meet the Plant Species for Seeding criteria outlined below. Establishment of fuel break-specific vegetation will require reduction or elimination of existing vegetation to decrease competition. Methods that may be used for seedbed preparation on all land ownerships within the Project area include prescribed fire, disking, targeted grazing, and/or herbicide application. Equipment selection will be dependent on soil type and seed requirements to ensure seeds are deposited at the required soil depth. Seeder implements are typically pulled behind a rubber-tire tractor or track-driven bulldozer.

On private lands, the landowner will choose who will implement the planned practices. The landowners may choose to implement the seeding themselves, hire a contractor, or work collaboratively with an adjacent land manager. Regardless of who implements the seeding, it is the landowner's responsibility to ensure the practice is installed to meet NRCS Standards and Specifications.

Minimal Soil Disturbance (0-1 inch): Seeds requiring shallow or no soil cover will be deposited with equipment such as the Brillion grass seeder, a minimum till drill seeder, or hydro-mulching. Seeder implements typically have a press wheel, imprinter, or drag chains integral to the design. If these components are not part of the equipment, a separate pass with an imprinter, rubber-tire culti-packer, or chain harrow will be made to increase seed to soil contact and germination success. Hydro-mulching combines seed and a mixture of moisture retention polymers, fertilizer, and tackifiers with water and organic material (mulch) creating a slurry that is sprayed from a nozzle under pressure onto the treatment site. Depending on the machinery, hydro-mulch can be sprayed a distance of up to 500 feet. Minimal soil disturbance seeding methods are preferred within, or in proximity to, areas of the Oregon Trail as well as in Occupied Habitat (inclusive of proposed critical habitat), Potential Habitat, and Slickspot Peppergrass Habitat[5] (USBLM and USFWS 2014, entire).

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[4] Class A foam is a biodegradable mixture of foaming and wetting agents that utilizes a surfactant to augment the effectiveness of water in suppression efforts. In light fuels, this foam can be an effective control line for prescribed fire.

[5] For definitions of the habitat categories for slickspot peppergrass, see Appendix F of this Opinion.

Moderate Soil Disturbance (1-2 inches): Seeds that require one to two inches of soil cover for germination and emergence will be deposited with equipment such as a standard rangeland drill equipped with depth-bands to limit the depth of furrows in the soil where seeds are deposited. Rangeland drills employ a disk system to open the soil and deposit seed; if a press wheel, imprinter, or drag chains are not part of the equipment, a separate pass with an imprinter or rubber-tire culti-packer will occur to improve seed to soil contact and germination success.

Substantial Soil Disturbance (2-6 inches): Where existing plant species are to be plowed under, a standard rangeland drill will be used to open a furrow into the soil and deposit seed. If a press wheel, imprinter, or drag chains are not part of the equipment, a separate pass with an imprinter or rubber-tire culti-packer could occur to improve seed to soil contact and germination success.

Plant Species for Seeding

To enhance establishment potential, cultivars specifically developed for use within the area will be selected for use on lands of all ownerships within the Paradigm Project area. St John and Ogle (2009) listed the most effective characteristics (criteria) for fuel break vegetation as:

- adapted or adaptable to the site
- competitive with annual grasses and forbs
- easy to establish
- low stature with an open canopy
- resilience and regrowth capabilities after fire and grazing
- reduce fuel accumulation and volatility
- retain moisture and remain green through the fire season

Plant species proposed for the Paradigm Project include prostrate kochia, *Poa secunda* (Sandberg bluegrass), *Elymus elymoides* (bottlebrush squirreltail), *Psathyrostachys junceus* (Russian wildrye), *Medicago sativa* (dryland alfalfa), and *Chrysothamnus viscidiflorus* (dwarf green rabbitbrush). On private lands, the methods for implementing fuel breaks as outlined in this section will be discussed with each landowner. If the landowner chooses the seeding method, several seeding options will be presented and analyzed based on site specific information. In areas where it is appropriate, pure seedings of prostrate kochia will be provided as an alternative for the landowners to consider. Justification for using prostrate kochia within 1.5 miles of EOs is described under the "Rationale for Proposed Kochia Fuel Breaks within 1.5 Mile Buffer" heading below (see pp. 21–35 of this Opinion).

Sandberg bluegrass is a relatively short-lived, short-statured, native perennial bunchgrass that perpetuates itself through prolific seed set and shatter. Sandberg bluegrass initiates growth early in the spring (Monsen et. al. 2004, p. 409), around the same time as cheatgrass. It increases in density under heavy grazing and is an early colonizing species on disturbed sites; it occupies interspatial areas in plant communities, which can deter encroachment of cheatgrass (Monsen et. al. 2004, pp. 409-410).

The growth form and phenological similarities enable Sandberg bluegrass to persist in areas dominated by cheatgrass. Sandberg bluegrass enters dormancy in May regardless of the amount of soil moisture (Laude 1953, p. 284), resulting in dry above-ground biomass during the summer months when wildland fires typically occur, and resumes growth in late fall and into winter. It provides good, albeit diminutive-statured, forage for grazing animals when it is actively growing in spring and fall, however; those periods are short-lived (Halverson 2011, p. 14). Sandberg

bluegrass is a common grass in the Project area and across southern Idaho; several cultivars appropriate for the Project area are available. Seed placement should be in the top 0.25 inch of firm soil and pressed in, it is seldom seeded in a pure stand. Sandberg bluegrass is considered a pioneer species and is often one of the first grasses to respond to surface manipulation of deteriorated rangeland. Sandberg bluegrass is a relatively short-lived grass, but often perpetuates itself through prolific seed set and shatter (Majerus et al. 2009, p. 4).

Bottlebrush squirreltail is a short-lived, mid-statured native perennial bunchgrass. It has a relatively short life span; therefore its persistence in a plant community is dependent on its ability to reseed itself. Bottlebrush squirreltail occurs naturally throughout the project area and cultivars are available that are adapted to the project area. This species germinates in fall or spring, initiates annual growth in early spring and does not enter complete dormancy in summer, remaining partially green throughout summer and into the fall. Seed should be placed 0.25 to 0.5 inches deep into firm soil.

Russian wildrye is a non-native perennial bunchgrass originating from the Russian and Mongolian steppes of central Asia (Barkworth et al. 2007, as cited in Ogle et al. 2012, p. 1). It is adapted to the Project area and has been used across southwest Idaho for many years. Russian wildrye remains green into the growing season and tends to exclude competition from other plants in established stands, developing wide spacing between the plants once established, making it a beneficial species in fuel breaks. It is palatable to all classes of livestock and wildlife, with higher protein content than most grasses (Ogle et al. 2012, p. 2). Seed should be placed 0.25 to 0.5 inches deep into firm soil (St John and Ogle 2009, p. 8). It is not considered weedy, but could spread into adjoining degraded plant communities via seed under ideal conditions. To date, the species has not raised any environmental concerns (Ogle et al. 2012, p. 2).

Alfalfa is a long-lived perennial forb that is distributed throughout the entire United States. Alfalfa is a nitrogen-fixing legume with deep roots, allowing it to withstand long periods of hot, dry weather. New growth occurs from buds located in the plant crown. It is a preferred forage for wildlife and livestock. The 'Ladak' cultivar is being proposed for the Project area; it originated from northern India in 1910, and is very winter hardy. Seed should be placed 0.25 to 0.5-inch deep into firm soil.

Dwarf green rabbitbrush is a native shrub that re-sprouts from the base (Wasser 1982, p. 227). It has been used successfully to re-vegetate depleted rangelands and other disturbed sites. It can be an important browse species for wildlife and livestock, but palatability varies significantly by subspecies. Seed can be deposited on the soil surface or drill seeded and seeding can occur in fall or spring on unprepared or prepared seed beds. Cultivars adapted to the Project area are available.

Prostrate kochia is a semi-evergreen sub-shrub originating from central Eurasia. It is well adapted to arid regions and has been effectively established across southern Idaho for almost 30 years. Several prostrate kochia fuel break projects are located around Boise and Mountain Home (Pellant 1992, pp. 63-68; Harrison et al. 2002, p. 4). Figure 5 shows existing prostrate kochia seeded fuel breaks and broadcast seeded areas within and adjacent to the Paradigm Project area. Prostrate kochia re-sprouts from the base following fire (Harrison et al. 2000, p. 7) and is competitive against invasive annual grasses and forbs (McArthur et al. 1990, pp. 63-64; Tilley et al. 2012, p. 1). Seeds would be broadcast applied to the soil surface and followed with a

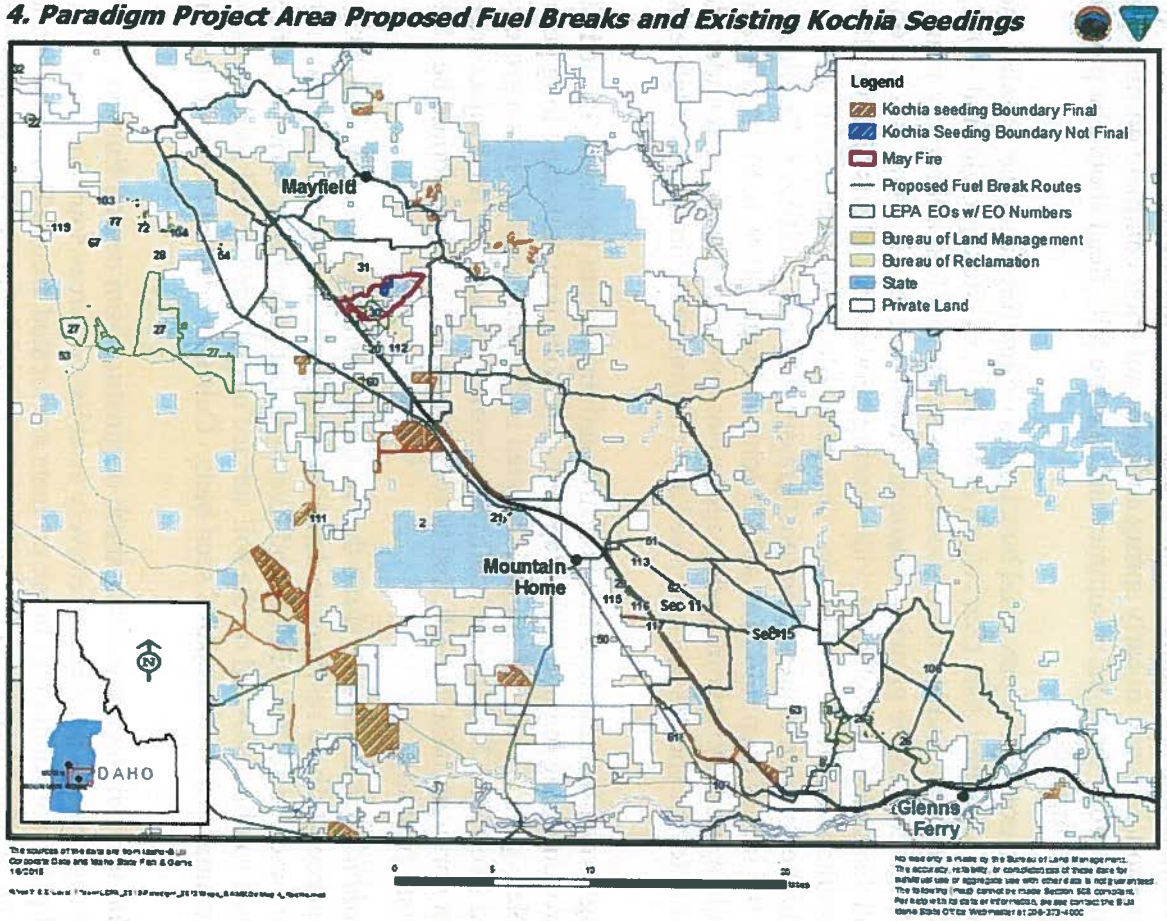

Figure 5. Existing seeded kochia fuel breaks and broadcast seedings within and adjacent to the Paradigm Fuel Break Project area.

cultipacker to improve seed to soil contact for improved germination. Prostrate kochia seeds are very sensitive to environmental gradients and lose viability within a few months of collection, therefore local collections of seed would be emphasized and encouraged to ensure successful establishment.

Prostrate kochia is competitive and once established, develops open spaces between plants. Gray and Muir (2013, p. 199) found prostrate kochia "abundance to be positively associated with biological crust cover and negatively associated with litter" and cheatgrass; these characteristics also improve fuel break effectiveness. Prostrate kochia retains foliar moisture late into summer reducing the rate of spread and intensity of wildfires (Harrison et al. 2002, pp. 4-5; Monsen and Memmott, 1999, p. 115; Monsen 1994, pp. 369-370). Monsen and Memmott (1999, p. 118) also documented fire burning two feet into prostrate kochia test strips in one of three kochia accessions, which ran out of fuel even when exposed to wind speeds of 16.3 miles per hour (mph). Wind speeds in excess of 20-25 mph were required to move fire into test plots of prostrate kochia and western yarrow.

During the Southsim fire in 2011, the prostrate kochia fuel break along the east side of Simco Road provided firefighters a safe location from which to anchor their suppression efforts due to decreased flame lengths and the lack of spotting within the fuel break (L. Neiwert, Fire Operations Specialist Battalion 10, Boise District Office, personal communication, 2014 and L. Okeson, Fuels Program Manager, personal communication, 2014, as cited in USBLM 2015, p. 15). Additionally, the only location where the Southsim fire crossed control lines was along Highway 67 (Grandview Highway) in an area with heavy sagebrush immediately adjacent to the road (L. Neiwert, Fire Operations Specialist Battalion 10, Boise District Office, personal communication, 2014, as cited in USBLM 2015, p. 15). Weather also played an important role in this fire as winds gusted up to 28 mph.

Similar fire behavior was observed during the MM86 I-84 fire of 2012. This was a human-ignited fire that started along Interstate 84 near Lockman Butte, northwest of Mountain Home, Idaho. Following ignition, the fire meandered through the prostrate kochia fuel break adjacent to Interstate 84 before eventually breaking through to the other side. Because this fire was started in October, response time was slower than during the active fire season as resources were limited. If the fire had been started during the regular fire season when fire crew response time would be expected to have been more rapid, it is likely that fire crews could have controlled the fire before it broke through the prostrate kochia fuel break (L. Okeson, personal communication, 2014, as cited in USBLM 2015, p. 15).

Prostrate kochia tolerates saline (sodic) soil conditions and has been used in mine reclamation projects because it can establish on harsh, depleted soils. Concerns have been raised of the potential for prostrate kochia to displace slickspot peppergrass resulting in limited use in areas known as being inhabited by slickspot peppergrass (USBLM and USFWS 2014, Appendix A, pp. 18-19, 22).

The Bureau and NRCS Assessments list the benefits of prostrate kochia use in greenstrip fuel breaks to include:

- a source of high protein forage used by wildlife and domestic animals
- minimal maintenance required once established to eliminate annual grasses and forbs
- controlled by standard herbicides[6]

The Bureau and NRCS Assessments list the potential disadvantages of prostrate kochia use in greenstrip fuel breaks to include:

- potential to spread from original planting
- can be a challenge to establish
- known to establish in slickspots and playas within prostrate kochia seedings and likely competes with slickspot peppergrass plants[7]

The Bureau and NRCS Assessments (USBLM 2015, p. 15; NRCS 2015, p. 8) cite NatureServe 2014, which reports that although prostrate kochia "does possess the ability to persist in areas, it does not appear to be spreading aggressively," and ranked ecological impact as low/insignificant (USBLM 2015, p. 15). Although not described in the Assessments, the NatureServe Species Report for prostrate kochia also states that "Forage kochia has been planted in many states in the Intermountain West, and has spread outside these planted areas." The report further states that "forage kochia probably does impact the *Lepidium* but not very often", and that "*Kochia prostrata* does occur in native ecological communities and in areas where the rare Slickspot Peppergrass, *Lepidium papilliferum* occurs (USFWS 2004) but it does appear that it usually occurs in common ecological communities and may only occasionally affect the slickspot peppergrass." However, the 2014 NatureServe Species Report for forage kochia does not appear to have been updated since it was originally created in 2005; therefore, the forage kochia Species Report does not consider more recent information available that documents forage kochia presence in the vicinity of slickspot peppergrass and its habitat (for example, Gray and Muir 2013, entire or recent Idaho Department of Fish and Game slickspot peppergrass monitoring reports that document kochia increase within and adjacent to some monitoring transects). With review of more recent information on prostrate kochia within the range of slickspot peppergrass, the content of the NatureServe Species Report for forage kochia with regards to slickspot peppergrass could be modified from the current version.

Table 1 displays the mileage and acreage of proposed prostrate kochia fuel breaks that cross habitat categories for slickspot peppergrass within the Paradigm Project area by land ownership. A combined total of up to 163 miles and 5,662 acres of kochia fuel breaks are proposed on Federal, State, and private lands within the proposed Project area. In addition, the Project

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[6] Although requested from the Bureau, to date, the Service has not been provided with information documenting the effectiveness of standard herbicides for the control of prostrate kochia. The ability to control prostrate kochia through use of 2,4-D herbicide is based on a 1999 personal communication cited in Harrison et al. 2000 (p. 7); the scope and rigorousness of the data set used as the basis for this personal communication is unknown. It is the Service's expectation that monitoring and subsequent control efforts associated with the Paradigm Project as well as other unrelated kochia control efforts in the vicinity of the Project will provide more conclusive information on effectiveness of various herbicides for the control of prostrate kochia.

[7] For additional information on kochia establishment and movement, see the Effects section of this Opinion.

includes up to 36 miles (1,349 acres) of prostrate kochia fuel breaks within the "kochia fuel breaks within 1.5 mile – slickspot peppergrass zone" on Federal, State, and private lands.

Table 1. Proposed prostrate kochia seeding and/or maintenance located within slickspot peppergrass habitat types and within the "kochia fuel breaks within 1.5 mile – slickspot peppergrass zone" on Federal, State, and private lands.

Habitat Type	Prostrate Kochia Fuel Breaks			
	Federal and State Lands		Private Lands	
	Miles	Acres	Miles	Acres
Occupied Habitat*	3	118	13	188
Slickspot Peppergrass Habitat	147	5,356	0	0
Proposed Critical Habitat	0	0	0	0
TOTALS	**150**	**5,474**	**13**	**188**
Kochia Fuel Breaks within 1.5 Mile Buffer - Slickspot Peppergrass Zone	26	977	10	372

* Occupied Habitat is a subset of the 1.5 mile buffer zone surrounding EOs.

Prostrate kochia could be planted on up to 5,356 acres of Slickspot Peppergrass Habitat on Federal and State lands. If prostrate kochia is planted within Slickspot Peppergrass Habitat, slickspot microsites within this habitat type could be lost for future reintroduction of slickspot peppergrass. It is unknown at this time if slickspots can be planted or seeded with slickspot peppergrass to allow re-introduction of this plant. If this becomes a possibility in the future, it may be possible to control prostrate kochia within the area using herbicides to make these slickspot microsites available for slickspot peppergrass reintroduction.

2.1.2.2 Rationales for Proposed Kochia Fuel Breaks Located within 1.5 Miles of EOs

In 2011, the Bureau's Boise District Fire and Fuels staff evaluated transportation routes in the Project area to determine suitability for development of fuel breaks for use during fire suppression. The routes chosen for fuel break establishment were chosen based on existing route presence, historic fire ignitions, and suppression opportunities. Using existing routes is preferred to building new routes due to less habitat fragmentation, less sagebrush habitat damage and loss, and ease of access for firefighting on existing roads. In 2014, the Bureau added 26 miles of prostrate kochia greenstrip fuel breaks on Federal and State lands and up to 9 miles of prostrate kochia fuel breaks proposed for use on private lands located within 1.5 miles of eight individual EOs to their original Project proposal.

The following rationale was provided by the Bureau and NRCS to be applied to all Paradigm Project kochia fuel breaks proposed within 1.5 miles of EOs:

The Bureau and NRCS Assessments state that, within the Bureau's Boise District Office, prostrate kochia fuel breaks are recognized as the best tool for achieving the desired results of: 1) enhanced safety for firefighters and the public, 2) additional and improved anchor points for fire suppression tactics, 3) decreased fire size, 4) reduced ignitions, 5) protection of big sagebrush communities, and 6) protection of future habitat rehabilitation and restoration treatments (Lance Okeson, personal communication 2014, as cited in USBLM 2015, pp. 39; NRCS 2015, pp. 37). The Bureau and NRCS Assessments concluded that other fuel break methods and/or greenstrip fuel break species will not be as effective as prostrate kochia at outcompeting invasive annual plants and providing an effective, low maintenance fuel break. Specific rationales for location of proposed prostrate kochia greenstrip fuel breaks within 1.5 miles of EO boundaries specific to each of the eight individual EOs are provided below.

EO-specific Bureau and NRCS rationales for location of proposed prostrate kochia greenstrip fuel breaks within 1.5 miles of EO boundaries specific to each of the eight individual EOs are provided below.

EO 10 - In 1998 and again in 2005, EO 10 was given a ranking of D due to small slickspot peppergrass population size, very poor habitat condition, and a surrounding landscape of invasive annual weeds surrounded by agriculture land. No slickspot peppergrass plants have been observed in any of the HIP or HII transects located in EO 10 since monitoring began in 1998. Roughly 50 individuals were observed in 2005, possibly northwest of the HIP transect although the exact location was not recorded. During Bureau surveys of slickspot peppergrass habitat types in the area surrounding EO 10 in 2008, no slickspot peppergrass plants were found. In 2012, EO 10 burned in the Rio Fire. During a project clearance in October 2014[8], three first-year biennial plants were observed northeast of the HIP transect. These biennials were not found in a slickspot but were located on hummocky ground near what was historically a slickspot. The area to the northwest where 50 plants were observed in 2005 was also surveyed, but no slickspots or plants were found in this area. Most slickspots in EO 10 and in the vicinity of EO 10 have been severely damaged by livestock grazing. Element Occurrence 10 is located outside of any LEPA Management Area and is not associated with proposed critical habitat.

A 300-500 foot-wide prostrate kochia fuel break was developed about 1.3 miles (6,780 feet, at the closest point) north of EO 10 (Figures 6 and 7) in 1986. This existing fuel break would be maintained as described in the Methods section above. If fuel breaks are fully implemented at 300 feet wide, the fuel break would be extended, to within 1.1 miles (5,642 feet, at the closest point) east of EO 10 on Federal lands. If fuel breaks are fully implemented at 300 feet wide, there would be 1.76 miles (62 acres) of new prostrate kochia planted within the 1.5 mile buffer and 1.65 miles (60 acres) of existing prostrate kochia fuel break that would be maintained within the 1.5 mile buffer of this EO on Bureau-managed land (Figure 6). Similarly, if fuel breaks are fully implemented on private land at 300 feet wide, there would be 1.1 miles (42 acres) of new

[8] As 2008 and 2014 yielded high numbers of slickspot peppergrass plants rangewide over the 10 years of HIP monitoring data available to date, the Service recognizes the high likelihood that Bureau 2008 and 2014 surveys accurately reflected the lack of above-ground plants present in those years at EO 10.

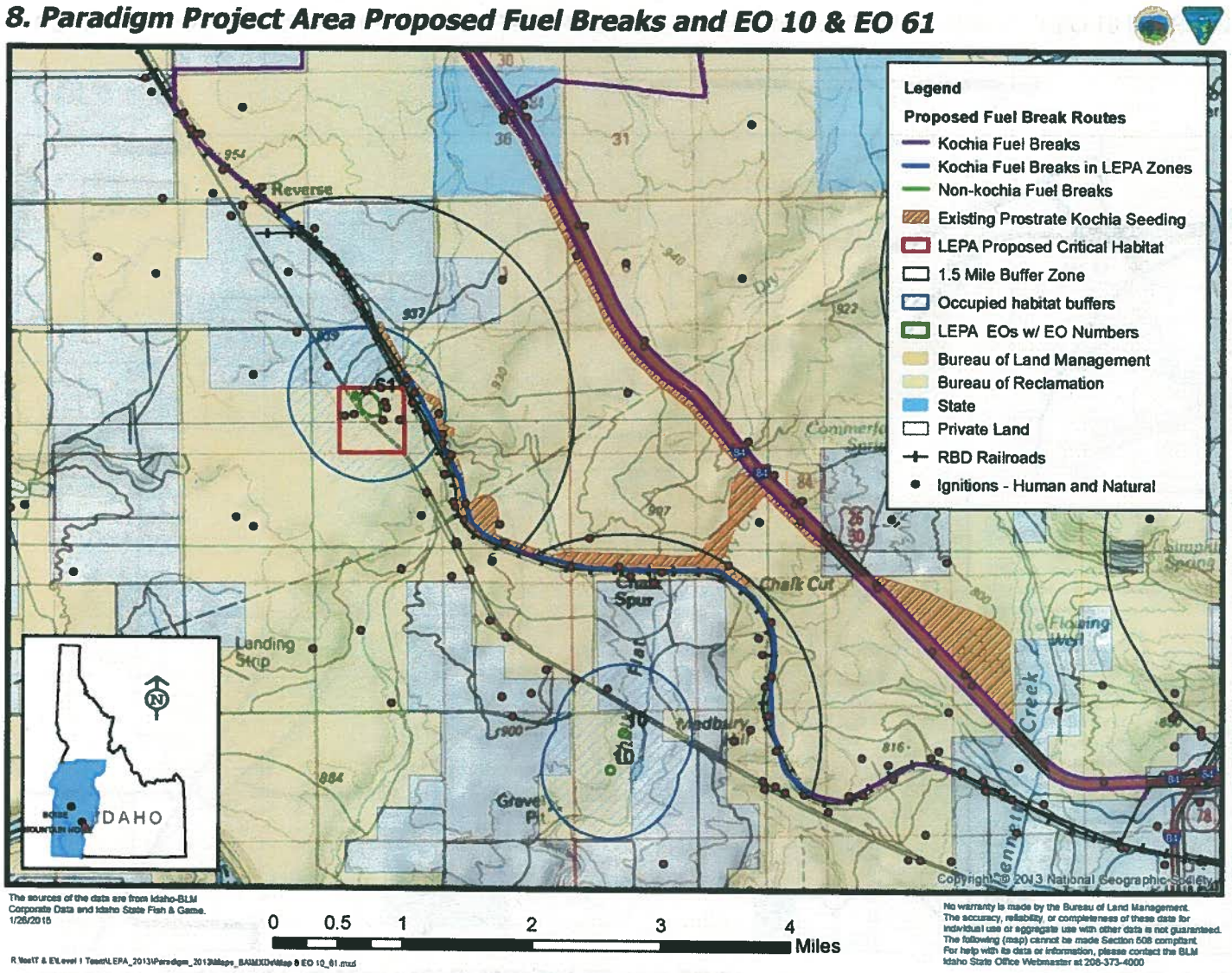

Figure 6. Existing and proposed prostrate kochia greenstrip fuel breaks on Federal and State lands in the vicinity of EO 10 and EO 61.

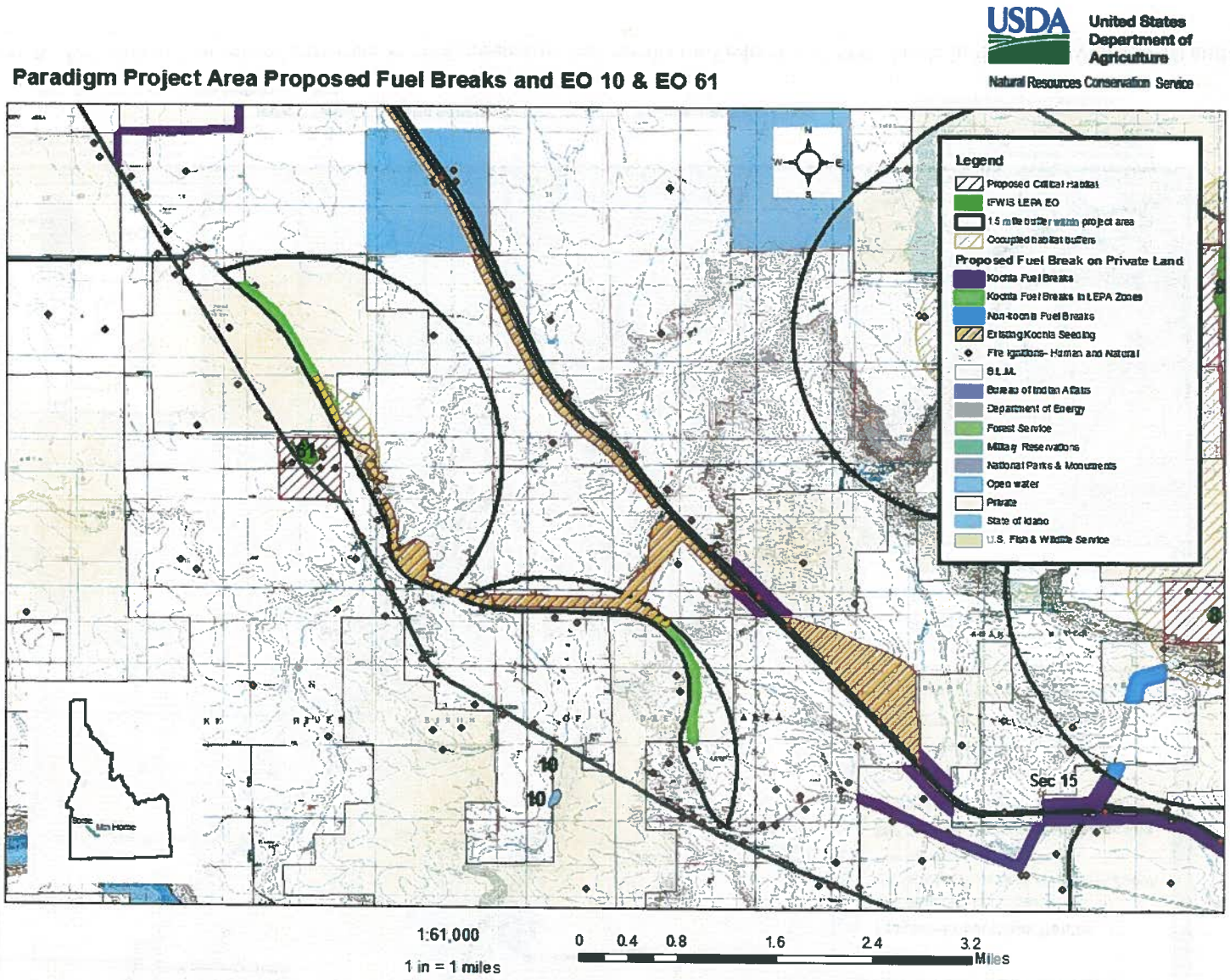

Figure 7. Existing and proposed prostrate kochia greenstrip fuel breaks on private lands in the vicinity of EO 10 and EO 61.

prostrate kochia planted within the 1.5 mile buffer of EO 10. If fuel breaks are fully implemented at 300 feet wide, the fuel break on private land would be within 1.1 miles (5,983 feet), at the closest point, northeast of EO 10 (Figure 7).

No prostrate kochia has been observed in any HIP transects, surveys, or clearances for EO 10 to date. Both the existing and the proposed fuel breaks are physically and geographically separated from EO 10. Old Highway 30 and the railroad tracks separate the fuel breaks from the EO and the fuel breaks are approximately 2,000 feet lower in elevation than the EO. Due to these natural and manmade barriers, and the Bureau and NRCS Monitoring and Control protocols for prostrate kochia seedings, the Bureau and NRCS Assessments state that it is extremely unlikely that prostrate kochia could move from the fuel break treatment and negatively affect this already degraded EO and surrounding habitat.

Ninety-nine ignitions within a 3-mile radius and 31 ignitions within a 1.5 mile radius of EO 10 have been documented since 1957. The majority of these ignitions were concentrated along Old Highway 30 and the railroad tracks (Figures 6 and 7). Given the high number of past ignitions surrounding EO 10, the Bureau and NRCS Assessments state that a robust fuel break that has been proven to be effective is needed in this area (USBLM 2015, p. 39; NRCS 2015, p. 37). The Bureau and NRCS Assessments concluded that other fuel break methods and/or greenstrip fuel break species will not be as effective as prostrate kochia at outcompeting invasive annual plants and providing an effective, low maintenance fuel break.

EO 21 - In 2005, EO 21 was given a ranking of C. Annual HIP transect monitoring within EO 21 since July of 2004 have failed to document any slickspot peppergrass plant observations; however, until recent years, HIP monitoring does not record the presence of slickspot peppergrass plants located outside of the monitoring transects. The original ranking of EO 21 has not been re-evaluated since 2005. No slickspot peppergrass plants were observed during 2012 Bureau surveys of slickspot peppergrass habitat types in the area[9]. A portion of EO 21 burned in 1957. This EO is located within proposed critical habitat.

A 300 foot wide prostrate kochia fuel break was developed in 1986 about 0.96 miles (5,044 feet, at the closest point) north of EO 21 on the north side of Interstate 84. This fuel break was expanded in 1992 to 600 feet wide (Figures 8 and 9). This existing fuel break would be maintained as described in the Methods section. If fuel breaks are fully implemented at 300 feet wide, there would be 0.68 miles (25 acres) of existing prostrate kochia fuel breaks that would be maintained within the 1.5 mile buffer of EO 21 on Bureau-managed land (Figure 8). Furthermore, if prostrate kochia fuel breaks are fully implemented on private land at 300 feet wide, there would be 3.7 miles (137.6 acres) of new prostrate kochia planted within the 1.5 mile buffer for EO 21. If fuel breaks are fully implemented at 300 feet wide, the fuel break on private land would be located 0.5 miles (2,968 feet, at the closest point) north of EO 21 (Figure 9).

[9] The Service recognizes that, as HIP monitoring in 2012 yielded relatively low numbers of slickspot peppergrass plants rangewide, above ground expression of slickspot peppergrass may not have occurred or been so low that plants were not detected within or near EO 21 during 2012 Bureau surveys.

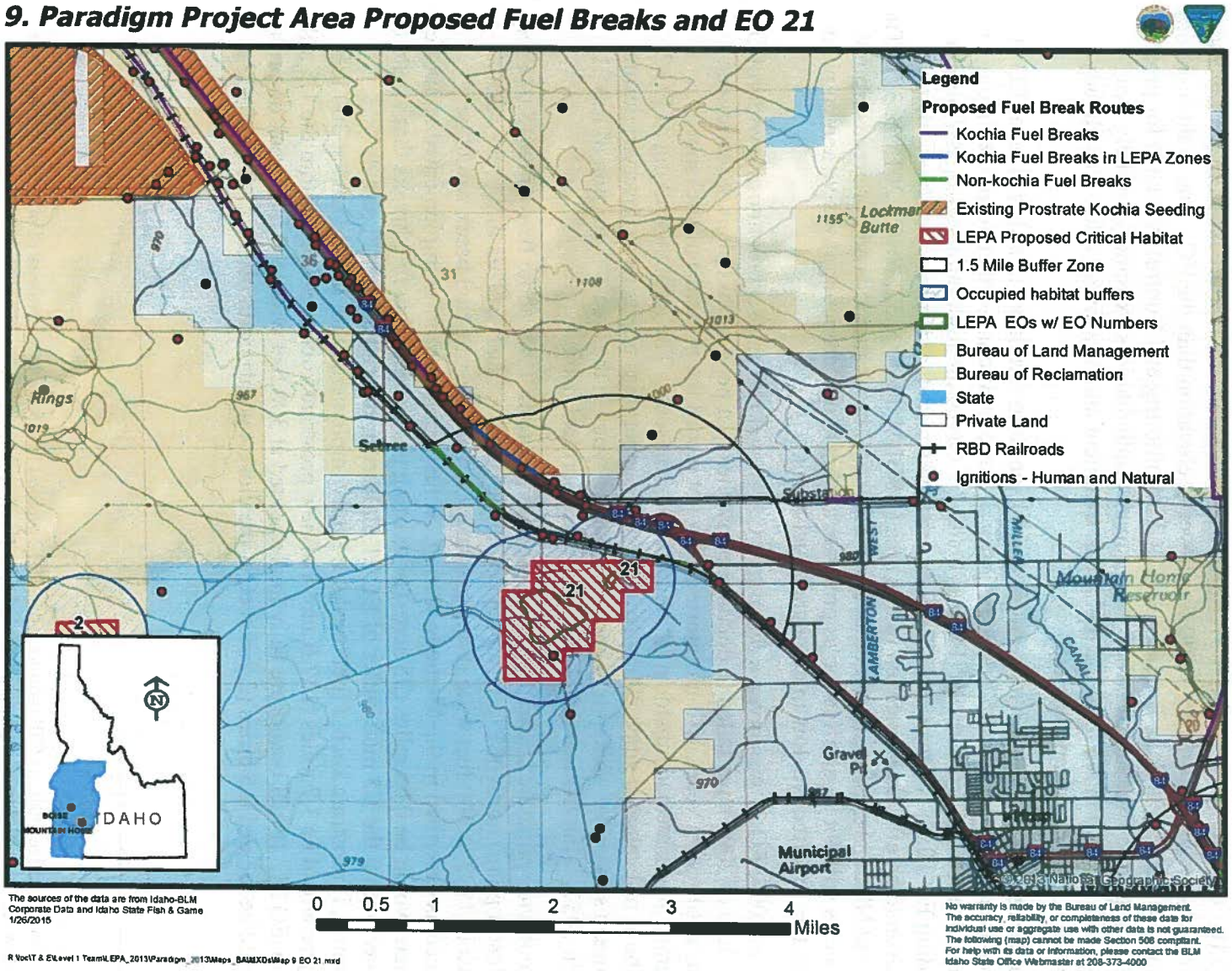

Figure 8. Existing and proposed prostrate kochia greenstrip fuel breaks on Federal and State lands in the vicinity of EO 21.

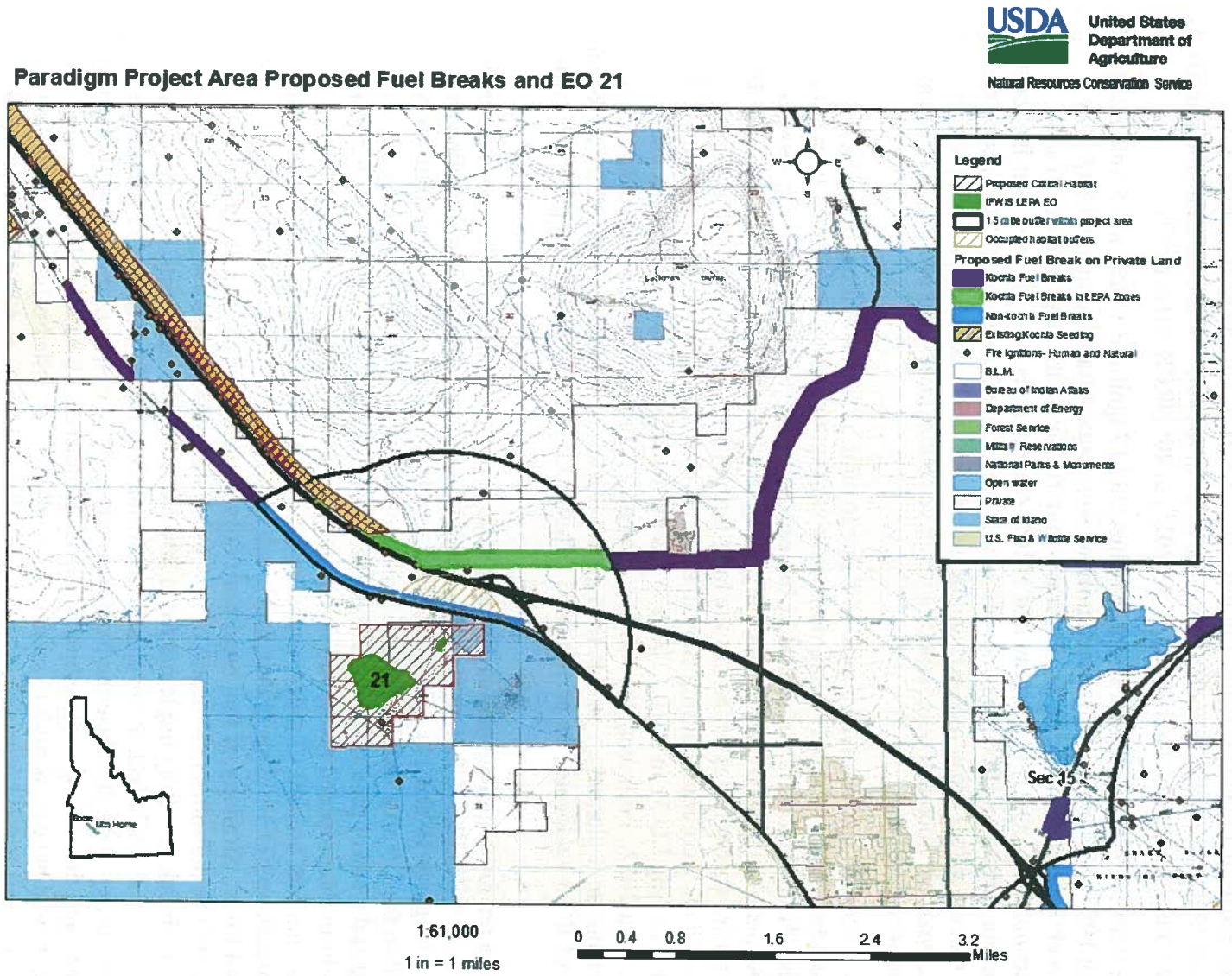

Figure 9. Existing and proposed prostrate kochia greenstrip fuel breaks on private lands in the vicinity of EO 21.

No prostrate kochia has been detected in EO 21 along HIP transect 021 during the 11 years of HIP monitoring, and no plants were observed during 2012 Bureau surveys of slickspot peppergrass habitat types in the vicinity. Interstate 84 is located between the proposed kochia fuel break and EO 21, providing an effective buffer, in addition to the approximately one mile physical separation, to deter prostrate kochia plants from establishing within EO 21. Due to these natural and manmade barriers, and the Bureau and NRCS Monitoring and Control protocols for prostrate kochia seedings, the Bureau and NRCS Assessments state that it is extremely unlikely that prostrate kochia could move from the fuel break treatment and negatively affect EO 21 and surrounding habitat (USBLM 2015, p. 40; NRCS 2015, p. 37).

There have been 56 ignitions within a 3-mile radius, and 17 ignitions within a 1.5 mile radius of EO 21 since 1957. The majority of these ignitions were concentrated along Old Highway 30/Ditto Creek Road and Interstate 84 (Figures 8 and 9). Given the high number of past ignitions surrounding EO 21, the Bureau and NRCS Assessments state that a robust fuel break that has been proven to be effective is needed in this area. The Bureau and NRCS Assessments concluded that other fuel break methods and/or greenstrip fuel break species would not be as effective as prostrate kochia at outcompeting invasive annual plants and providing an effective, low maintenance fuel break.

EO 31 - In 2005, EO 31 was given a rank of C due to poor to fair habitat quality, poor to fair landscape quality, and a relatively small number of slickspot peppergrass plants. Population counts at the HIP transect 031 within EO 31 has ranged from 0 to 458 plants, with less than 5 slickspot peppergrass plants observed annually along this HIP transect between 2011 and 2014. In 1998, wildfire was noted as a threat to the long-term viability of this EO. No slickspot peppergrass plants were found during Bureau surveys of slickspot peppergrass habitat types in the area surrounding EO 31 in 2010. This EO has burned three times in the last 58 years; in 1957, 1982, and 2012. Following the May Fire in early August of 2014, prostrate kochia was part of a seeding mix planted on private land approximately 1 mile southeast of EO 31. Roughly 40 percent of EO 31 is located on private land. This EO is also located within proposed critical habitat.

If fuel breaks are fully implemented at 300 feet wide, a prostrate kochia fuel break segment will be located 1.33 miles (7,046 feet, at the closest point) northwest of and across Baseline Road from EO 31 (Figures 10 and 11). There will be 0.4 miles (19 acres) of new prostrate kochia planted within the 1.5 mile buffer of EO 31 on State-managed land. By employing all Monitoring and Control protocols, and due to the physical separation of EO 31 for a distance of 1.33 miles from the proposed prostrate kochia fuel break (Figure 10), the implementation of a prostrate kochia fuel break 0.17 miles inside the 1.5 mile buffer, will minimize the likelihood of adverse impacts on EO 31. This kochia fuel break could protect EO 31 from the negative effects of future wildfires. Similarly, if fuel breaks are fully implemented on private land at 300 feet wide, there will be 3.3 miles (127 acres) of new prostrate kochia planted within the 1.5 mile buffer. If fuel breaks are fully implemented at 300 feet wide, the fuel break on private land would be 1.1 miles (5,975 feet, at the closest point) north of EO 31 (Figure 11). The Bureau and NRCS Assessments state that Baseline Road presents the best option in this area for fuel break development, and there are no other suitable routes in the area. If Baseline Road were not used, a new route would have to be built to maneuver around the 1.5 mile buffer, adding to the habitat fragmentation in an already fragmented landscape (USBLM 2015, p. 40; NRCS 2015, p. 38).

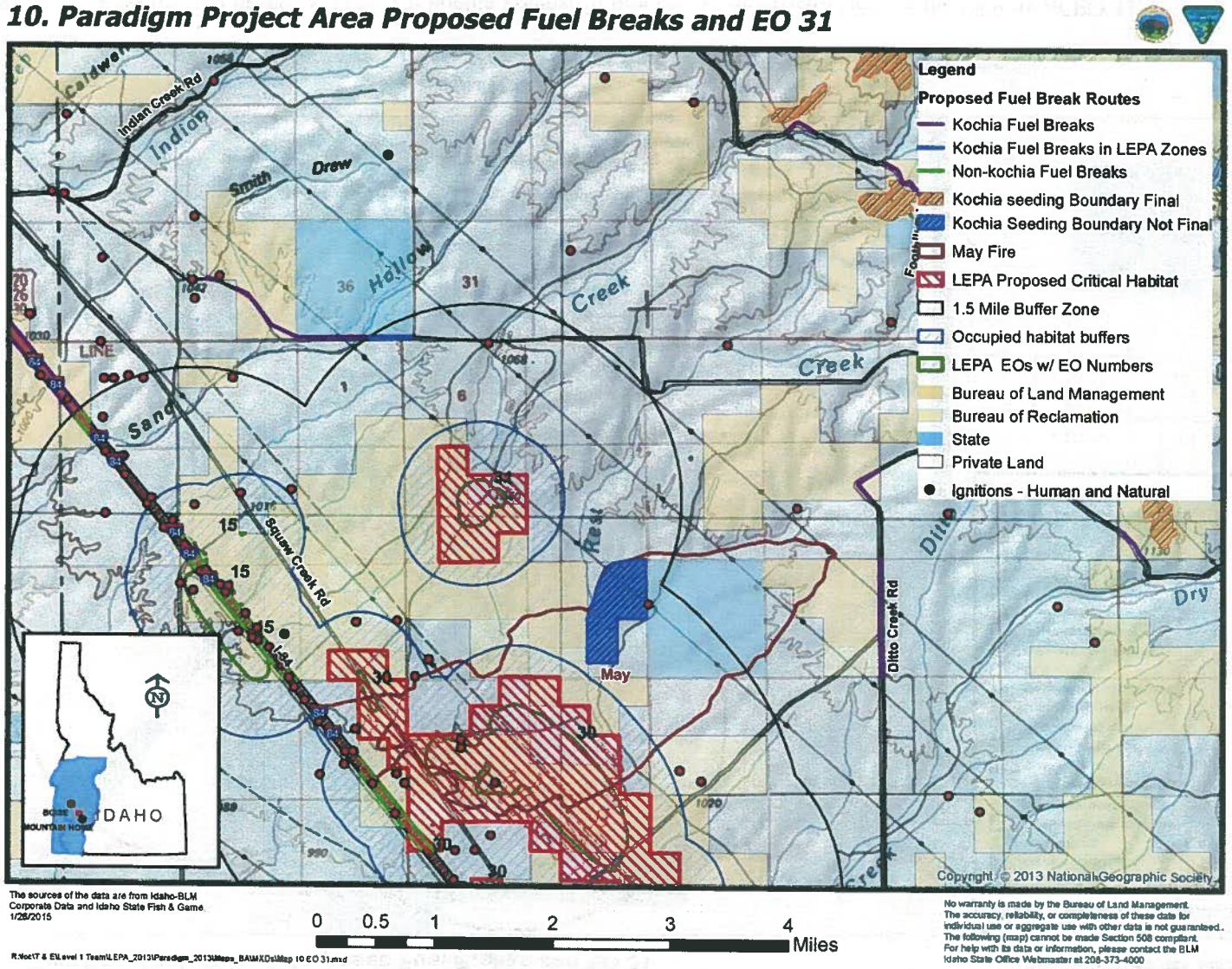

Figure 10. Existing and proposed prostrate kochia greenstrip fuel breaks on Federal and State lands in the vicinity of EO 31.

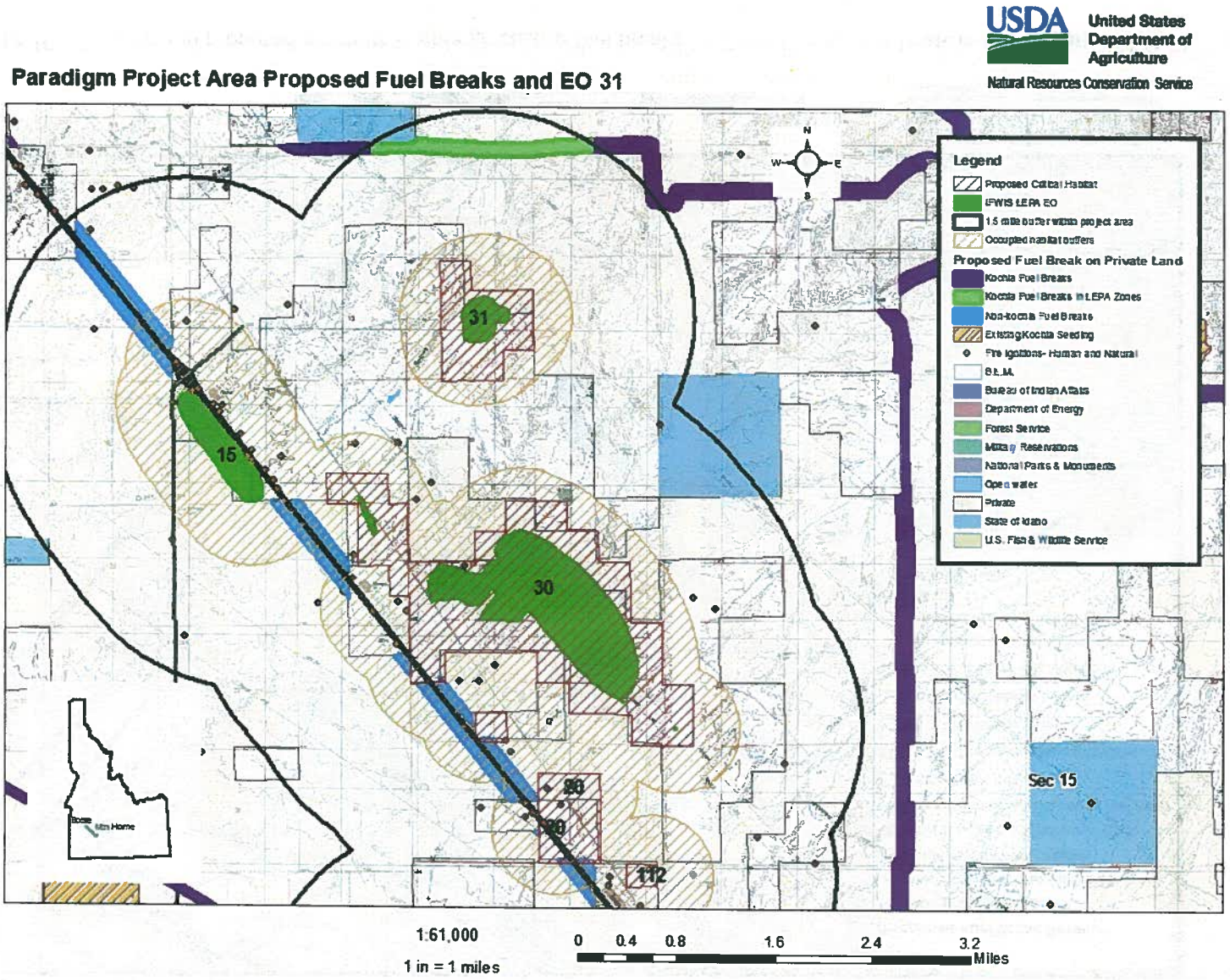

Figure 11. Existing and proposed prostrate kochia greenstrip fuel breaks on private lands in the vicinity of EO 31.

EO 60 - In 1994 and again in 2005, EO 60 was given a rank of D due to poor estimated viability and poor population vigor. When first observed in 1994, EO 60 contained 64 plants. Since that time, one slickspot peppergrass plant was observed on HIP monitoring transect 060 in 2005, with another single plant observed in 2006; none have been observed on HIP transect 060 since 2006. In addition, no slickspot peppergrass plants were observed during 2012[10] Bureau surveys of slickspot peppergrass habitat types in the area. The western half of EO 60 is located on Bureau land, with the eastern half located on private land. The public portion of EO 60 is bounded on three sides by private lands in a patchwork of land ownership. The site was heavily grazed and slickspots were trampled in 1998. In 2004, slickspots within the HIP transect sustained extremely severe penetrating livestock trampling. In the fall of 2009, the Bureau-administered portion of EO 60 was fenced to exclude grazing. EO 60 is located in a high risk area for wildfires and has burned four times in the past 58 years (in 1957, 1982, 1984, and 2004). Two slickspots on the EO 60 HIP transect were destroyed in 2012 by agricultural plowing on private land (Kinter et al. 2013, p. 9). The Bureau and NRCS Assessments also states that aerial imagery documents that the eastern portion of EO 60 located on private land has been converted to agriculture (USBLM 2015, p. 41; NRCS 2015, p. 38).

If fuel breaks are fully implemented at 300 feet wide, a prostrate kochia fuel break segment will be located 0.14 miles (769 feet, at the closet point) southeast of EO 60 along the railroad tracks within Occupied Habitat (Figures 12 and 13). There will be 0.57 miles (21 acres) of new prostrate kochia planted within Occupied Habitat, and an additional 0.17 miles (14 acres) planted within the 1.5 mile buffer surrounding EO 60 on Bureau-managed land (Figure 12). Furthermore, if fuel breaks are fully implemented on private land at 300 feet wide, there will be an additional 2.4 miles (88 acres) of new prostrate kochia planted within the 1.5 mile buffer. If fuel breaks are fully implemented at 300 feet wide, the fuel break on private land would be within 0.25 miles (1,339 feet, at the closest point) south of EO 60 (Figure 13). The Bureau and NRCS Assessments state that EO 60 is in poor condition, is possibly extirpated, is not located within a LEPA Management Area, is not located in proposed critical habitat and is surrounded by private land (USBLM 2015, p. 41; NRCS 2015, p. 39).

There have been 91 ignitions within a 3-mile radius, and 25 ignitions within a 1.5 mile radius of EO 60 since 1957. The majority of these 91 ignitions were concentrated along the railroad tracks and Interstate 84 (Figures 12 and 13). Given the high number of past ignitions surrounding EO 60, the Bureau and NRCS Assessments state that a robust fuel break that has been proven to be effective is needed in this area (USBLM 2015, p. 41; NRCS 2015, p. 39). The Bureau and NRCS Assessments concluded that other fuel break methods and/or species would not be as effective at outcompeting invasive annual plants and providing an effective, low maintenance fuel break.

[10] The Service recognizes that, as HIP monitoring in 2012 yielded relatively low numbers of slickspot peppergrass plants rangewide, above ground expression of slickspot peppergrass may not have occurred or been so low that plants were not detected within or near EO 60 during 2012 Bureau surveys.

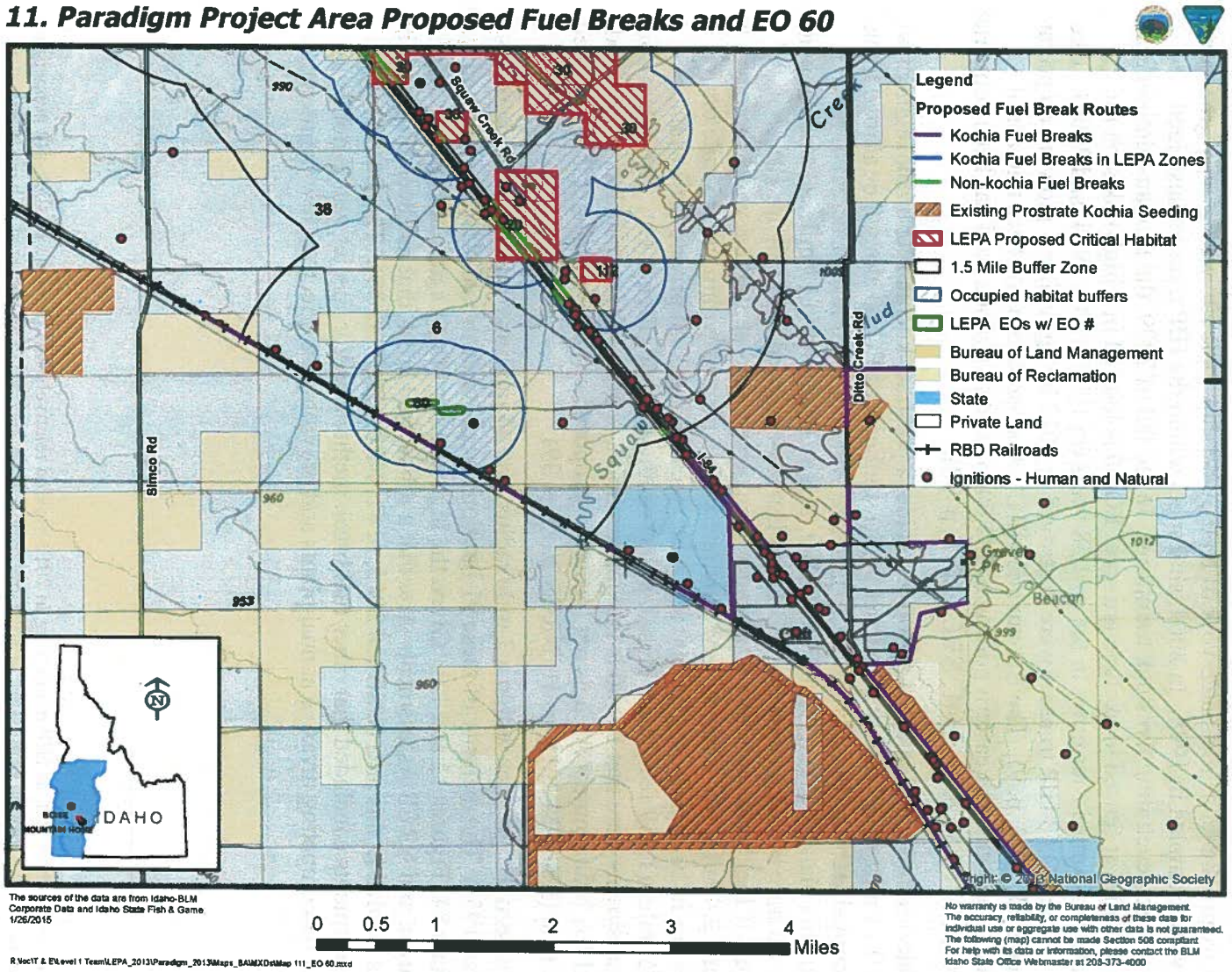

Figure 12. Existing and proposed prostrate kochia greenstrip fuel breaks on Federal and State lands in the vicinity of EO 60.

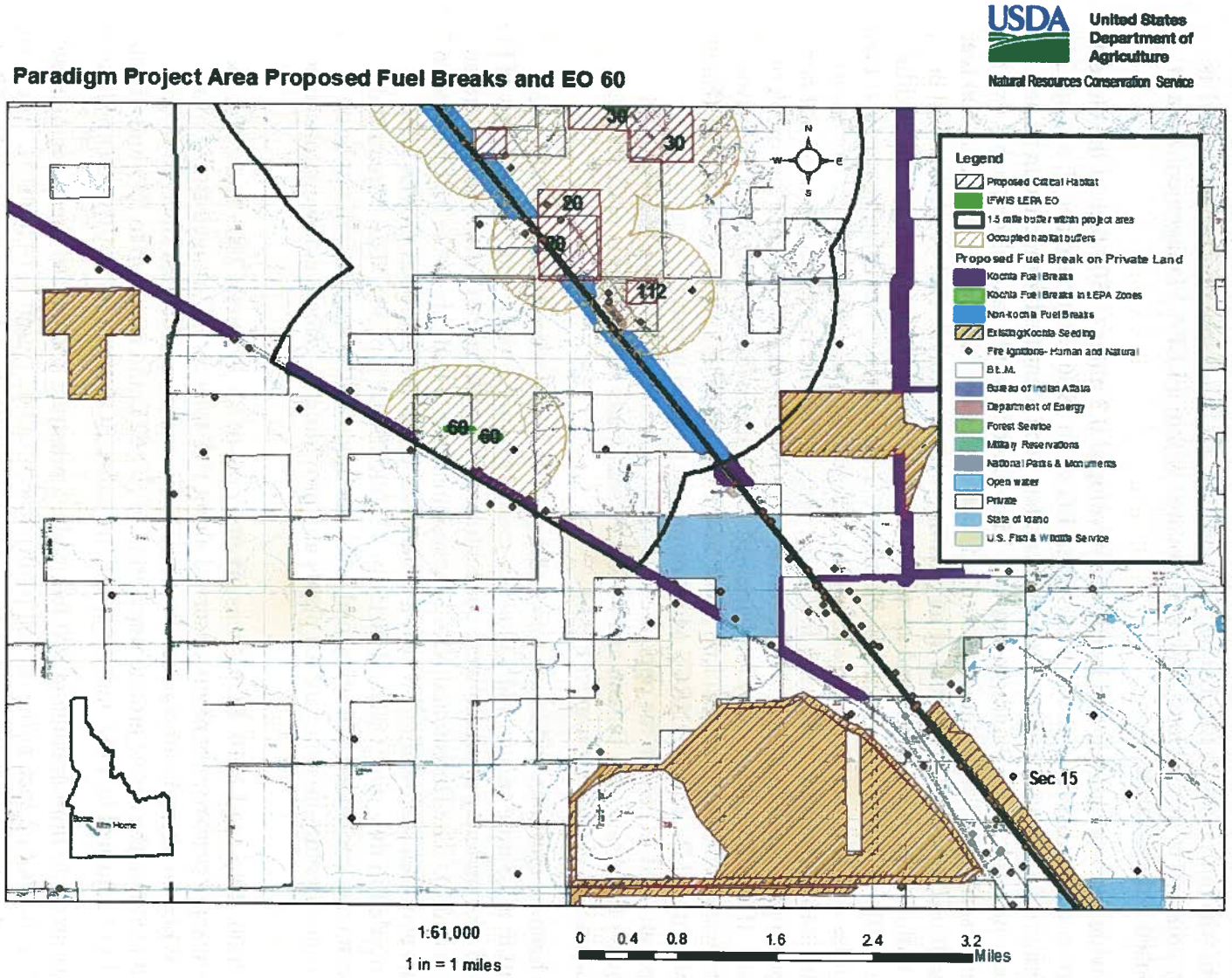

Figure 13. Existing and proposed prostrate kochia greenstrip fuel breaks on private lands in the vicinity of EO 60.

EO 61 - In 2005, EO 61 was given a rank of C. Population counts on the HIP transect 061 within EO 61 have ranged from 72 individuals observed in 2007 to 850 individuals observed in 2014. In 2005 one prostrate kochia plant was found near the HIP transect for EO 61. No prostrate kochia was seen again until 2013, when one prostrate kochia plant was observed on Old Highway 30 to the southwest. In 2014, multiple prostrate kochia plants were observed again near HIP transect 061. There have been 13 fires since 1957 within the Occupied Habitat of EO 61 though the EO itself has only burned once (in 1957). A 30 foot-wide dozer line from the 1957 wildfire was built through this EO between HIP transect slickspot microsites. EO 61 is immediately adjacent to private land, and is not located within a LEPA Management Area or within proposed critical habitat.

A 300 foot-wide prostrate kochia fuel break was developed 0.3 miles (1,508 feet, at the closest point) northeast and across the railroad tracks from EO 61 in 1986 (Figures 6 and 7; see pp. 24-25 of this Opinion). This existing kochia fuel break has been identified for inclusion as part of the fuel breaks network of the Paradigm Project. Maintenance would take place on this existing fuel break as described in the Methods section. If fuel breaks are fully implemented at 300 feet wide there will be 0.65 miles (22 acres) of an existing prostrate kochia fuel break that will be maintained within Occupied Habitat and an additional 1.27 miles (49 acres) maintained within the 1.5 mile buffer of EO 61 for a total of 1.92 miles (71 acres total) of existing kochia fuel break within 1.5 miles of EO 61 on Bureau-managed land (Figure 6). In addition, if fuel breaks are fully implemented on private land at 300 feet wide, there would be 1.3 miles (46 acres) of new prostrate kochia planted within the 1.5 mile buffer to tie into the existing kochia fuel break on Federal lands. If fuel breaks are fully implemented at 300 feet wide, the fuel break on private land will be located within 0.3 miles (1,637 feet, at the closest point) northeast of EO 61 (Figure 7). By employing all Bureau and NRCS Monitoring and Control measures, and due to the physical separation of EO 61 on the opposite side of the railroad tracks from the proposed prostrate kochia fuel break, the Bureau and NRCS Assessments state that it is unlikely that prostrate kochia will negatively impact EO 61.

There have been 97 ignitions within a 3-mile radius (70 of which were human-caused), 42 ignitions within a 1.5 mile radius, and 13 human-caused ignitions within a 0.5 mile radius of EO 61 since 1957, the majority of which were concentrated along the railroad tracks and Interstate 84 (Figures 6 and 7). The Bureau and NRCS Assessments state that, given the high number of past ignitions and fires surrounding EO 61, a robust fuel break that has been proven to be effective is needed in this area (USBLM 2015, p. 42; NRCS 2015, p. 39). The Bureau and NRCS Assessments concluded that other fuel break methods and/or species will not be as effective at outcompeting invasive annual plants and providing an effective, low maintenance fuel break.

EO 62 - In 2000, 2005, and 2010, EO 62 was given a rank of C. Between 2005 and 2014, the number of slickspot peppergrass plants observed along HIP transect 062 ranged from 0 plants to 297 plants. When combined with various Bureau survey and clearance data since 2008, the Bureau estimated that the above ground population of EO 62 could range up to 500 individuals. Portions of EO 62 burned in 1957 and 1981, and the entire EO burned in the 2012 Benwalk Fire.

If fuel breaks are fully implemented at 300 feet wide, a prostrate kochia fuel break segment will be located 1.36 miles (8,612 feet, at the closest point) east of EO 62 (Figures 14 and 15). There will be 1.22 miles (70 acres) of new prostrate kochia planted within the 1.5 mile buffer of EO 62 on

Bureau-managed land (Figure 14). There are no planned fuel breaks on private land within the 1.5 mile buffer of EO 62 (Figure 15).

The majority of EO 62 is greater than 1.5 miles from the proposed kochia fuel break. However, one slickspot with 57 individual slickspot peppergrass plants was observed in 2009 about 1.36 miles from the edge of the proposed fuel break (Figures 14 and 15). The Bureau and NRCS Assessments state that, by employing all Bureau Monitoring and Control protocols, and due to the physical separation of EO 62 from the proposed prostrate kochia fuel break (at least 1.36 miles), the implementation of a prostrate kochia fuel break 0.14 miles inside the 1.5 mile buffer, will minimize the likelihood of adverse impacts on EO 62, and could protect the EO from the negative effects of future wildfires. The network of fuel breaks in the immediate area near EO 62 will be implemented without the use of prostrate kochia, which the Bureau and NRCS Assessments state will not be as effective as a prostrate kochia fuel break in protecting the area from wildfire. The Bureau and NRCS Assessments further indicate that the proposed prostrate kochia fuel break in the area east of EO 62 will protect up to eight additional EOs in the area from future wildfire and will protect the sagebrush habitat in the greater area from future wildfires (USBLM 2015, p. 42; NRCS 2015, p. 40).

There have been five fires within the Occupied Habitat surrounding EO 62 since 1957, and 34 fires within 3 miles of EO 62 (Figures 14 and 15). The Bureau and NRCS Assessments state that, given the high number of fires within Occupied Habitat and in the broader surrounding area, a robust fuel break that has been proven to be effective is needed in this area (USBLM 2015, p. 42; NRCS 2015, p. 40). The Bureau and NRCS Assessments conclude that other fuel break methods and/or species will not be as effective at outcompeting invasive annual plants and providing an effective, low maintenance fuel break.

EO 106 - EO 106 is currently unranked. An unknown number of plants were observed in 2001 in this EO. No plants have been observed in yearly Bureau visits to EO 106 that began in 2008. EO 106 burned in the 1984 Rye Grass Fire. EO 106 is not located within a LEPA Management Area or within proposed critical habitat. The Bureau and NRCS Assessments also state that EO 106 was not listed as an EO by the Service in the 2006 Draft Best Available Biological Information for Slickspot Peppergrass (BAI) (USFWS 2006b, pp. 25-27). Although EO 106 was not entered into the Idaho Natural Heritage Program (INHP) database at the time that the BAI was written (Colket et al. 2006, entire), this EO is included in this Opinion as part of the best scientific information currently available.

If fuel breaks are fully implemented at 300 feet wide, a prostrate kochia fuel break segment will be located 0.12 miles (633 feet, at the closest point) east of EO 106 along Bennett Mountain Road in Occupied Habitat (Figures 16 and 17). There will be 1 mile (72 acres) of new prostrate kochia planted within Occupied Habitat and an additional 5.1 miles (369 acres) planted within the 1.5 mile buffer of EO 106 for a total of 6.1 miles (441 acres total) of new kochia fuel breaks located on Bureau-managed land (Figure 16). There are no planned fuel breaks on private land within the 1.5 mile buffer of EO 106 (Figure 17). The Bureau and NRCS Assessments further state that,

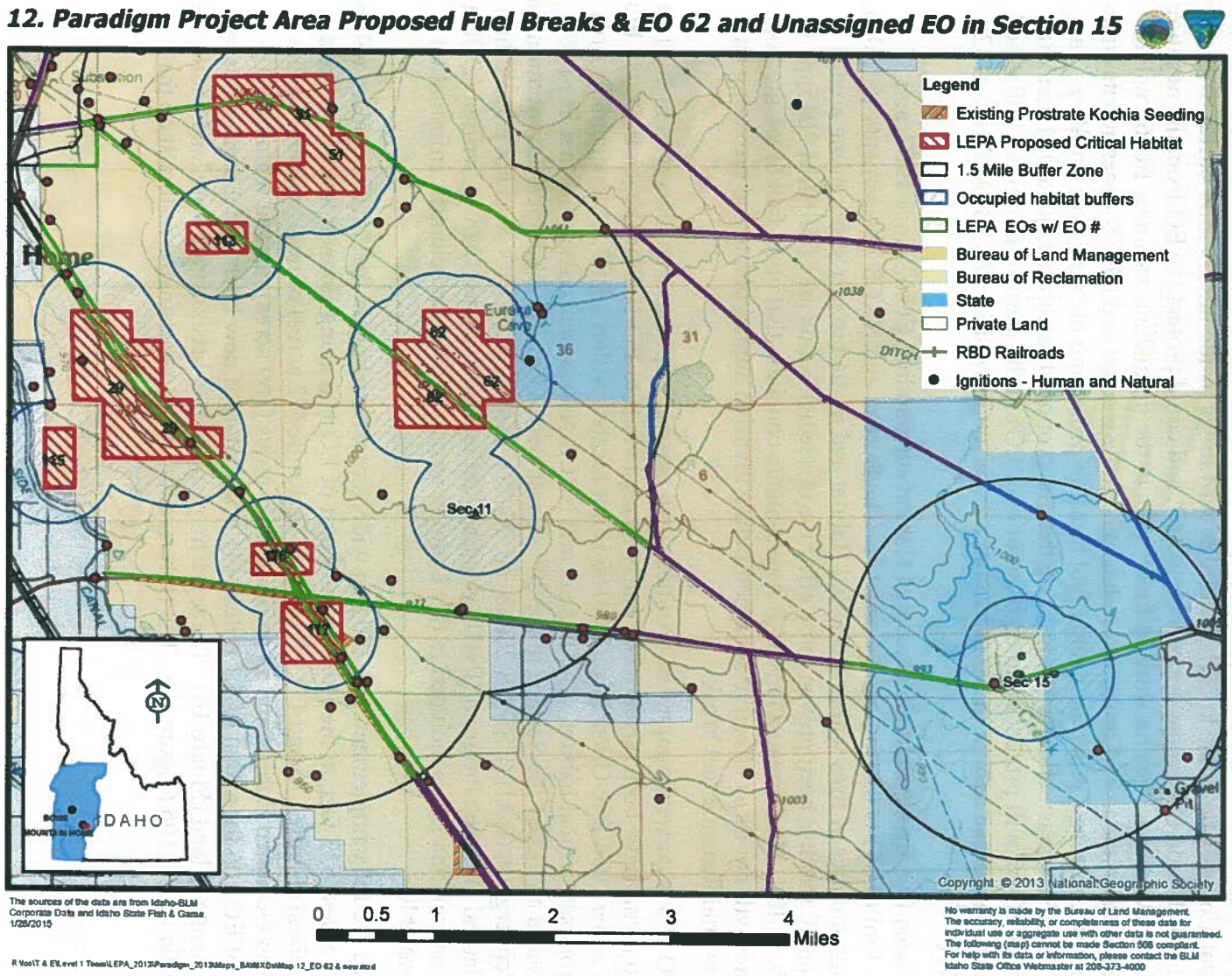

Figure 14. Existing and proposed prostrate kochia greenstrip fuel breaks on Federal and State lands in the vicinity of EO 62 and the unassigned EO in section 15.

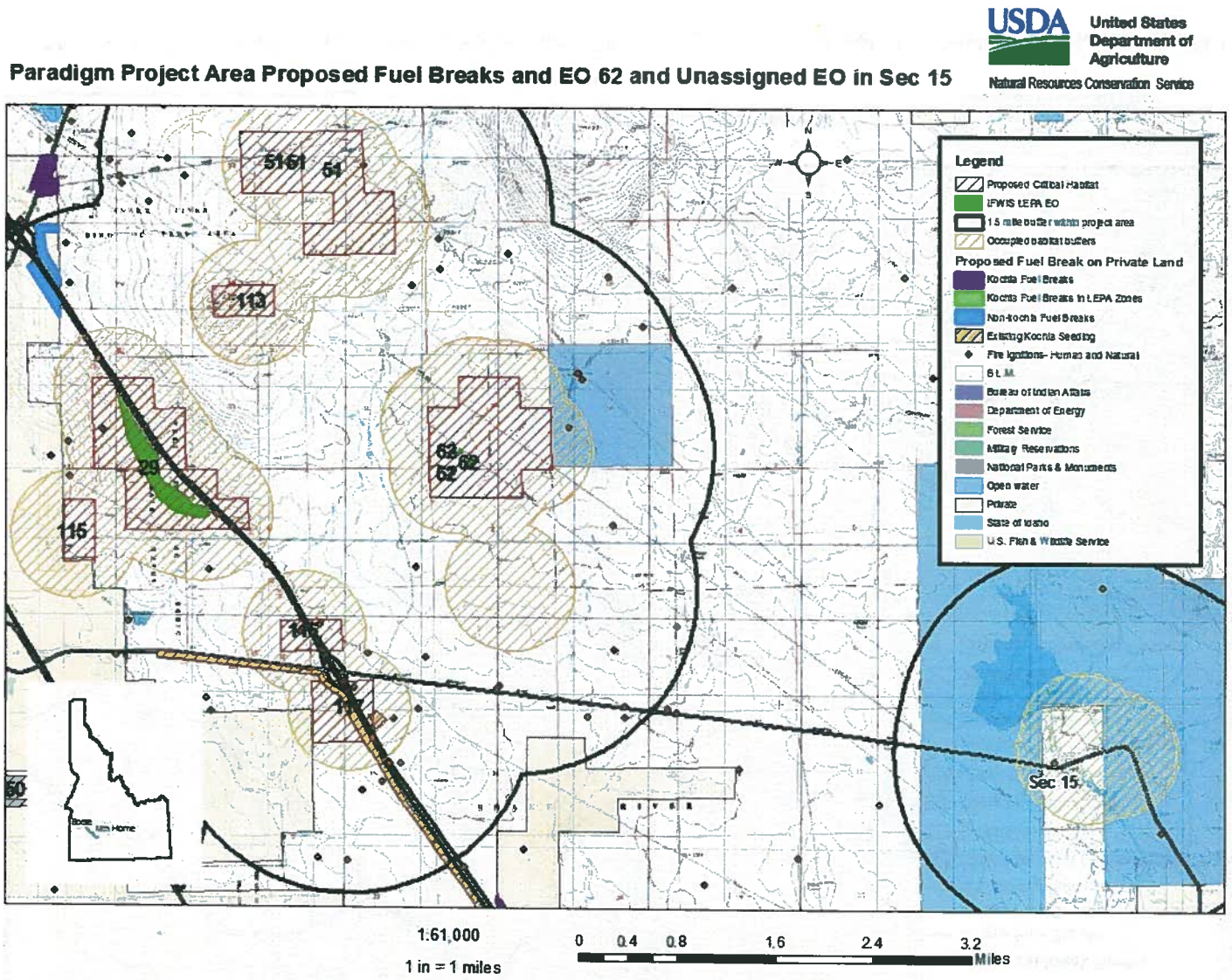

Figure 15. Existing and proposed prostrate kochia greenstrip fuel breaks on private lands in the vicinity of EO 62 and the unassigned EO in section 15.

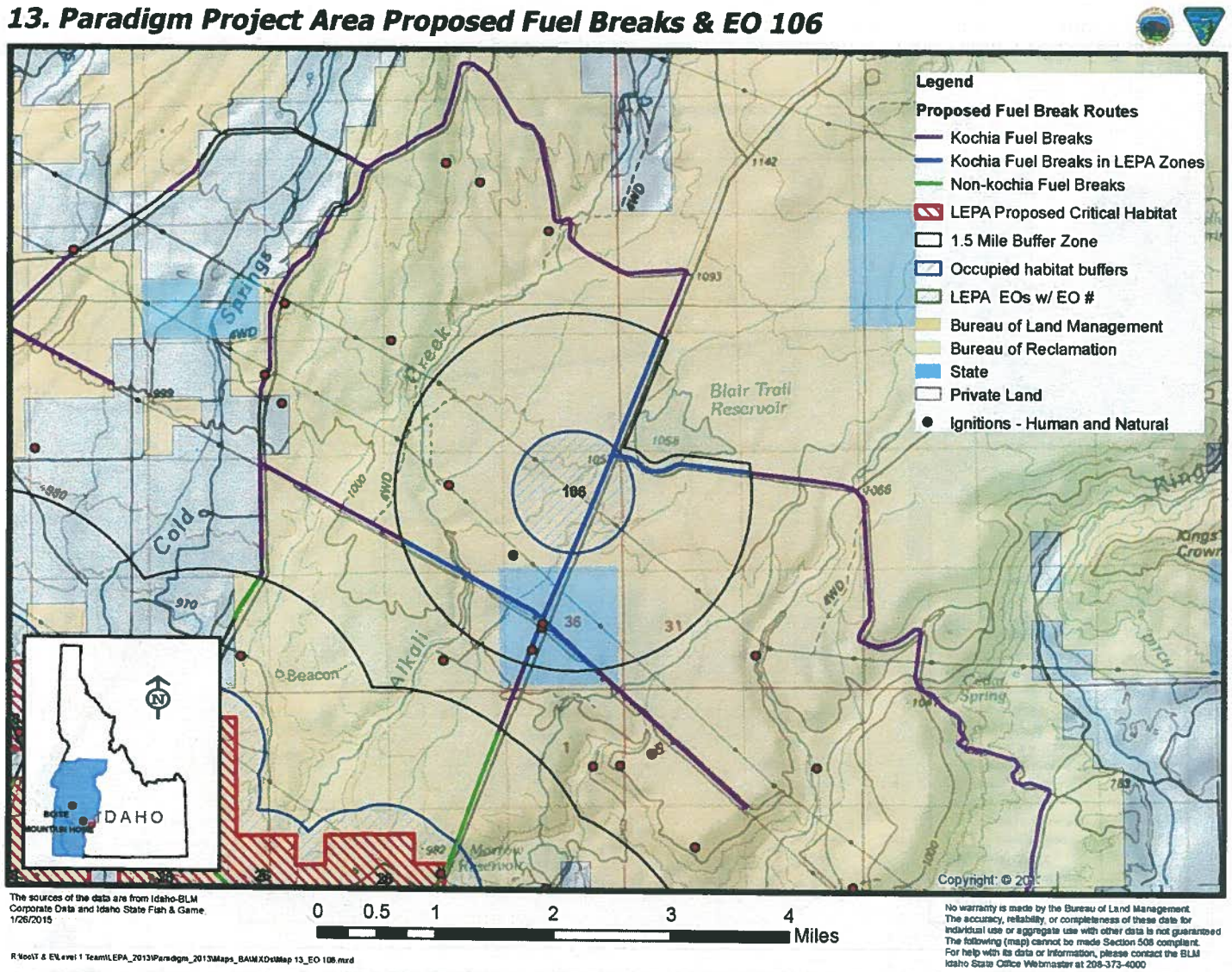

Figure 16. Existing and proposed prostrate kochia greenstrip fuel breaks on Federal and State lands in the vicinity of EO 106.

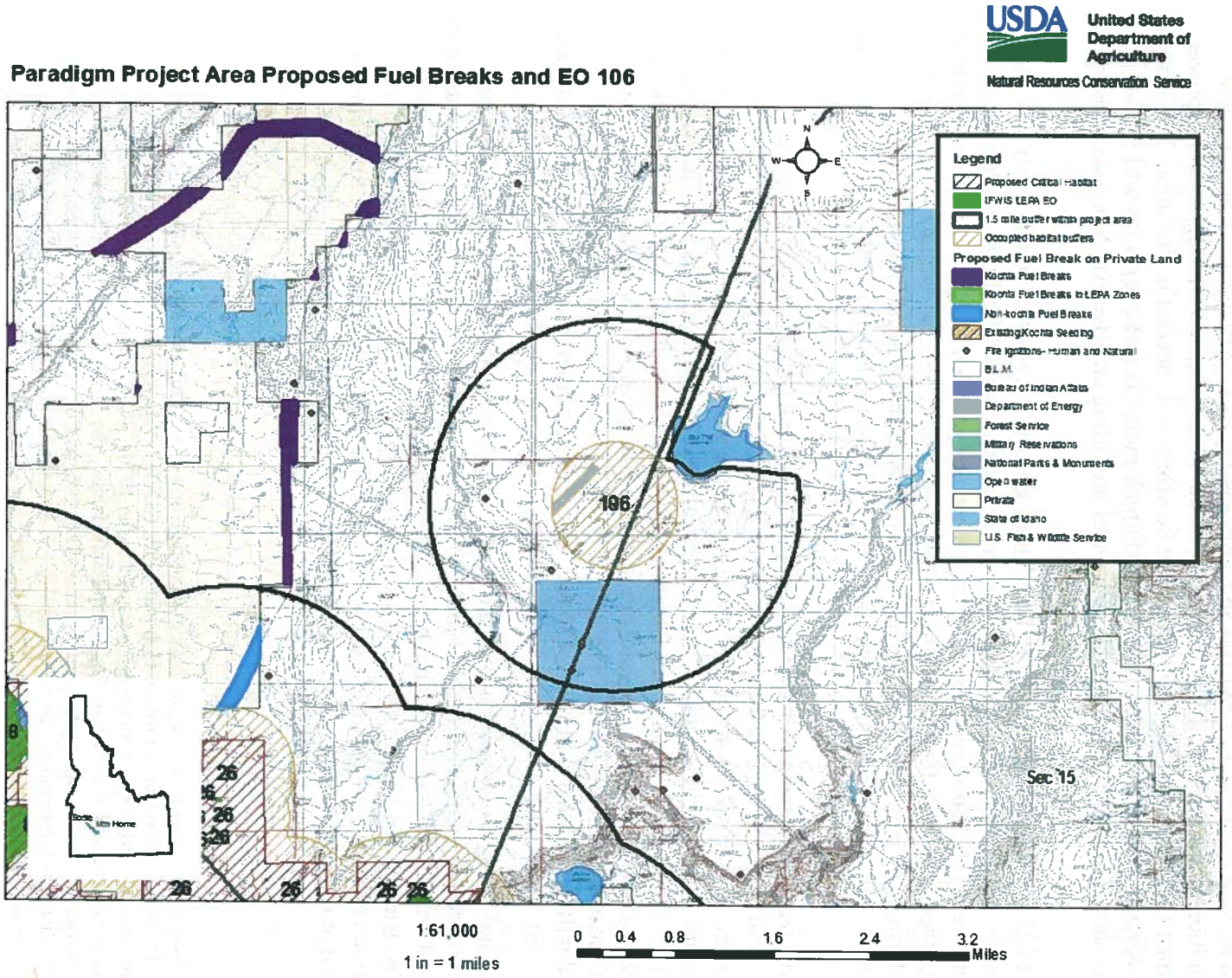

Figure 17. Existing and proposed prostrate kochia greenstrip fuel breaks on private lands in the vicinity of EO 106.

because EO 106 is likely extirpated, prostrate kochia fuel breaks in the area surrounding EO 106[11] will serve to protect B-ranked EO 26 to the south from future wildfire and will protect the sagebrush habitat in the greater area from future wildfires (USBLM 2015, p. 43; NRCS 2015, pp. 40-41).

There have been 16 fires within 3 miles of EO 106 since 1973 (Figures 16 and 17). The Bureau and NRCS Assessments state that, given the high number of fires in the area surrounding EO 106, the past and present conditions of EO 106 and surrounding areas, and the close proximity to potential ignition sources for wildfire (Bennett Mountain Road and several high-voltage power lines), a robust fuel break that has been proven to be effective is needed in this area. The Bureau and NRCS Assessments concluded that other fuel break methods and/or species will not be as effective at outcompeting invasive annual plants and providing an effective, low maintenance fuel break.

Unassigned EO in T4S, R8E, Section 15 - This unassigned EO was discovered in 2014 during Bureau surveys for special status plants within the Paradigm Project treatment footprint. This recently discovered slickspot peppergrass location has not yet been assigned a number or ranked by the Idaho Department of Fish and Game (IDFG). A total of 126 individuals were found in 6 slickspots during a subsequent thorough survey of the Bureau and State land in the area surrounding the occupied slickspots. This unassigned EO burned in 1974 and again in the 2012 Benwalk Fire.

If fuel breaks were implemented at 300 feet wide, a prostrate kochia fuel break segment will be located 1.14 miles (6,019 feet, at the closest point) north of the unassigned EO on State lands (Figures 14 and 15, see pp. 39-40 of this Opinion). There would be 2.7 miles (194 acres) of new prostrate kochia planted within the 1.5 mile buffer of the unassigned EO on State-managed land (Figure 14). If fuel breaks are fully implemented on private land at 300 feet wide, an additional 0.6 miles (24 acres) of new prostrate kochia greenstrip fuel break will be planted within the 1.5 mile buffer located on private lands. The up to 0.6 miles of new kochia greenstrip fuel break on private land will be within 1.4 miles (7,480 feet, at the closest point) northeast of the unassigned EO (Figure 15).

The Bureau and NRCS Assessments indicate that a "non-kochia fuel break" is proposed for development through the unassigned EO, but is unlikely to be fully effective since the unassigned EO is located within 300 feet of the fuel break route centerline, limiting fuel break implementation options. The Bureau and NRCS Assessments identify implementation of a prostrate kochia fuel break to the north along an existing power line road as the best viable alternative for fuel break development in the area (USBLM 2015, p. 43; NRCS 2015, p. 41).

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[11] Ranking of slickspot peppergrass EOs, including documentation of an extirpated EO (classified as "X-ranked"), is the responsibility of the Idaho Department of Fish and Game (IDFG). According to IDFG records, the most recent EO extirpation known for slickspot peppergrass occurred in the 1970s. IDFG is currently re-evaluating the rankings of all slickspot peppergrass EOs located on Federal and State lands. The final report documenting the results of this EO ranking evaluation effort, including the current rank of EO 106, will be available no later than September 2016. Until such time that IDFG determines the current rank of EO 106, the Service does not consider EO 106 to be extirpated. However, Bureau and NRCS descriptions of this EO are consistent with an F-ranking, which can lead to designation of an X-rank over time.

Three fires have burned within the Occupied Habitat of the unassigned EO since 1974, and 21 fires have burned within 3 miles of the unassigned EO since 1957 (Figures 14 and 15). The Bureau and NRCS Assessments state that, given the high number of fires in the area surrounding the unassigned EO, the close proximity to Bennett Road and several high-voltage power lines (which are identified as potential ignition sources for wildfire), a robust fuel break that has been proven to be effective is needed in this area (USBLM 2015, p. 43; NRCS 2015, p. 41). The Bureau and NRCS Assessments concluded that other fuel break methods and/or species will not be as effective at outcompeting invasive annual plants and providing an effective, low maintenance fuel break.

2.1.2.3 Project Design Features

Layout for all Fuel Break Methods

- Within slickspot peppergrass EOs and Occupied Habitat, inclusive of proposed critical habitat, fuel break design and layout on Federal, State, and private lands will be coordinated with the Service in order to minimize the likelihood of Project-related adverse impacts to slickspot peppergrass and its habitat, including guidance described in "*Lepidium papilliferum* (slickspot peppergrass): Draft Guidance for planning and evaluating fuel breaks in Idaho" (USFWS 2012e, entire).
- Within EOs and proposed critical habitat on Federal, State, and private lands, slickspot microsites would be flagged for avoidance by machinery and personnel.
- Fuel break implementation within EOs or in Occupied Habitat, inclusive of proposed critical habitat, on Federal and State lands, will be overseen by a Bureau botanist or qualified botany technician to ensure avoidance is maximized and impacts are minimized. Similarly, fuel break implementation within EOs or in Occupied Habitat, inclusive of proposed critical habitat, on private lands, will be overseen by an NRCS State or Area Biologist or State Range Conservationist to ensure avoidance is maximized and impacts are minimized.

Surveys

Upon completion of Stage 1 surveys in June of 2013, all Potential Habitat within the Project treatment footprint was classified as Slickspot Peppergrass Habitat on Federal and State land. Additional Stage 1 surveys on 37 miles of new routes were completed in October of 2014; Stage 2 surveys of all previously recorded slickspots from Stage 1 surveys were completed in July of 2014. Two new EOs were documented within the treatment boundary; one was located during Stage 2 surveys and the other during other Bureau field office monitoring. As a result, Slickspot Peppergrass Habitat located within a 0.5 mile buffer surrounding these new EOs was reclassified as Occupied Habitat. See the Status of the Species section of this Opinion for further details regarding these new EOs.

Surveys on Potential Habitat located on private lands within the Project treatment area will be completed as landowners express interest in the Project. Landowners will have the option of completing Stage 1, 2, and 3 surveys or to treat the privately-managed land as Occupied Habitat.

Disking

- Disking will not occur within EOs or proposed critical habitat on Federal, State, and private lands.

- Disking will only occur in Occupied Habitat (excluding proposed critical habitat) on Federal, State, and private lands through annual site-specific coordination with the Service.
- Disking will only occur in Occupied Habitat (excluding proposed critical habitat) in areas that are devoid of slickspot microsites on Federal, State, and private lands.
- Disking will only occur in Slickspot Peppergrass Habitat on Federal, State, and private lands after three years of surveys confirm that the area is unoccupied Slickspot Peppergrass Habitat.

Mechanical Thinning and Mowing

- Occupied Habitat, inclusive of proposed critical habitat, will be thinned or mowed on a site-specific basis on Federal and State lands with direction from Bureau and Service botanists. Thinning or mowing in Occupied Habitat on private lands will occur on a site specific basis with direction from NRCS State or Area Biologist, State Range Conservationist and/or Service botanists.
- Mowing in Slickspot Peppergrass Habitat on Federal, State, and private lands will not occur when slickspot soils are saturated.

Herbicide

- On Federal, State, and private lands, ground-based herbicide application within slickspot peppergrass Management Area boundaries, but outside of slickspots, will be limited to wind conditions less than 7 miles per hour, use large droplet spray with reduced pump pressure, and use spot spraying techniques to prevent drift of herbicide into slickspots (USBLM 2006, p. 3).
- Within slickspot peppergrass EOs on Federal, State, and private lands, herbicide will only be applied using hand sprayers. A 10-foot no-herbicide treatment buffer will be established around slickspots located in EOs. Within the buffer zone, weeds will be treated by hand (USBLM 2006, p. 3).
- On Federal, State, and private lands, off-site movement of herbicides either through the air, soil, or over the soil surface will be avoided. Terrain, soil type, and vegetation will be taken into consideration when selecting herbicide type, application method, and application timing. Weed treatments using persistent herbicides will not occur within 150 feet of EOs (USBLM 2006, p. 3).
- During herbicide application within EOs on private lands, barriers such as plastic sheeting, tarps, or plywood boards will be placed between herbicide target and slickspots to minimize the potential for the chemical to come into direct contact with slickspot peppergrass plants. Slickspots will be covered for minimal periods of time to avoid mechanical and heat damage to individual plants (USBLM 2011, p 6).

Targeted Grazing

- Targeted grazing will not occur within slickspot peppergrass EOs or proposed critical habitat on Federal, State, and private lands.
- Within Occupied Habitat but outside of an EO, and within all Slickspot Peppergrass Habitat, targeted grazing on Federal, State, and private lands will not occur when soils are saturated (USBLM and USFWS 2014, pp. 9, 12, 22); soils would be considered

saturated if there is evidence of puddles (i.e. standing water) and the soil within slickspots are not firm (i.e. a boot heel will penetrate more than 0.5 inches).

- On Federal, State, and private lands, livestock used in targeted grazing treatments will not be allowed to gather, trail, or bed within slickspot microsites in Occupied Habitat, inclusive of proposed critical habitat, or within slickspot microsites in Slickspot Peppergrass Habitat.

Prescribed Burning

- Prescribed burning will not take place within extant EOs on Federal, State, and private lands.
- On Federal and State lands, prescribed burning will only occur in Occupied Habitat, inclusive of proposed critical habitat, through site-specific annual coordination with the Service.
- On Federal, State, and private lands, slickspot microsites in Occupied Habitat but outside of a given EO and/or proposed critical habitat, will be flagged for avoidance by operational equipment, to protect against potential compaction and soil displacement.
- Prescribed burning on Federal, State, and private lands will take place during periods when soils are frozen or wet to decrease potential damage to slickspot soils.

Seeding

- In Occupied Habitat, inclusive of proposed critical habitat, on Federal, State, and private lands, native species will be a priority for use in seed mixes (USBLM and USFWS 2014, pp. 21-22).
- On Federal, State, and private lands, seeding within Occupied Habitat, inclusive of proposed critical habitat, and within Slickspot Peppergrass Habitat will occur via minimum or moderate soil disturbance seeding techniques as described in Methods.
- Prostrate kochia will not be utilized for seeded fuel break treatments in proposed critical habitat on Federal and State lands.
- On Federal, State, and private lands, prostrate kochia will not be utilized for seeded fuel break treatments within 1.5 mile of extant slickspot peppergrass EOs (USBLM 2012, p. 2; USFWS 2012e, pp. 5-9; USBLM and USFWS 2014; pp. 21-22), except within the limited areas identified as exceptions as described in the Bureau and NRCS Assessments (see pp. 21-41 of this Opinion).
- Seedings will be monitored for establishment success on Federal, State, and private lands. If areas are determined to be unnecessary or not capable of becoming successful seedings, those areas will be seeded with a mix of native grasses, forbs, and shrubs.

Although NRCS does not know the exact location or extent, several private land owners have implemented various fuel breaks in the Project area. NRCS will make a concentrated effort to document all previously implemented fuel breaks in the planning area on private land once a landowner has requested assistance from NRCS. Fuel breaks previously installed without Federal assistance that can be incorporated into the proposed Project could further reduce the overall effects of the Project by reducing the amount of new ground disturbance required to implement the proposed Paradigm Project fuel breaks network.

2.1.2.4 Monitoring and Control

The collection of implementation and effectiveness monitoring data and information will be used to inform management and private landowners whether the treatments are achieving the desired goals and whether changes are necessary. Developed and effective fuel breaks will accomplish the following goals:

- Enhance firefighter and public safety by reducing the amount of fires that ignite and burn near roadways;
- Provide additional and improved anchor points for fire suppression tactics;
- Reduce the size of fires that burn across the Project area by compartmentalizing the Project area into more defensible sections;
- Reduce the number of roadside fires that burn into the adjacent rangelands;
- Facilitate protection of remaining intact big sagebrush communities, particularly those areas associated with greater sage-grouse habitat;
- Facilitate protection of remaining slickspot peppergrass EOs and intact habitats;
- Provide protection to future habitat rehabilitation and restoration treatments.

Implementation Monitoring is the inspection of operations during treatment implementation to document adherence to applicable design features such as; treatment width, equipment type, Oregon Trail and slickspot peppergrass buffers. Implementation monitoring documents resource conditions during implementation, equipment issues, and/or resolutions, and any necessary adjustments to the prescribed designs. Information derived through implementation monitoring will be used to improve future fuel break project design.

Effectiveness Monitoring includes the initial and subsequent collection of qualitative and quantitative information at randomly established monitoring sites on Federal and State lands as well as for each individual private landowner's project (see Monitoring Plot Design in Monitoring Methodology on pp. 48-50 of this Opinion). Effectiveness monitoring will be conducted at regularly scheduled intervals to inform whether treatments are becoming adequately established, whether re-treatments are necessary, and whether maintenance is required to ensure effectiveness. On Federal and State lands, a minimum of one monitoring site will be established for every five miles of fuel break except as described below in the "Seedings Monitoring/Prostrate Kochia Fuel Breaks" section (see pp. 46-47 of this Opinion). Similarly, on private lands, a minimum of one monitoring site would be established for every landowner project or at least one monitoring site for every five miles of fuel break except as described in the "Seedings Monitoring/Prostrate Kochia Fuel Breaks" section below.

Effectiveness Monitoring consists of:

- Pre-implementation inventory to establish a baseline of existing vegetation conditions in and adjacent to the proposed fuel break and will be used to inform which treatment method will be most appropriate for a given site.
- Post-implementation monitoring will inform management of resource conditions and will be used to spatially and temporally compare treatments, if subsequent treatments or maintenance is needed, and to determine progress towards meeting long-term goals.

On Federal and State lands, post-implementation effectiveness monitoring will be conducted annually for the first five years, then every three to five years thereafter to evaluate conditions of

treatments and the need for additional or follow-up treatments (adaptive management). A minimum of one monitoring site will be established for every five miles of fuel break. Data will be collected prior to treatment implementation for baseline data and revisited at regularly scheduled intervals for data collection. Monitoring will be conducted utilizing a standard interagency monitoring tool called FEAT/FIREMON Integrated (FFI). The methods described below represent established FFI guidelines and address most objectives pertaining to various fuel break treatments, including mowing, and vegetated fuel breaks. Monitoring results will provide information on fuel break effectiveness in altering fire behavior to enhance fire control efforts and provide fire fighters a greater margin of safety and suppression options.

On private lands, post-implementation effectiveness monitoring would be conducted annually for the first five years of each individual project, which is the NRCS practice life span for fire breaks. A minimum of one monitoring site would be established per land owner or one monitoring site for every five miles of fuel break whichever is greater. Landowners that fall within the "kochia fuel breaks in 1.5 mile buffers - slickspot peppergrass zones" will have monitoring established in these zones. Data will be collected prior to treatment implementation for baseline data and revisited annually for the first five years. Monitoring will be conducted utilizing a standard NRCS Range Inventory Form ID-CPA-016 for line-point or step point intercept methods, ID-CPA-018 for gap intercept, ID-CPA-019 for plant height, ID-CPA-021 for ocular production estimates, and photographic monitoring points. These forms can be found on the Idaho NRCS website at http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/technical/cp/ (last accessed April 10, 2015) under Pasture and Range. Not all monitoring methods will be used at each site. The monitoring methods described below represent established inventory guidelines and address most objectives pertaining to various fuel break treatments, including mowing, and vegetated fuel breaks. Monitoring results will provide information on fuel break effectiveness in altering fire behavior to enhance fire control efforts and provide fire fighters a greater margin of safety and suppression options.

After the NRCS contract has expired with the private landowners, NRCS will request that landowners continue to monitor the treatment areas with photo monitoring techniques annually and inform NRCS if prostrate kochia is detected outside of the treatment area. In addition, if Bureau monitoring results detect movement of prostrate kochia outside the treatment area footprints, this will trigger NRCS to contact private landowners who have received financial assistance from NRCS and request a site visit to collect monitoring data on those sites. Prostrate kochia that has migrated outside of treatment areas will be physically removed, or spot treated with application of chemicals using appropriately analyzed herbicides.

Vegetation characteristics to be measured during monitoring of fuel break treatments on Federal, State, and private lands will include, but not be limited to:

- Average shrub height and percent canopy cover;
- Height, density, and presence of all species, including cheatgrass and other non-native annual plant species of concern in the treatment area;
- Percent ground cover;
- Recruitment of introduced plant species from the treatment area into untreated periphery.

Treatment Mapping

The actual treatment footprint will be mapped immediately post-implementation using Trimble global positioning system (GPS) technology and incorporated into Idaho BLM Vegetation Treatment Geodatabase (VTG) for treatments located on Federal and State lands, and incorporated into the official NRCS customers' electronic case file (currently the Customer Toolkit database) for treatments located on private lands. The resulting Geographic Information System (GIS) shape-file will define the physical extent of the treatments, and aid in determining movement of plant species outside of the treatment boundaries. On Federal and State lands, plot locations along treatment boundaries will be marked with witness posts (see Monitoring Methodology below) and will be recorded using Trimble GPS technology to verify GPS accuracy. On private lands, photographic locations along treatment boundaries will be marked and recorded using Trimble GPS technology to verify GPS accuracy.

Mowing/Thinning Shrub Cover Monitoring

Where mowing is used to reduce shrub height to between 6 and 12 inches on Federal, State, and private lands, retreatment will be scheduled when re-growth exceeds an average of 15 inches in height. Thinning treatments will reduce shrub canopy to an average of 5 to 10 percent and scheduled for maintenance when canopy cover exceeds 25 percent.

Seedings Monitoring

Seeded fuel breaks on Federal, State, and private lands will be monitored for establishment of seeded species and presence of annual grasses and forbs.

- Reseeding will occur, when the average density of desired perennial plants is less than what is effective at controlling annual plant invasions.
- When the functionality of seeded fuel breaks is compromised by the presence of undesirable vegetation, one of the analyzed treatment methods will be used to restore fuel break effectiveness.

Prostrate kochia fuel breaks - All newly implemented and maintained prostrate kochia fuel breaks within the proposed treatment footprint will be subject to the following additional Monitoring and Control protocols.

- At least one monitoring site will be established in each fuel break segment that intersects the 1.5 mile buffer zone for slickspot peppergrass. If monitoring data shows prostrate kochia moving from seeded fuel breaks, the number of monitoring sites on Federal State, and private lands will be increased[12] to improve detection and responsiveness.
- On Federal and State lands, monitoring sites will be established where prostrate kochia fuel breaks that were previously seeded occur in Project treatment footprints within Occupied Habitat and the 1.5 mile buffer.

[12] On Federal and State lands, the number of kochia movement monitoring sites will be doubled within the 1.5 mile buffer surrounding EOs if kochia movement outside the fuel break footprint is detected.

- Plants that have migrated outside of the treated areas will be physically removed, or spot treated with application of appropriate chemicals using appropriately-analyzed herbicides[13] (see Appendix A of this Opinion).
- Monitoring results and subsequent control treatments on Federal and State lands will be reported annually to the Service through the Level 1 team. Similarly, monitoring results and subsequent control treatments on private lands will be reported annually to the Service through the NRCS State Biologist.

Prostrate kochia seedings exist across the Project landscape that were implemented by private landowners, State agencies, and previously by the Bureau. The Bureau and NRCS Assessments state that those areas seeded with prostrate kochia prior to implementation of the Paradigm Project are not subject to the same scrutiny or kochia control methods, with the exception of maintenance within both pre-existing and proposed Paradigm Project fuel break footprints. The Assessments further state that control of prostrate kochia populations located outside of the Paradigm Project fuel break footprints is considered by the Bureau and NRCS to be beyond the scope of the environmental analysis for the Project and does not meet the Bureau- or NRCS-identified purpose and need for the Project. It is the Service's understanding that control of kochia within the Paradigm Project area that did not originate directly from the Paradigm Fuel Breaks Project will not occur as part of this Project; control of kochia not associated with the Paradigm Project could be accomplished through a separate action implemented independently of the Paradigm Project.

Disking Monitoring

Disked fuel breaks on Federal, State, and private lands will be inspected annually to evaluate condition. When biomass accumulates or plants persist in the disked treatment, herbicide, targeted grazing, or another analyzed treatment could be used to maintain fuel break effectiveness.

Noxious Weeds Monitoring

Noxious weeds encountered within or adjacent to the Project area will be photographed and a GPS position will be recorded in Universal Transverse Mercator coordinate system (UTMs), if located on Federal or State lands. Noxious weeds encountered on private lands will be photographed and a GPS position would be recorded in the landowners' electronic case file. Information on noxious weed locations on Federal or State lands will be provided to the Bureau's Boise District Weeds Specialist for entry into the National Invasive Species Information Management System (NISIMS) per reporting requirements and to ensure an appropriate weed treatment occurs. On private lands, noxious weed location information will be provided to the landowner, who will be responsible for appropriate weed treatment.

[13] On Federal and State lands, only Bureau-approved herbicides will be used: all herbicides listed in Appendix A of this Opinion are Bureau-approved.

2.1.2.5 Monitoring Methodology

Monitoring Plot Design

Monitoring sites[14] on Federal, State, and private lands will be established where conditions are representative of the various prescribed treatments in the Project area. Locations will be marked on the edge of treatment area[15] to aid in relocation, and recorded using a GPS receiver. The transect start points will be located a minimum of 5 meters from the established monitoring sites to reduce potential impacts to transects. On Federal and State lands, two transects will be established at the monitoring location, one 100-meter transect inside the treatment and one meandering transect running parallel but outside of the treatment. Data collected along the transect inside the treatment will document species diversity, invasive species density, and shrub data; while data from the transect outside the treatment will specifically focus on the movement of prostrate kochia from seedings. At each location, a series of photographs will visually record the condition of transects. Data collected would vary by treatment type, but will include line and point intercept and density of all plant species present. Monitoring methods and plot design on private lands will be planned according to the Monitoring Manual for Grasslands, Shrubland, and Savanna Ecosystems (Herrick et al. 2009, entire, see http://jornada.nmsu.edu/monit-assess/manuals/monitoring – last accessed April 10, 2015). Monitoring data collection on Federal and State lands for the Project will follow protocols within this interagency manual.

On private lands, one transect will be established at the monitoring location and include a zigzag step point transect, collecting data from 100 points. Photographic monitoring will be established at the edge of the fuel break to document movement of prostrate kochia from seeded areas. Data collected along this transect will document species diversity, invasive species density, and shrub data. Additionally, a GPS receiver will record the UTMs at the start and end points of each transect on private as well as Federal and State lands so transects can be relocated for monitoring in subsequent years.

Plot Description

On Federal and State lands, general information related to the macro plot (i.e., plot identifier, date, UTM, elevation, aspect, slope, etc.) will be recorded. On private lands, general site conditions will be documented, such as elevation, aspect, and slope, at each monitoring site.

Photo Points

On Federal and State lands, a landscape view photograph will be taken at both the start point looking toward the end point and a photo of the first plot (5 meter mark). On private lands, a landscape view photograph will be taken at both the start point looking toward the end point and at the end point looking toward the starting point. On all lands, a photo-card will be included in each photograph with the following information:

[14] On Federal and State lands, the monitoring sites will be permanent.

[15] On Federal and State lands, monitoring sites will be marked with a witness post.

- project name
- date
- plot identifier
- start-point UTM
- direction or bearing of transect

Point Intercept

On Federal and State lands, cover, height, and species composition will be collected as point intercept data at 2 meter intervals along the 100 meter transect within the treatment area, for a total of 50 points. On private lands, cover, height, and species composition within the treatment area will be collected as step point intercept data at documented intervals along the zigzag transect, for a total of 100 points.

Density

On Federal and State lands, density of all species will be recorded using a 0.25 meter nested plot frame at 20 meter intervals along the 100 meter transect, for a total of 5 plots. On private lands, density of all species will be recorded using a 0.25 meter nested plot frame at 20-point intervals along the 100-point zigzag transect, for a total of 5 plots. On Federal, State, and private lands, density data will be used to determine species density and composition.

Line Intercept

On Federal, State, and private lands, canopy cover of plant species and plant height will be measured and recorded along the length of each transect.

Meandering Transect with Shrub Hoop Plots

This transect covers a large area and is designed to detect rare occurrences of plant species, such as satellite populations of introduced species. This transect will provide quantitative data to detect establishment of prostrate kochia from the seeded area on Federal and State lands into adjacent unseeded lands. Beginning from a witness post and running parallel to the treatment area, 50 - 1/100 acre plots record target species along a designated azimuth. Transects generally cover 500 to 1,000 feet in length. On private lands, photo points and point intercept data from the 100-point zigzag transect will be used to document kochia movement.

Suppression Effectiveness. Effectiveness of the fuel breaks as a wildland fire suppression tactic on Federal and State lands will be determined with established practices outlined in the Fuels Treatment Effectiveness Module (FTEM). Due to the fire expertise of the Bureau, private landowners will be encouraged to work with the Bureau on determining the effectiveness of the fuel breaks as a wildland fire suppression tactic when fire occurs on their privately-managed lands. Data collected using the FTEM as well as data from private lands allows analysis of the effect of fuel treatments on wildfire behavior. The analysis will also help managers understand how moderating fire behavior influences the ability to safely contain wildfires, and how it reduces impacts to resources. An FTEM assessment on Federal and State lands as well as a fuel break assessment on private lands will be performed for any wildfire that intersects a treatment area, which will provide crucial information to help fire managers improve fuel breaks to make them more effective in the future.

When observations show reduction of fire behavior between fuel breaks and adjacent untreated vegetation, a fuel break could be considered effective. Effectiveness will also be determined if the fuels break was used as a tool in the active suppression of a wildfire by resources on scene. This will be determined through interviews with individuals that respond to the incident and with other available empirical data. All observations made will be catalogued and recorded in the FTEM database by the Bureau.

Additional documentation to evaluate fuel break effectiveness during fire suppression on Federal, State, and private lands will include interviews with fire personnel and post-fire site evaluation.

2.2 Analytical Framework for the Jeopardy and Adverse Modification Determinations

2.2.1 Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this Opinion relies on four components:

1. The *Status of the Species*, which evaluates slickspot peppergrass rangewide condition, the factors responsible for that condition, and its survival and recovery needs.
2. The *Environmental Baseline*, which evaluates the condition of slickspot peppergrass in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of slickspot peppergrass.
3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on slickspot peppergrass.
4. *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on slickspot peppergrass.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of slickspot peppergrass current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of slickspot peppergrass in the wild.

The jeopardy analysis in this Opinion places an emphasis on consideration of the rangewide survival and recovery needs of slickspot peppergrass and the role of the action area in the survival and recovery of slickspot peppergrass as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

2.2.2 Adverse Modification Determination

This Opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this Opinion relies on four components:

1. The *Status of Critical Habitat*, which evaluates the rangewide condition of proposed critical habitat for slickspot peppergrass in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall.
2. The *Environmental Baseline*, which evaluates the condition of the proposed critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area.
3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected proposed critical habitat units.
4. *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected proposed critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on slickspot peppergrass proposed critical habitat are evaluated in the context of the rangewide condition of the proposed critical habitat, taking into account any cumulative effects, to determine if the proposed critical habitat rangewide would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for slickspot peppergrass.

The analysis in this Opinion places an emphasis on using the intended rangewide recovery function of slickspot peppergrass proposed critical habitat and the role of the action area relative to that intended function as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

2.3 Status of the Species and Proposed Critical Habitat

This section presents information about the regulatory, biological and ecological status of slickspot peppergrass that provides context for evaluating the significance of probable effects caused by the proposed action.

2.3.1 Slickspot Peppergrass

2.3.1.1 Listing Status

Effective December 7, 2009, slickspot peppergrass was listed as threatened under the Act (74 FR 52014–52064, October 8, 2009, p. 52014). However, on August 8, 2012, the United States District Court for the District of Idaho ordered that the final rule listing slickspot peppergrass as a threatened species under the Act, be vacated and remanded for further consideration consistent with the court's decision. On February 12, 2014, the Service published a Federal Register Notice which addressed the Court's request that a specific definition of foreseeable future for slickspot

peppergrass be provided. In addition, the Service proposed that threatened status be reinstated for slickspot peppergrass under the Act. A final decision on the Service's proposal to reinstate slickspot peppergrass as threatened under the Act is anticipated in 2015.

2.3.1.2 Species Description

Slickspot peppergrass is an intricately branched, tap-rooted plant, averaging 2 to 8 inches (in.) high, but occasionally reaching up to 16 in. high. Leaves and stems are covered with fine, soft hairs, and the leaves are divided into linear segments. Flowers are numerous, 0.11 to 0.15 in. in diameter, white, and four-petalled. Fruits (siliques) are 0.10 to 0.15 in. across, round in outline, flattened, and two-seeded (Moseley 1994, pp. 3, 4; Holmgren *et al.* 2005, p. 260). The species is monocarpic (it flowers once and then dies) and displays two different life history strategies—an annual form and a biennial form. The annual form reproduces by flowering and setting seed in its first year and dies within one growing season. The biennial life form initiates growth in the first year as a vegetative rosette but does not flower and produce seed until the second growing season. Biennial rosettes must survive generally dry summer conditions, and consequently many of the biennial rosettes die before flowering and producing seed. The number of prior-year rosettes is positively correlated with the number of reproductive plants present the following year (ICDC 2008, p. 9; Unnasch 2008, p. 14; Sullivan and Nations 2009, p. 44). The proportion of annuals versus biennials in a population can vary greatly (Meyer *et al.* 2005, p. 15), but in general, annuals appear to outnumber biennials (Moseley 1994, p. 12).

2.3.1.3 Life History

Seed Production

Depending on an individual plant's vigor, the effectiveness of its pollination, and whether it is functioning as an annual or a biennial, each slickspot peppergrass plant produces varying numbers of seeds (Quinney *in litt.* 1998, pp. 15, 17). Biennial plants normally produce many more seeds than annual plants (Meyer *et al.* 2005, p. 15). Average seed output for annual plants at the Idaho Army National Guard's (IDARNG) Orchard Combat Training Center[16] (OCTC) was 125 seeds per plant in 1993 and 46 seeds per plant in 1994. In contrast, seed production of biennials at this site in 1993 and 1994 averaged 787 and 105 seeds per plant, respectively (Meyer *et al.* 2005, p. 16). Based on data collected from a 4-year demography study on the OCTC, survivorship of the annual form of slickspot peppergrass was demonstrated to be higher than survivorship of biennials (Meyer *et al.* 2005, p. 16). Meyer *et al.* (2005, p. 21) hypothesize that the reproductive strategy of slickspot peppergrass is a plastic response, meaning that larger plants will flower and produce seed in their first season, whereas smaller plants that stand less chance of successfully setting seed in their first season will delay reproduction until the following year. Thus, the biennial life form is maintained, despite the higher risk of mortality.

Like many short-lived plants growing in arid environments, above-ground numbers of slickspot peppergrass individuals can fluctuate widely from year to year, depending on seasonal

[16] The Idaho Army National Guard's Orchard Combat Training Center (OCTC) was previously named the Orchard Training Area (OTA).

precipitation patterns (Mancuso and Moseley 1998, p. 1; Meyer *et al.* 2005, pp. 4, 12, 15; Palazzo *et al.* 2005, p. 9; Menke and Kaye 2006a, p. 8; Menke and Kaye 2006b, pp. 10, 11; Sullivan and Nations 2009, p. 44). Mancuso and Moseley (1998, p. 1) note that sites with thousands of above-ground plants one year may have none the next, and vice versa. Above-ground plants represent only a portion of the population; the seed bank (a reserve of dormant seeds generally found in the soil) contributes the other portion and in many years, constitutes the majority of the population (Mancuso and Moseley 1998, p. 1). Seed banks are adaptations for survival in a "risky environment" because they buffer a species from stochastic (random) impacts, such as lack of soil moisture (Baskin and Baskin 2001, p. 160).

Seed Viability and Germination

The seeds of slickspot peppergrass are found primarily within the slickspot microsites where the plants are found (Meyer and Allen 2005, pp. 5–6). Slickspots, also known as mini-playas or natric (high sodium content) sites, are visually distinct openings in the sagebrush-steppe created by unusual soil conditions characterized by significantly greater sodium and clay content relative to the surrounding area (Moseley 1994, p. 7). The vast majority of slickspot peppergrass seeds in slickspots have been located near the soil surface, with lower numbers of seeds located in deeper soils (Meyer *et al.* 2005, p. 19; Palazzo *et al.* 2005, p. 3). Slickspot peppergrass seeds have been found in slickspots even if no above-ground plants are present (Meyer *et al.* 2005, p. 22; Palazzo *et al.* 2005, p. 10). When above-ground plants are present, flowering usually occurs in late April and May, fruit set occurs in June, and the seeds are released in late June or early July. Seeds produced in a given year are dormant for at least a year before any germination takes place. Following this year of dormancy, approximately 6 percent of the initially viable seeds produced in a given year germinate annually (Meyer *et al.* 2005, pp. 17–18). When combined with an average annual 3 percent loss of seed viability, approximately 9 percent of the original seed cohort per year is lost after the first year. Thus, after 12 years, all seeds in a given cohort will likely have either died or germinated, resulting in a maximum estimated longevity of 12 years for seeds in the seed bank (Meyer *et al.* 2005, p. 18).

Billinge and Robertson (2008, pp. 1005–1006) report that both small and large slickspot peppergrass populations share similar spatial structure, and that spatial structuring within its unique microsite slickspot habitats suggests that both pollen dispersal and seed dispersal are low for this species and occur over short distances (Robertson *et al.* 2006a, p. 3; Billinge and Robertson 2008, pp. 1005–1006). Dispersal and seed dormancy modeling of desert annual plants predicts that plants with long-range dispersal will have few dormancy mechanisms and quick germination (Venable and Lawlor 1980, p. 272). Contrary to this prediction, however, slickspot peppergrass has delayed germination (Meyer *et al.* 2005, pp. 17–18), and, therefore, according to the model, may not disperse long distances. The primary seed dispersal mechanism for slickspot peppergrass is not known (Robertson and Ulappa 2004, p. 1708), although viable seeds have been found outside of slickspots, indicating that some seed dispersal is occurring beyond slickspot habitat (Palazzo *et al.* 2005, p. 10). Additionally, beginning in mid-July, entire dried-up biennial plants and some larger annual plants have been observed to break off at the base and are blown by the wind (Stillman, pers. obs., as reported in Robertson *et al.* 2006b, p. 44). This tumbleweed-like action may have historically resulted in occasional long-distance seed dispersal (Robertson *et al.* 2006b, p. 44). Ants are not considered a likely disperser despite harvesting an average of 32 percent of fruits across six sites (Robertson and White 2007, p. 11).

Slickspot peppergrass seeds located near the soil surface show higher rates of germination and viability (Meyer and Allen 2005, pp. 6–8; Palazzo *et al.* 2005, p. 10) and the greatest seedling emergence success rate (Meyer and Allen 2005, pp. 6–8). Viable seeds were more abundant and had greater germination rates from the upper 2 in. of soil (Palazzo *et al.* 2005, pp. 8, 10), while Meyer and Allen (2005, pp. 6–8) observed the upper 0.08 in. as optimal for germination. Deep burial of slickspot peppergrass seeds (average depths greater than 5.5 in.) can entomb viable seeds and may preserve them beyond the 12-year period previously assumed as the maximum period of viability for slickspot peppergrass seeds (Meyer and Allen 2005, pp. 6, 9). However, seeds buried at such depth, even if they remain viable, are unlikely to regain the surface for successful germination. The effects of environmental factors, such as wildfire, on slickspot peppergrass seed dormancy and viability are unknown although slickspot peppergrass abundance is reduced in burned areas.

Pollination

Slickspot peppergrass is primarily an outcrossing species requiring pollen from separate plants for more successful fruit production and has a low seed set in the absence of insect pollinators (Robertson 2003, p. 5; Robertson and Klemash 2003, p. 339; Robertson and Ulappa 2004, p. 1707; Billinge and Robertson 2008, pp. 1005–1006). Slickspot peppergrass is able to self-pollinate, with a selfing rate (rate of self-pollination) of 12 to 18 percent (Billinge 2006, p. 40; Robertson *et al.* 2006a, p. 40). In pollination experiments where researchers moved pollen from one plant to another, fruit production was higher when pollen from distant sources was used (4 to 12.4 miles (mi)) between patches of plants) than when pollen from plants within the same patch was used (246 to 330 feet (ft)) between plants within the same patch) (Robertson and Ulappa 2004, p. 1705; Robertson *et al.* 2006a, p. 3).

Fruits produced from fertilized flowers reach full size approximately two weeks after pollination (Robertson and Ulappa 2004, p. 1706). Each fruit typically bears two seeds that drop to the ground when the fruit dehisces (splits open) in midsummer (Billinge and Robertson 2008, p. 1003).

Known slickspot peppergrass insect pollinators include several families of bees (Hymenoptera), including Apidae, Halictidae, Sphecidae, and Vespidae; beetles (Coleoptera), including Dermestidae, Meloidae, and Melyridae; flies (Diptera), including Bombyliidae, Syrphidae, and Tachinidae; and others (Robertson and Klemash 2003, p. 336; Robertson *et al.* 2006b, p. 6). In slickspot peppergrass insect pollinator studies conducted at three study sites, seed set was not limited by the number of pollinators at any study site (Robertson *et al.* 2004, p. 14). Studies have shown a strong positive correlation between insect diversity and the number of slickspot peppergrass plants flowering at a site (Robertson and Hannon 2003, p. 8). Measuring fruit set per visit revealed considerable variability in the effectiveness of pollination by different types of insects, ranging from 0 percent in dermestid beetles to 85 percent in honeybees (*Apis mellifera*) (Robertson *et al.* 2006b, p. 15).

Population Dynamics

Due to its occupancy of patchily distributed slickspots, the habitat of slickspot peppergrass is somewhat naturally fragmented. However, large-scale fragmentation can pose problems for slickspot peppergrass by creating barriers in the landscape that prevent effective genetic exchange between populations. Seed dispersal for slickspot peppergrass likely occurs only over

very short distances; thus, pollinators and pollen dispersal are the primary means for reproductive and genetic exchange between slickspot peppergrass sites (Robertson and Ulappa 2004, pp. 1705, 1708; Stillman *et al.* 2005, pp. 1, 6–8).

Research indicates that seeds generated by the pollen of nearby plants have reduced viability, and that slickspot peppergrass seed viability increases as the distance to the contributing pollination source increases (Robertson and Ulappa 2004, pp. 1705, 1708). The ability to exchange pollen with distant populations is therefore an advantage for slickspot peppergrass. Barriers or too much distance between slickspots and pollinating insect habitats can reduce the effective range of insects important to slickspot peppergrass pollination (Robertson *et al.* 2004, pp. 2–4). Barriers can include agricultural fields, urban development, and large areas of annual and perennial grass monocultures that do not support diversity and suitable floral resources such as nectar or edible pollen for pollinators. Slickspot peppergrass habitats separated by distances greater than the effective range of available pollinating insects (about 0.6 mi. as described in Colket and Robertson *in litt.* 2006, p. 1) are at a genetic disadvantage and may become vulnerable to the effects of loss of genetic diversity (Stillman *et al.* 2005, pp. 1, 6–8) and a reduction in seed production (Robertson *et al.* 2004, p. 1705). A genetic analysis of slickspot peppergrass suggested that populations in the Snake River Plain and Owyhee Plateau "may have reduced genetic diversity" (Larson *et al.* 2006, p. 1).[17]

Many of the remaining occurrences of slickspot peppergrass, particularly in the Snake River Plain near urban centers, are restricted to small, remnant patches of suitable sagebrush-steppe habitat. When last surveyed, 31 of the 80 EOs (39 percent) each had fewer than 50 plants (Colket *et al.* 2006, Tables 1–13). Many of these small, remnant EOs exist within habitat that is degraded. Small slickspot peppergrass populations have likely persisted due to their long-lived seed bank, but the potential risk of depleting each population's seed bank with no new genetic input makes the persistence of these small populations uncertain. Providing suitable nesting and foraging habitats for the species' insect pollinators is important for maintaining slickspot peppergrass genetic diversity. Small populations are vulnerable to relatively minor environmental disturbances such as wildfire, herbicide drift, and nonnative plant invasions (Given 1994, pp. 66–67) and are subject to the loss of genetic diversity from genetic drift and inbreeding (Ellstrand and Elam 1993, pp. 217–237). Populations with lowered genetic diversity are more prone to extirpation (Barrett and Kohn 1991, pp. 4, 28). Smaller populations generally have lower genetic diversity, and lower genetic diversity may lead to even smaller populations by decreasing the species' ability to adapt, thereby increasing the probability of population extinction (Newman and Pilson 1997, p. 360).

Fragmentation (either by development or wildfires) has occurred in 62 of 79 EOs (15 of 16 on the Boise Foothills, 35 of 42 on the Snake River Plain, and 12 of 21 on the Owyhee Plateau), and within 0.31 mi in 78 of the 79 EOs (all except one on the Owyhee Plateau) (Cole 2009, threats table).[18] Additionally, several development projects are planned within slickspot peppergrass

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[17] The Boise Foothills were not analyzed separately in this study.

[18] Habitat information is known for 79 of the 80 extant EOs; habitat information is not known for 1 EO on the Snake River Plain.

occupied range that would contribute to further large-scale fragmentation of its habitat, potentially resulting in decreased viability of populations through decreased seed production, reduced genetic diversity, and increased inherent vulnerability of small populations to extirpation.

2.3.1.4 Status and Distribution

The range of slickspot peppergrass is restricted to the volcanic plains of southwest Idaho, occurring primarily in the Snake River Plain and its adjacent northern foothills, with a single disjunct population on the Owyhee Plateau (Figure 18). The plant occurs at elevations ranging from approximately 2,200 to 5,400 ft in Ada, Canyon, Gem, Elmore, Payette, and Owyhee Counties (Moseley 1994, pp. 3–9). Based on differences in topography, soil, and relative abundance, we have divided the extant slickspot peppergrass populations into three physiographic regions: the Boise Foothills, the Snake River Plain, and the Owyhee Plateau. The nature and severity of factors affecting the species also vary between the three physiographic regions for the purposes of analysis. For example, urban and rural development, agriculture, and infrastructure development has been substantial in the sagebrush-steppe habitat of the Boise Foothills and the Snake River Plain regions, while very little of these types of development have occurred within the Owyhee Plateau region.

As of February 2009, there were 80 extant EOs in the three physiographic regions that collectively comprise approximately 15,801 ac of total area broadly occupied by slickspot peppergrass (Cole 2009, threats table). The Idaho Fish and Wildlife Information System (IFWIS, 2014, entire) includes updated information on individual EOs due to more precise site mapping and results of additional surveys conducted since the 2009 listing. These updated IFWIS data indicate that there are 106 extant slickspot peppergrass EOs and subEOs[19] totaling about 15,819 acres rangewide. The area actually occupied by slickspot peppergrass is a small fraction of this total rangewide acreage since slickspots occupy only a small percentage of the landscape, and slickspot peppergrass occupies only a fraction of those slickspots (Air Force 2002, p. 9). Table 2 presents distribution, land ownership and management information for all slickspot peppergrass EOs, in total and by region. The majority of slickspot peppergrass sites are located on Federal lands; most of these Federal lands are administered by the Bureau.

Habitat Characteristics

The biological soil crust, also known as a microbiotic crust or cryptogamic crust, is one component of quality habitat for slickspot peppergrass. Such crusts are commonly found in semiarid and arid ecosystems and are formed by living organisms, primarily bryophytes, lichens, algae, and cyanobacteria, that bind together surface soil particles (Moseley 1994, p. 9; Johnston 1997, p. 4). Microbiotic crusts play an important role in stabilizing the soil and preventing erosion, increasing the availability of nitrogen and other nutrients in the soil and regulating water infiltration and evaporation levels (Johnston 1997, pp. 8–10). In addition, an

[19] Metapopulation EO 16, which is located in the Owyhee physiographic region, is represented in this total by its 19 individual subEOs. If only extant EOs are considered, a total of 88 extant EOs are described by IFWIS as of July 2014.

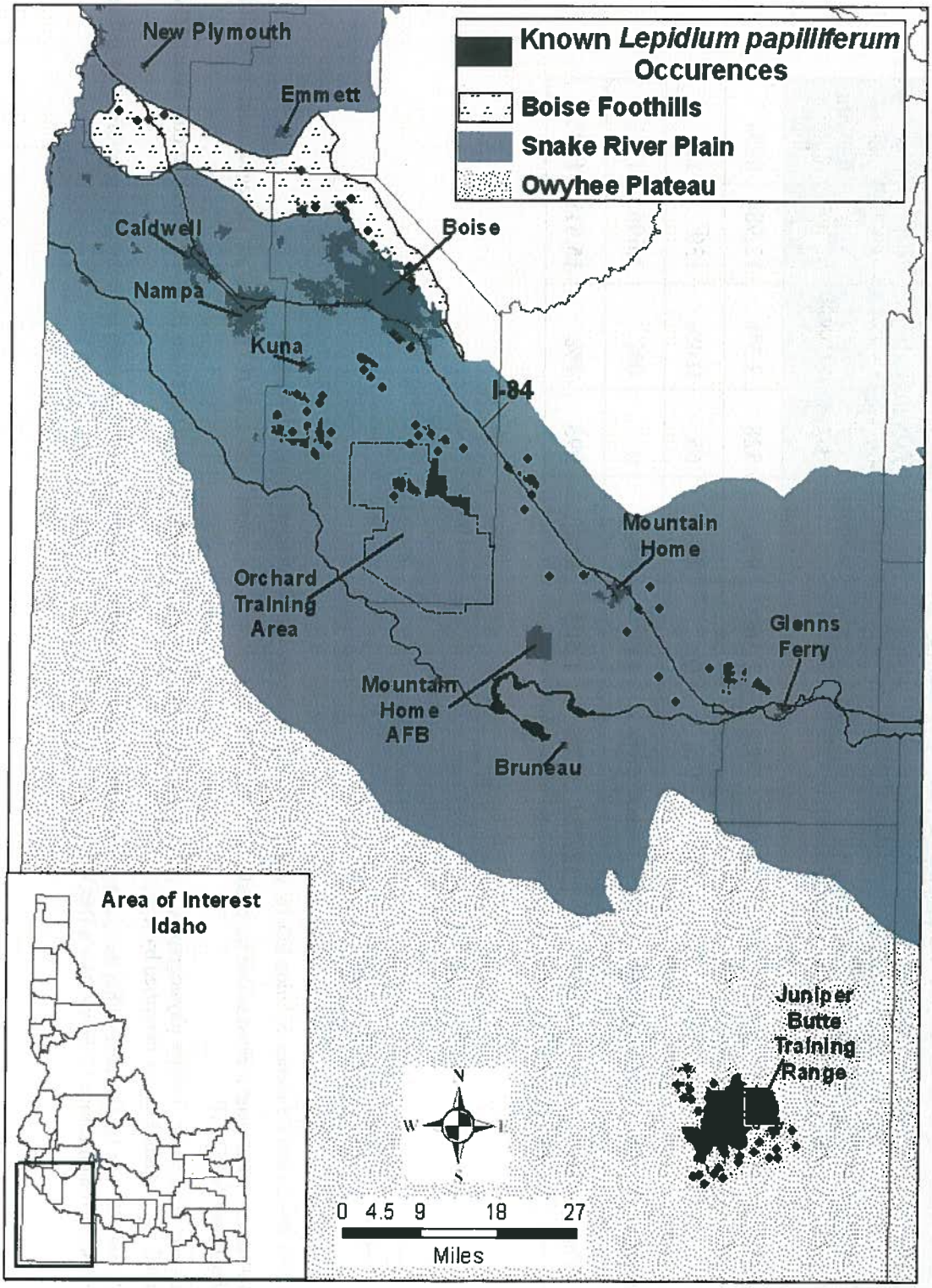

Figure 18. The range of *Lepidium papilliferum* (slickspot peppergrass) in southwest Idaho, showing its distribution in the Snake River Plain, Boise Foothills, and Owyhee Plateau physiographic regions.

Table 2. Distribution and landownership of slickspot peppergrass extant Element Occurrences (EOs)/SubEOs[20] by physiographic region (IFWIS 2014). All areas are estimates; acreages/percentages may not total exactly due to rounding.

	Slickspot Peppergrass EOs		Federal		State		Private		Total	
	Number	Percent (%)	Acres	Percent (%)	Acres	Percent (%)	Acres	Percent	Acres	Percent (%)
Snake River Plain	47	44%	11,087	70%	1,369[21]	9%	528	3.3%	12,984	82%
Boise Foothills	18	17%	74	0%	0	0%	65	0.4%	139	1%
Owyhee Plateau	41[22]	39%	2,563	16%	133[23]	1%	0	0%	2,696	17%
All Extant EOs	**106**	**100%**	**13,724**	**87%**	**1,502**	**9%**	**593**	**4%**	**15,819**	**100%**

[20] SubEOs are only designated for metapopulation EO 16, which is located in the Owyhee Plateau physiographic region.

[21] Of these 1,369 acres of State land located within the Snake River Plain physiographic region, about 1,269 acres (93 percent) are managed under the Orchard Combat Training Center's INRMP.

[22] EO 16, which is located in the Owyhee physiographic region, is represented by its 19 individual subEOs in the extant EO/SubEO total. If only extant EOs are considered, a total of 88 extant EOs are described by IFWIS as of July 2014.

[23] Of these 133 acres of State land located within the Owyhee Plateau physiographic region, about 76 acres (57 percent) are located within subEO 704 and are managed under the Mountain Home Air Force Base's INRMP.

intact crust appears to aid in preventing the establishment of invasive plants (Brooks and Pyke 2001, p. 4 and references therein; Serpe *et al.* 2006, pp. 174, 176). These crusts are sensitive to disturbances that disrupt crust integrity, such as compression due to livestock trampling or off highway vehicle (OHV) use and are subject to damage by fire; recovery from disturbance is possible but occurs very slowly (Johnston 1997, pp. 10–11).

Slickspot peppergrass occurs in slickspot habitat microsites scattered within the greater semiarid sagebrush-steppe ecosystem of southwestern Idaho. On a broad scale, the Snake River Plains and the Owyhee Plateau physiographic regions are volcanic in nature and underlain by Tertiary basalt or rhyolite; the adjacent Boise Foothill sites are underlain by Pliocene/Quaternary lacustrine deposits (Moseley 1994, p. 8). Slickspots are visually distinct openings characterized by natric soils and distinct clay layers; they tend to be highly reflective and relatively light in color, making them easy to detect on the landscape (Fisher *et al.* 1996, p. 3). Slickspots are distinguished from the surrounding sagebrush matrix as having the following characteristics: microsites where water pools when rain falls (Fisher *et al.* 1996, pp. 2, 4); sparse native vegetation, distinct soil layers with a columnar or prismatic structure, higher alkalinity and clay content, and natric properties (Fisher *et al.* 1996, pp. 15–16; Meyer and Allen 2005, pp. 3–5, 8; Palazzo *et al.* 2008, p. 378); and reduced levels of organic matter and nutrients due to lower biomass production (Meyer and Quinney 1993, pp. 3, 6; Fisher *et al.* 1996, p. 4). Fisher *et al.* (1996, p. 11) describe slickspots as having a "smooth, panlike surface" that is structureless and slowly permeable when wet, moderately hard and cracked when dry. Although the low permeability of slickspots appears to help hold moisture (Moseley 1994, p. 8), once the thin crust dries out, slickspot peppergrass seedling survival depends on its ability to extend its taproot into the argillic horizon (soil layer with high clay content) to extract moisture from the deeper natric zone (Fisher *et al.* 1996, p. 13).

How long slickspots take to form is unknown, but is hypothesized to take several thousands of years (Nettleton and Peterson 1983, p. 193; Seronko 2006, *in litt.* p. 2). Climate conditions that allowed slickspot formation in southwestern Idaho are thought to have occurred during a wetter Pleistocene period. Holocene additions of wind-carried salts (often loess deposits) produced the natric soils characteristic of slickspots (Nettleton and Peterson 1983, p. 191; Seronko 2006, *in litt.*, p. 2). Several hundred years may be necessary to alter or lose slickspots through natural climate change or severe natural erosion (Seronko 2006, *in litt.* p. 2). However, some researchers hypothesize that new slickspots are no longer being created given current climatic conditions (Nettleton and Peterson 1983, pp. 166, 191, 206). As slickspots in southwest Idaho appear to have formed during the Pleistocene and current climate conditions may not allow for the formation of new slickspots, the loss of slickspot microsites appears to be permanent.

Some slickspots subjected to past light disturbance may be capable of reforming (Seronko 2006, *in litt.* p.2). However, disturbances that alter the physical properties of the soil layers, such as deep disturbance and the addition of organic matter, may lead to the destruction and permanent loss of slickspots. For example, deep soil tilling and adding organic matter and gypsum have been recommended for eliminating slickspots from agricultural lands in Idaho (Peterson 1919, p. 11; Rasmussen *et al.* 1972, p. 142). Slickspot soils are especially susceptible to mechanical disturbances when wet (Rengasamy *et al.* 1984, p. 63; Seronko 2004, *in litt.* pp. 1–2). Such disturbances disrupt the soil layers important to slickspot peppergrass seed germination and seedling growth and alter hydrological function. Meyer and Allen (2005, p. 9) suggest that if

sufficient time passes following the disturbance of slickspot soil layers, the slickspot soil layers may regain their pre-disturbance configuration yet not support the species. Thus, while the slickspot appears to have regained its former character, some essential component required to sustain the life history requirements of slickspot peppergrass has apparently been lost, or the active seed bank is no longer present.

Most slickspots are between 10 and 20 square feet (ft^2) in size although some are as large as 109 ft^2 (Mancuso *et al.* 1998, p. 1). Slickspots cover a relatively small cumulative area within the larger sagebrush-steppe matrix, and only a small percentage of slickspots are known to be occupied by slickspot peppergrass.

Slickspot peppergrass has infrequently been documented outside of slickspots on disturbed soils, such as along graded roadsides and badger mounds. However, the vast majority of plants documented over the past 19 years of surveys and monitoring for the species were observed within slickspot microsite habitats (USFWS 2006b, p. 20). For example, in 2002, a complete census of an 11,070-ac area recorded approximately 56,500 slickspots (Air Force 2003 *in litt.*, p. 15), of which approximately 2,450 (about 4.0 percent) were occupied by slickspot peppergrass plants (Bashore, pers. comm. 2003, p. 1). Of the approximately 11,300 slickspot peppergrass plants documented during the survey effort, only 11 plants (less than 1 percent) were documented outside of slickspots (Air Force 2002, summary attachment).

Not all potential slickspot peppergrass habitats in southwest Idaho have been surveyed, and additional slickspot peppergrass sites may be found outside of areas known to be occupied. In 2008, a high-quality, predictive-distribution model of slickspot peppergrass to identify Potential Habitat was developed (Colket 2008, p. 1). The Bureau defines Potential Habitat as areas within the known range of slickspot peppergrass that have certain general soil and elevation characteristics that indicate the potential for the area to support slickspot peppergrass, although the presence of slickspots or the plant is unknown (USBLM 2009, p. B–2; see also Appendix F of this Opinion). Although surveys were conducted in 2008 in some areas identified as previously unsurveyed habitat with potential to contain the species, these surveys did not result in any new locations of the species (Colket 2008, pp. 4–6). Slickspot peppergrass has also been surveyed for in eastern Oregon, but the species has never been found there (Findley 2003 *in litt.*, p. 1). We have no historical records indicating that slickspot peppergrass has ever been found anywhere outside of its present range in southwestern Idaho.

The Idaho Natural Heritage Program (INHP) uses an EO ranking system for assessing the status of slickspot peppergrass. This system ranks slickspot peppergrass occurrences based on measures of habitat quality and species abundance. EO ranks are useful for assessing estimated viability or probability of persistence and helping prioritize conservation planning or actions (NatureServe 2002). The ranks are defined as follows (Colket *et al.* 2006, pp. 3–4):

- A-Rank—
    - SIZE: Greater than 1,000 detectable genets.
    - CONDITION: Native plant community is intact with trace introduced plant species cover. Slickspots have zero or trace introduced weed cover and/or livestock disturbance. Zero or few minor anthropogenic disturbances are present. EO is unburned.

  - LANDSCAPE CONTEXT: Surrounding landscape less than 0.6 mi away has not been fragmented by agricultural lands, residential or commercial development, introduced annual grasslands, or drill seeding projects.

- B-Rank—
  - SIZE: 400–999 detectable genets.
  - CONDITION: Native plant community is intact with low introduced plant species cover. Slickspots have low introduced weed cover and/or livestock disturbance. Zero or few minor anthropogenic disturbances present. EO is predominantly unburned.
  - LANDSCAPE CONTEXT: Surrounding landscape less than 0.6 mi away is minimally to partially fragmented by agricultural lands, residential or commercial development, introduced annual grasslands, or drill seeding projects.
- C-Rank—
  - SIZE: 50–399 detectable genets.
  - CONDITION: Native plant community is partially intact with low-to-moderate introduced plant species cover. Slickspots have low-to-moderate introduced weed cover and/or livestock disturbance. Few or several minimally to moderately severe anthropogenic disturbances are evident. EO has partially burned. Portions of EO may have been drill seeded, but slickspots are largely intact.
  - LANDSCAPE CONTEXT: Surrounding landscape less than 0.6 mi away is partially to predominantly fragmented by agricultural lands, residential or commercial development, introduced annual grasslands, or drill seeding projects.
- D-Rank—
  - SIZE: 1–49 detectable genets.
  - CONDITION: Few components of the native plant community remain and introduced plant species cover is high. Slickspots have high introduced weed cover and/or livestock disturbance. Few or several moderately severe anthropogenic disturbances are evident. EO has been predominantly to completely burned. Portions of EO may have been drill seeded, and slickspot soils have been altered by drill seeding.
  - LANDSCAPE CONTEXT: Surrounding landscape less than 0.6 mi away is moderately to completely fragmented by agricultural lands, residential or commercial development, introduced annual grasslands, or drill seeding projects.
- E-Rank (Extant)—
  - EO has been verified extant, but population size, condition, and landscape context have not been assessed.
- F-Rank (Failed to find)—
  - EO has been surveyed by experienced individuals who failed to find any slickspot peppergrass individuals, despite searching under conditions appropriate for the element at a location where it was previously recorded. Only one visit is required for this rank designation, but the survey should cover the entire extent of the EO. The F-rank was first standardized by NatureServe (2002) and not implemented for slickspot peppergrass before 2006.

- H-Rank (Historical)[24]—
    - An EO that has not been observed since 1970. These are historical EOs indicating where slickspot peppergrass was reported, often based on older herbarium records. Locations associated with these herbarium records are typically geographically vague and may be simply indicated by the name of a town.
- X-Rank (Extirpated)—
    - EO has been extirpated. Extirpation is based on: 1) agricultural conversion, commercial or residential development, or other documented habitat destruction where slickspot peppergrass has been previously recorded, or 2) when an EO has consistently received an F-rank five times within a 12-year time period.
- X?-Rank (Probably Extirpated)—
    - EO has probably been extirpated. The "?" qualifier is used with the most appropriate rank (i.e. X?) if there is incomplete information on the EO size, condition, and/or landscape context factors.

As of February 2009, the INHP ranked 80 extant EO records for slickspot peppergrass based on habitat quality and abundance (Cole 2009, threats table). As described above, updated 2014 information available from the IFWIS indicates that there are 106 extant slickspot peppergrass EOs/subEOs totaling about 15,819 acres rangewide. No A-ranked EOs for slickspot peppergrass exist. The most common rangewide EO ranks for slickspot peppergrass are C and D. There are currently 14 B-ranked EOs rangewide, with about 60 percent of the combined B-ranked EO acreage rangewide located on the IDARNG's OCTC (about 7,173 acres of the total 11,944 B-ranked EO acreage rangewide). In addition, nine EOs are ranked as X or X?, and seven EOs are ranked as H.

EO ranks also vary by physiographic region. A little over half of the extant EO area in the Boise Foothills physiographic region is C-ranked (75 acres (53 percent) of the 139 total acreage in the Boise Foothills). In contrast, approximately 74 percent of the total EO area in the Snake River Plain is B-ranked (9,577 acres of the 12,984 total acreage of the Snake River Plain physiographic region), the majority of which is located within the IDARNG's OCTC (about 7,173 acres). About 84 percent of the total EO area in the Owyhee Plateau physiographic region is also B-ranked (2,287 acres of the 2,696 total acreage of the Owyhee Plateau physiographic area, the majority of which is located on the Air Force's Juniper Butte Range).

Population Trends

Extreme variability in annual plant counts makes detecting significant population trends in slickspot peppergrass difficult. However, the best scientific and commercial evidence available collected over the past 18 years from the rough census areas on the OCTC shows a significant downward density trend in the abundance of slickspot peppergrass plants during the past two decades (74 FR 52025, October 8, 2009). Furthermore, we believe it is reasonable to infer that

[24] No G-rank exists in the INHP EO ranking system for slickspot peppergrass.

this negative trend may be similar or possibly even greater rangewide in areas outside the high-quality habitat of the OCTC, and this trend appears to be independent of any precipitation trend.

Uncertainties associated with both the data and the model, used by Sullivan and Nations (2009, entire) in their analysis of slickspot peppergrass density and abundance on the OCTC over time, preclude our ability to project future population trends for slickspot peppergrass. These uncertainties include, but are not limited to, great annual variability in plant numbers; the confounding influence of the long-lived seed bank; complications associated with annual variability in both precipitation and temperature; and inconsistent results between the special-use plots and the rough census areas on the OCTC (see Sullivan and Nations 2009, pp. 28–33 for an explanation of these two OCTC survey methodologies). The evaluation by Sullivan and Nations (2009, pp. 1–278) was based on a simple model of slickspot peppergrass abundance or density as a linear function of time and intended only to discern whether there was any general population trend (74 FR 52025, October 8, 2009). The authors acknowledge that the dynamics are complicated, and note their model is not intended to describe (nor explain) the details of the temporal pattern of abundance or density of slickspot peppergrass (Sullivan and Nations 2009, p. 38).

In addition, we do not have any models for slickspot peppergrass based on multivariate analyses, which would simultaneously consider additional variables such as precipitation to potentially allow for the prediction of abundance or density of slickspot peppergrass over time based on projected conditions. As stated in our listing rule, although the available descriptive model is helpful for interpreting the population information available to date and indicates that slickspot peppergrass has likely been trending downward for all of the reasons outlined above, it would be inappropriate to rely on this model to predict any future population trajectory for slickspot peppergrass (74 FR 52025, October 8, 2009).

2.3.1.5 Previous Consultations and Conservation Efforts

The Service has completed several consultations under section 7 of the Act for programs and individual actions located in the vicinity of the proposed Project. Some of these were completed as letters of concurrence/conference reports [Normal Fire Emergency Stabilization and Rehabilitation Plan (01EIFW00-2013-FE-0103; USFWS 2013, *in litt.*, entire; 14420-2006-IC-0975, USFWS 2006a, *in litt.*, entire); Noxious Weed Management Plan (14420-2006-IC-0918; USFWS 2006b, *in litt.*, entire)] as they were determined to be unlikely to adversely affect listed/proposed species, including slickspot peppergrass. Following listing of the species in 2009, conference reports for slickspot peppergrass were converted to letters of concurrence, at the request of the Bureau, to ensure continued compliance under section 7 of the Act (14420-2010-TA-0103; USFWS 2009, *in litt.*, entire). The Service has completed formal consultations with the Bureau on the Kuna Management Framework Plan (MFP), the Cascade Resource Management Plan (RMP), and the Snake River Birds of Prey National Conservation Area RMP, which provide management direction for the Project area (11420-2010-F-0019; USFWS 2009, entire). Formal consultation or conference on the effects of multiple projects on slickspot peppergrass have been completed, including Bureau ongoing livestock grazing activities on 27 Allotments (14420-2010-F-0025; USFWS 2010, entire), Bureau authorization of rights-of-way associated with the M3 Development in northwest Ada County (14420-2011-F-0148; USFWS 2011, entire), reauthorization of livestock grazing activities on the Mountain Home Subunit

Allotment #00813 (01EIFW00-2012-F-0183; USFWS 2012b, entire), construction of the Kinyon Road Fuel Breaks Project (01EIFW00-2012-F-0040; USFWS 2012d, entire), reauthorization of the existing Williams Northwest Pipeline Right-of-Way (01EIFW00-2013-FC-0040; USFWS 2012c, entire), rights-of-way authorizations for the Gateway West Transmission Line Project (06E1 3000-2013-F-0033; USFWS 2013b, entire), and construction of the Jarbidge Fuel Breaks Project (01EIFW00-2014-FC-0767; USFWS 2014b, entire). For actions that are underway, standing concurrences and consultations will remain in effect as long as the actions are carried out as proposed and no new information surfaces to indicate the species will be affected in unanticipated ways.

As described above, the Service and Bureau have entered into a CA committing to implement conservation measures for slickspot peppergrass that would avoid or minimize effects associated with Bureau actions planned under the standards and guidelines of their LUPs (USBLM and USFWS 2014, entire). The 2014 CA represents an update of earlier versions of the CA (USBLM and USFWS 2013, entire; USBLM and USFWS 2009, entire; USBLM and USFWS 2006, entire). The conservation measures and associated implementation actions for ongoing Bureau LUP programs provide overall guidance for avoiding or minimizing direct and indirect effects to the habitat of slickspot peppergrass and restoring and maintaining that habitat. Conservation measures and implementation actions for slickspot peppergrass include conducting species inventories on Bureau lands, exchanging location information with agency partners, completing site-specific section 7 consultation on both ongoing and new actions, and avoiding or minimizing potential adverse impacts of site-specific projects covered under LUP programs. Site-specific implementation and effectiveness monitoring, including annual reporting requirements, will also be completed to track progress toward achieving conservation objectives. All conservation measures in the CA will be implemented until such time that new LUPs or amendments are approved with completed consultations and signed Records of Decision. The CA provides goals for inventories of slickspot peppergrass as well as direction for completing section 7 consultations on all ongoing and proposed activities on Bureau lands that may affect this species.

The Bureau is also implementing conservation measures defined in the Candidate Conservation Agreement (CCA) signed between the State of Idaho, the Bureau, the IDARNG, and nongovernmental cooperators (private landowners who also hold livestock grazing permits on Bureau lands) (State of Idaho *et al.* 2003, entire and 2006, entire). The majority of the individual conservation efforts being implemented for slickspot peppergrass that are applicable to individual projects are contained in the CCA, which was originally drafted in 2003 and updated in 2006. The CCA represents an important milestone in the cooperative conservation of slickspot peppergrass given its rangewide scope and coordinated management across lands managed by Federal agencies and the State of Idaho. The CCA includes rangewide efforts that are intended to address the need to maintain and enhance slickspot peppergrass habitat; reduce intensity, frequency, and size of natural- and human-caused wildfires; minimize loss of habitat associated with wildfire-suppression activities; reduce the potential of nonnative plant species invasion from wildfire; minimize habitat loss associated with rehabilitation and restoration techniques; minimize the establishment of invasive nonnative species; minimize habitat loss or

degradation from OHV use; mitigate the negative effects of military training and other associated activities on the IDARNG's OCTC; and minimize the impact of ground disturbances caused by livestock penetrating trampling[25] when soils are saturated (State of Idaho *et al.* 2006, p. 3).

As a signatory of the CCA (State of Idaho *et al.* 2003, 2006), the Bureau is the primary land management agency responsible for implementing conservation actions for slickspot peppergrass on their lands. Implementing the conservation measures in the CCA represents a major commitment on behalf of the Bureau, which has management authority for the majority of the range where slickspot peppergrass occurs (i.e., 85 percent of the total Element Occurrence [EO] area [11,703 of the total 13,724 acres of Federal lands within EOs rangewide]) and partial-to-entire management authority for 94 of the 106 total extant EOs/subEOs comprising the current population of this species occur on Bureau lands). The Bureau also has the lead for implementing CCA-derived conservation measures that were appropriate for LUP-level programs that were included in the August 22, 2006 CA between the Service and the Bureau to avoid or minimize the adverse impacts of implementing Bureau LUPs to slickspot peppergrass, which was updated September 15, 2014 (USBLM and USFWS 2014, entire).

Although the majority of the conservation measures identified in the CCA have been implemented to date, relatively few of these measures have been determined at this time to be measurably effective for conserving slickspot peppergrass. For example, many of the implemented measures include conducting surveys, monitoring, or providing for public outreach and education, which have limited direct or long-term conservation benefits to the species. With the exception of several conservation efforts implemented at the IDARNG's OCTC that have been successful in controlling wildfire effects on slickspot peppergrass habitats, many of the remaining conservation efforts and adaptive management provisions identified in the CCA have not been implemented over a long enough period of time to demonstrate their effectiveness in reducing threats to the species. Furthermore, the conservation measures identified in the CCA are concentrated on slickspot peppergrass EOs. While this focus is helpful, effectively controlling the most significant threats to slickspot peppergrass (wildfire and invasive nonnative plant species) requires efforts that extend well beyond the boundaries of the EOs since these threats are naturally expansive and occur throughout the Great Basin. We recognize the conservation efforts identified in the CCA have a conservation benefit for slickspot peppergrass, but rangewide their effectiveness in reducing or eliminating the most significant threats to the species has not been demonstrated at this time.

Conservation measures identified for slickspot peppergrass are either specific measures designed to reduce impacts to the species and its habitat at the local level, or general measures designed to improve the ecological condition of native sagebrush-steppe vegetation at a landscape scale, inclusive of areas supporting slickspot peppergrass. Specific measures include management actions such as varying the timing or season of livestock grazing or trailing and moving water or supplements away from EOs. General measures include management actions designed to

[25] Penetrating trampling is defined by the CCA as breaking through the restrictive layer (i.e., the middle layer of slickspot soil that supports slickspot peppergrass, as described by Meyer and Allen 2005, p. 3) under the silt surface area of a slickspot during saturated conditions (State of Idaho *et al.* 2006, p. 9).

maintain or increase native forb and grass cover, protect sagebrush through fire protection or suppression, and restore degraded habitats to improve connectivity between sites. General conservation measures and implementation actions within the CA include direction to prioritize slickspot peppergrass EOs for fire protection and weed control across the range of the species. For example, the CA indicates that fire suppression efforts will be conducted, as possible, to protect slickspot peppergrass habitat; protecting slickspot peppergrass habitat will be a high priority. The Bureau will also promote diversity, richness, and health of native plant communities to support pollinators and habitat for slickspot peppergrass, including conducting weed control activities compatible with slickspot peppergrass conservation. The Service expects the Bureau's continued implementation of these general conservation measures will reduce effects from wildfire and nonnative invasive plants across the range of the species, including within the Project area.

2.3.1.6 Conservation Needs

Although recovery planning has not been completed for slickspot peppergrass, the Service anticipates that providing for its survival and recovery will entail reducing the threats that are the basis for its being listed: habitat loss, degradation, and fragmentation primarily caused by increased fire frequencies and the invasion of exotic plants; lack of sufficient gene flow between populations; and reduced viability of seed banks. The Service anticipates that the following factors will be important for survival and recovery of the species:

- Protection, restoration, and maintenance of suitable habitat conditions for all life stages of slickspot peppergrass;
- Reduction and mitigation of negative effects caused by increased fire frequencies and invasive nonnative plants on slickspot peppergrass;
- Establishment of vegetation management goals and objectives that are compatible with slickspot peppergrass recovery;
- Identification of what is necessary to conserve genetic diversity and gene flow among populations of slickspot peppergrass; and monitoring to ensure that this diversity and gene flow are being maintained;
- Implementation of an adaptive management based research and monitoring program that uses feedback from implemented, site-specific recovery tasks to implement and evaluate slickspot peppergrass recovery activities;
- Use of all available conservation programs and regulations to protect and conserve slickspot peppergrass and sagebrush-steppe habitats, including slickspot microsites; and
- Development of a management area-based recovery program that relies on adaptive management to implement and revise, as appropriate, recovery actions for slickspot peppergrass.

Slickspot peppergrass survival and recovery depends on maintaining and enhancing Wyoming big sagebrush–steppe habitat and the slickspot microsites located within this ecosystem in southwestern Idaho. The long-term conservation of slickspot peppergrass is dependent upon the maintenance or improvement of ecological function of the higher quality (C- through A-ranked) EOs rangewide, including maintaining or improving connectivity within and between EOs, which may involve the maintenance or enhancement of currently lower ranked EOs (D- through

F-ranked) as necessary to facilitate pollinator activity; the maintenance of genetic diversity; and limiting the establishment of invasive nonnative plant species.

Key to maintaining quality habitat includes preserving existing Wyoming big sagebrush stands by avoiding or minimizing adverse effects of wildfire and invasive nonnative plants, such as cheatgrass and *Taeniatherum caput-medusae* (medusahead). The Service has identified the modified wildfire regime in the Great Basin and subsequent proliferation of invasive nonnative plants as the primary threats to slickspot peppergrass. Adequate resources should be made available to reduce the wildfire risk in remaining sagebrush stands, and efforts to maintain and restore native shrubs, grasses, forbs, and biological soil crust should be identified as a priority in areas that have burned in or nearby slickspot peppergrass population strongholds. Plant species that may invade slickspots and compete with slickspot peppergrass should be avoided for use in emergency stabilization and rehabilitation or habitat restoration seedings in areas that support slickspot peppergrass and its habitat. Native forb cover should be maintained or restored to levels that would encourage diverse insect pollinators available for slickspot peppergrass seed production. Activities that could cause direct plant mortality should be minimized. Ground disturbance that could cause decreased suitability of microsites to support slickspot peppergrass should be avoided or minimized. When soils are saturated, ground disturbing activities should be minimized to reduce the likelihood of directly affecting plants and burying seeds too deep to successfully germinate and emerge. Conservation measures should be implemented to mitigate the effect of actions that create conditions conducive to both unseeded and seeded invasive nonnative plants within and adjacent to slickspot habitat.

Secondary threats, such as commercial and residential development, seed predation by Owyhee harvester ants (*Pogonomyrmex salinus*), habitat fragmentation and isolation, and climate change, were identified in the Federal Register notice for listing of slickspot peppergrass as factors that could impact slickspot peppergrass throughout a significant portion of its range. Other factors, including livestock grazing, fire rehabilitation activities, military training, and recreational use, were discussed as not having significant impacts that would lead to slickspot peppergrass becoming endangered in the foreseeable future. However, both secondary threats and these other factors have been identified as aggravating degraded habitat conditions caused by the modified wildfire regime and associated invasion of nonnative plants. While not identified as rangewide issues, secondary threats and other factors may adversely affect individual slickspot peppergrass plants at the physiographic regional or local level. In areas containing high-quality sagebrush-steppe habitats, conservation measures should be implemented to avoid or minimize the impacts of habitat loss on slickspot peppergrass. Actions that could degrade slickspots to the point that they can no longer provide the essential functions to support slickspot peppergrass should be avoided as losing habitat represents a permanent loss for the species. Using pesticides near EOs should also be minimized to avoid impacts to individual slickspot peppergrass plants or insect pollinators.

For purposes of this jeopardy analysis, the maintenance or improvement of moderate to high conservation value EOs (i.e., those currently ranked C through B by INHP, and including any EOs that may be A-ranked in the future) will be an important component of the rangewide conservation strategy for slickspot peppergrass. We anticipate the enhancement of higher-quality EOs will effectively offset the relatively low contribution made by the lower-ranked EOs of lesser conservation value to the species. In general, small populations of slickspot

peppergrass in degraded and fragmented habitat are at high risk of extirpation and are unlikely to significantly contribute to the conservation of the species.

The anticipated beneficial and adverse effects of the Paradigm Fuel Breaks Project form the basis for our determination as to whether this action is expected to maintain, reduce, or improve the current conservation value of the affected area for slickspot peppergrass. Conservation measures designed to reduce wildfire threats and competition from invasive nonnative plants (including potentially invasive seeded plant species) are expected to be especially important for the survival and recovery[26] of slickspot peppergrass.

Effects of Climate Change on Slickspot Peppergrass Survival and Recovery Needs

Warmer temperature regimes associated with global climate change represent another potentially significant risk factor for slickspot peppergrass. Researchers confirmed "experimentally in an intact ecosystem that elevated carbon dioxide may enhance the invasive success of *Bromus* spp. in arid ecosystems," and suggest that this enhanced success will then expose these areas to accelerated fire cycles (Smith *et al.* 2000, p. 81). Chambers and Pellant (2008, p. 32) also suggest that higher carbon dioxide levels are likely increasing cheatgrass fuel loads due to increased productivity, with a resulting increase in fire frequency and extent. Based on the best available information, we therefore expect continuing production of atmospheric carbon dioxide at or above current levels, as predicted, to increase the threat posed to slickspot peppergrass by cheatgrass and from more frequent, expansive, and severe wildfires (Smith et al. 1987, p. 143; Smith et al. 2000, p. 81; Brown et al. 2004, p. 384; Neilson et al. 2005, pp. 150, 156; Chambers and Pellant 2008, pp. 31-32). Thus, under current climate-change projections, we anticipate future climatic conditions will favor further invasion by cheatgrass, fire frequency is likely to continue to increase, and the extent and severity of fires may also increase.

Current projections for the Pacific Northwest region are that precipitation will increase in the winter but decrease in the summer months (Karl et al. 2009, p. 135). The survivorship of slickspot peppergrass rosettes to flower the following spring is favored by greater summer precipitation (Meyer et al. 2005, p. 15; CH2MHill 2007, p. 14; Sullivan and Nations 2009, pp. 33, 41), and increased winter precipitation appears to decrease survivorship (Meyer et al. 2005, pp. 15-16; Sullivan and Nations 2009, pp. 39, 43-44). As the projected rainfall pattern under climate change would follow the opposite pattern, this alteration in seasonal precipitation could result in decreased survivorship of slickspot peppergrass. Alterations in precipitation patterns, however, are more uncertain than predicted changes in temperature for the Great Basin region (Neilson et al. 2005, p. 153).

According to climate change models the temperature within the Snake River Plain has been increasing and is expected to continue to increase at least through the middle of the 21st century (Klos et al. 2012, p. 1). Precipitation patterns within the Snake River Plain have been shifting to

[26] For determination of jeopardy/adverse modification, survival refers to the species' persistence as listed or as a recovery unit, beyond the conditions leading to its endangerment, with sufficient resilience to allow for the potential recovery from endangerment. Recovery refers to the improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in section 4(a)(1) of the Act.

increased winter rain and less snow, increased intensity for spring rain events, and decreased summer precipitation than was received historically (Nayak et al. 2010, pp. 9-10, 15; Klos et al. 2012, pp. 2-4). Models predict that by mid-century, the largest portion of the precipitation within the Snake River Plain will come in December and January (Klos et al. 2014, p. 11). Using data collected from numerous field studies, Meyer et al. (2006, p. 896) found that slickspot peppergrass biennial persistence is reliant on high summer and low early winter rain fall. Meyer et al. (2006, p. 896) determined that while a constant percentage of the seed bank germinates each year, the proportion that survives to emergence is reliant on high levels of precipitation in February and March. Higher April and May precipitation is positively correlated with number of plants that make it to flowering and fruiting stage (Meyer et al. 2006, p. 896). Precipitation trends shifting as a result of climate change could negatively affect slickspot peppergrass by decreasing the number of first year biennials that survive over the winter and into the following summer in order to flower and fruit. Annual forms of slickspot peppergrass could also be negatively affected if growing season precipitation (February through May) decreases. As described above, increased temperatures and carbon levels could also result in an increase in cheatgrass throughout the Snake River Plain.

The consequences of climate change, if current projections are realized, are therefore likely to exacerbate the existing primary threats—modified wildfire regime and invasive nonnative plants, particularly cheatgrass—to slickspot peppergrass conservation. Because the Intergovernmental Panel on Climate Change (IPCC) projects changes to the global climate system in the twenty-first century will likely be greater than those observed in the twentieth century (IPCC 2007, p. 45), we anticipate that these effects will continue and likely increase into the future. Due to the uncertainty associated with climate change projections, we did not consider climate change in and of itself to represent a significant rangewide threat to slickspot peppergrass in our 2009 listing decision. However, we acknowledge that climate change will likely play a potentially important supporting role in intensifying the most significant current threats to the species in the foreseeable future. The severity and scope of the primary threats of changing wildfire regime and invasive nonnative plants to slickspot peppergrass are likely to be magnified, depending on the realized outcome of climate change. Habitat conservation and restoration efforts are likely to be further complicated by these climatic changes. Additional conservation measures may be needed to mitigate the effects of habitat degradation that are aggravated by climate change. For a more detailed discussion of climate change and slickspot peppergrass, refer to the final listing rule (74 FR 52014, October 8, 2009).

2.3.2 Slickspot Peppergrass Proposed Critical Habitat

2.3.2.1 Legal Status

Critical habitat was proposed for slickspot peppergrass on May 10, 2011. On February 12, 2014, the Service amended the original May 10, 2011 critical habitat proposal to include recently discovered slickspot peppergrass locations that met critical habitat designation criteria. Final designation of critical habitat will occur at a future date, contingent upon whether a decision to list the species under the Act is made.

2.3.2.2 Conservation Role and Description of Critical Habitat

The conservation role of slickspot peppergrass critical habitat is to support the various life history needs and provide for the conservation of the species (76 FR 27190). Four Critical Habitat Units (CHUs) encompassing a combined total of 57,756 acres within Ada, Elmore, Payette, and Owyhee Counties have been identified as being important to the survival and recovery of slickspot peppergrass. All CHUs currently proposed as critical habitat are located within the geographical area occupied by slickspot peppergrass at the time of listing, and are currently occupied by the species. These units proposed as critical habitat contain the physical and biological features essential to the conservation of slickspot peppergrass.

Primary constituent elements (PCEs) include physical and biological features of designated or proposed critical habitat essential to the conservation of the species, including, but not limited to: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and (5) habitats that are protected from disturbance or are representative of the historic geographic and ecological distributions of a species [Act §3(5)(A)(i), 50 CFR §424.12(b)]. In determining which areas to propose as critical habitat, the Service considered the physical and biological features that are essential to the conservation of slickspot peppergrass and that may require special management considerations or protection. These features are the PCEs laid out in the appropriate quantity and spatial arrangement for conservation of the species. The PCEs of slickspot peppergrass proposed critical habitat are:

PCE 1. Ecologically-functional microsites or ''slickspots'' that are characterized by:

- A high sodium and clay content, and a three-layer soil horizonation sequence, which allows for successful seed germination, seedling growth, and maintenance of the seed bank. The surface horizon consists of a thin, silty, vesicular, pored (small cavity) layer that forms a physical crust (the silt layer). The subsoil horizon is a restrictive clay layer with an abruptic (referring to an abrupt change in texture) boundary with the surface layer, that is natric or natric-like in properties (a type of argillic (clay-based) horizon with distinct structural and chemical features) (the restrictive layer). The second argillic subsoil layer (that is less distinct than the upper argillic horizon) retains moisture through part of the year (the moist clay layer); and
- Sparse vegetation with low to moderate introduced invasive nonnative plant species cover.

PCE 2. Relatively-intact native *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush) vegetation assemblages, represented by native bunchgrasses, shrubs, and forbs, within 250 m (820 feet) of slickspot peppergrass element occurrences to protect slickspots and slickspot peppergrass from disturbance from wildfire, slow the invasion of slickspots by nonnative species and native harvester ants, and provide the habitats needed by slickspot peppergrass' pollinators.

PCE 3. A diversity of native plants whose blooming times overlap to provide pollinator species with sufficient flowers for foraging throughout the seasons and to provide nesting and egg-laying sites; appropriate nesting materials; and sheltered, undisturbed places for hibernation and overwintering of pollinator species. In order for genetic exchange of slickspot peppergrass to

occur, pollinators must be able to move freely between slickspots. Alternative pollen and nectar sources (other plant species within the surrounding sagebrush vegetation) are needed to support pollinators during times when slickspot peppergrass is not flowering, when distances between slickspots are large, and in years when slickspot peppergrass is not a prolific flowerer.

PCE 4. Sufficient pollinators for successful fruit and seed production, particularly pollinator species of the sphecid and vespid wasp families, species of the bombyliid and tachnid fly families, honeybees, and halictid bee species, most of which are solitary insects that nest outside of slickspots in the surrounding sagebrush-steppe vegetation, both in the ground and within the vegetation.

The space for individual and population growth is provided by PCEs 1, 2, and 3; the need for food, water, air, light, minerals, or other physiological requirements is provided by PCEs 1 and 2; the need for cover and shelter is met by PCEs 1 and 2; sites for reproduction, germination, and seed dispersal are provided by PCEs 1, 2, 3, and 4; and habitat free from disturbance is met by PCE 2 (76 FR 27191).

Activities that cause adverse effects to critical habitat are evaluated to determine if they are likely to "destroy or adversely modify" critical habitat by no longer serving the intended conservation role for the species or retaining those PCEs that relate to the ability of the area to at least periodically support the species. Activities that may destroy or adversely modify critical habitat are those that alter the PCEs to such an extent that the conservation value of critical habitat is appreciatively reduced. The Service's evaluation must be conducted at the scale of the entire critical habitat area designated, unless otherwise stated in the final critical habitat rule (USFWS and NMFS 1998, p. 4-39). Thus, proposed critical habitat for slickspot peppergrass is evaluated at the scale of the entire area proposed for designation, which includes the four CHUs described above. All four CHUs contain features or areas essential to the conservation of slickspot peppergrass. Therefore, if a proposed or ongoing action would alter the physical or biological features of proposed critical habitat to the extent that appreciably reduces the conservation function of one or more critical habitat units for slickspot peppergrass, a finding of adverse modification for the entire proposed critical habitat area may be warranted.

2.3.2.3 Current Rangewide Condition of Species Critical Habitat

The condition of slickspot peppergrass proposed critical habitat varies across its range from poor to good. While some areas contain intact sagebrush steppe habitat, other areas have been fragmented by wildfires and both unseeded and seeded invasive nonnative plants such as cheatgrass and *Agropyron cristatum* (crested wheatgrass). The modified wildfire regime and spread of invasive nonnative plants continues to degrade slickspot microsites and associated sagebrush steppe habitat across the range of slickspot peppergrass (76 FR 27186).

Many factors have impacted slickspot peppergrass and its habitat, and continue to do so. Among the factors that contribute to degraded PCEs, those which appear to be particularly significant and have resulted in degraded habitat conditions within areas proposed for critical habitat designation are as follows:

- **Current Wildfire Regime (i.e., increasing frequency, size, and duration).** The result of this altered wildfire regime has been the conversion of vast areas of the former sagebrush-steppe ecosystem to nonnative annual grasslands (USGS 1999, *in litt.*, pp. 1–

9), resulting in loss reduction in cover of sagebrush, native grasses, and native forbs available for insect pollinator foraging and/or shelter. Frequent wildfires can also promote soil erosion and sedimentation (Bunting et al. 2003, p. 82) in arid environments such as the sagebrush-steppe ecosystem. Increased sedimentation can result in a silt layer that is too thick for optimal slickspot peppergrass germination (Meyer and Allen 2005, pp. 6–7). The altered wildfire regime is one of the primary causes of reduced quality of PCEs 1, 2, 3, and 4 of proposed critical habitat for slickspot peppergrass.

- **Invasive Nonnative Plant Species.** Invasive, nonnative plants can alter various attributes of ecosystems including geomorphology, wildfire regime, hydrology, microclimate, nutrient cycle, and productivity (for a summary see Dukes and Mooney 2003, entire). Additionally, these invasive nonnative plants can negatively affect native plants, including rare plants like slickspot peppergrass, through competitive exclusion, niche displacement, hybridization, and competition for pollinators; examples of these negative effects are widespread among different taxa, locations, and ecosystems (D'Antonio and Vitousek 1992, pp. 63–87; Olson 1999, p. 5; Mooney and Cleland 2001, p. 1). Recent analyses have revealed a significant, negative association between the presence of weedy species and the abundance or density of slickspot peppergrass, to the point that the species peppergrass may be excluded from slickspots (Sullivan and Nations 2009, pp. 109–112). Although the specific mechanisms are not well understood, some of these plants, such as *Agropyrum cristatum* (crested wheatgrass) and cheatgrass, are strong competitors in this arid environment for such limited resources as moisture, which tends to be concentrated in slickspots (Pyke and Archer 1991, p. 4; Moseley 1994, p. 8; Lesica and DeLuca 1998, p. 4), at least in the subsurface soils (Fisher et al. 1996, pp. 13–16). Invasive nonnative plants are one of the primary causes of reduced quality of PCEs 1, 2, 3, and 4 of proposed critical habitat for slickspot peppergrass.

- **Habitat Loss and Fragmentation due to Agricultural and Urban Development.** Residential and agricultural development can affect slickspot peppergrass and slickspot habitat through habitat conversion, increased nonnative plant invasions, increased off road vehicle use, increased wildfire, changes to insect populations, and increased fragmentation. Utility lines, such as electrical transmission and gas lines, as well as roads, also fragment slickspot peppergrass occupied areas and act as corridors for nonnative plant invasions. Habitat fragmentation and loss due to development has resulted in localized reduced quality of PCEs 1, 2, 3, and 4 of proposed critical habitat for slickspot peppergrass.

- **Livestock Grazing.** Livestock trampling of water-saturated slickspot soils that breaks through the restrictive layer (referred to as "penetrating trampling" (State of Idaho et al. 2006, p. 9)) has the potential to alter the soil structure and the functionality of slickspots (Rengasamy et al. 1984, p. 63; Seronko 2004, *in litt.*). Penetrating trampling that occurs when slickspots are wet also has the potential to affect the seed bank for slickspot peppergrass by pushing the seeds below a depth where they can germinate (i.e., below 3 cm (1.5 in.)) (Meyer and Allen 2005, pp. 9–10; Meyer et al. 2006, pp. 891, 901–902). Livestock grazing may also locally reduce native forb cover available for insect

pollinators. In contrast, with careful management, livestock grazing may be used as a tool to select for certain native species, or even to control cheatgrass (Frost and Launchbaugh 2003, p. 43). Therefore, livestock grazing may result in localized reductions in the quality of PCEs 1, 2, 3, and 4; current livestock management (including continued implementation of conservation measures to avoid or minimize impacts) is not considered to pose a significant threat to proposed critical habitat of slickspot peppergrass.

Other factors that may result in localized reduced quality of proposed critical habitat PCEs include rangeland revegetation projects, wildfire management practices, and recreational use.

Effects of Climate Change on Proposed Critical Habitat for Slickspot Peppergrass

Similar to potential effects of climate change on the species, we also recognize that climate change may cause changes in slickspot peppergrass proposed critical habitat. As described above for the species, climate change models show that the temperature has been increasing (Klos et al. 2012, p. 1); precipitation patterns within the Snake River Plain have been shifting to increased winter rain and less snow, increased intensity for spring rain events, and decreased summer precipitation than was received historically (Nayak et al. 2010, pp. 9-10, 15; Klos et al. 2012, pp. 2-4). Under projected future temperature conditions, the cover of sagebrush in the Great Basin region is anticipated to be dramatically reduced (Neilson et al. 2005, p. 154). Warmer temperatures and greater concentrations of atmospheric carbon dioxide create conditions favorable to cheatgrass, and perpetuate the positive feedback cycle between annual grasses and fire frequency that poses a significant threat to the sagebrush habitat (Chambers and Pellant 2008, p. 32; Karl et al. 2009, p. 83) where slickspot peppergrass occurs.

The direct, long-term impact from climate change to the critical habitat of slickspot peppergrass is yet to be determined. As discussed above, we anticipate that future climatic conditions will favor further invasion by cheatgrass, that fire frequency will continue to increase, and that the extent and severity of fires may increase as well, further changing the species composition of southwest Idaho's sagebrush-steppe habitat. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features described in PCEs 1, 2, 3, and 4. Climate change may exacerbate habitat degradation impacts both physically (i.e., degradation or loss of slickspot microsites) and biologically (i.e., reduction of insect pollinators due to habitat degradation as well as increased competition with invasive nonnative plants). Protecting slickspot peppergrass strongholds and remaining intact sagebrush steppe habitat from the effects of the modified wildfire regime and associated spread of invasive nonnative plants as well as ensuring connectivity among populations are important considerations in addressing the potential impacts of climate change.

2.3.2.4 Previous Conference on the Effects of Actions on Slickspot Peppergrass Proposed Critical Habitat

Ongoing or proposed actions with formal conference completed for slickspot peppergrass proposed critical habitat include emergency conference on effects of 2011 and 2012 wildfire suppression actions on the Bureau's Boise District (01EIFW00-2012-EF-0073; USFWS 2012a, entire and 01EIFW00-2013-FE-0103; USFWS 2013c, entire), Bureau authorization of rights-of-way associated with the M3 Development in northwest Ada County (14420-2011-F-0148;

USFWS 2011b, entire); reauthorization of livestock grazing activities on the Mountain Home Subunit Allotment #00813 (01EIFW00-2012-F-0183; USFWS 2012b, entire), rights-of-way authorizations for the Gateway West Transmission Line Project (06E1 3000-2013-F-0033; USFWS 2013b, entire), reauthorization of the existing Williams Northwest Pipeline Right-of-Way (01EIFW00-2013-FC-0040; USFWS 2012c, entire), and ongoing livestock grazing activities on 8 Bureau Allotments (14420-2010-F-0025-R001; USFWS 2014a, entire). As described in section 2.3.1.5 above, section 7 consultation/conference has occurred on the effects of multiple actions and plans on the species itself. It is anticipated that section 7 conference or consultation, as appropriate, will be completed regarding the potential effects of additional ongoing and new actions on proposed and designated critical habitat for slickspot peppergrass. Section 7 conference and consultation are expected to include some actions that may degrade the environmental baseline over the short-term in many cases. However, existing conservation measures are intended to minimize habitat degradation for the species; these conservation measures also are expected to minimize short-term impacts to PCEs of slickspot peppergrass critical habitat.

2.4 Environmental Baseline of the Action Area

This section assesses the effects of past and ongoing human and natural factors that have led to the current status of the species, its habitat and ecosystem in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have already undergone section 7 consultations, and the impacts of state and private actions which are contemporaneous with this consultation.

2.4.1 Slickspot Peppergrass

2.4.1.1 Status of the Species in the Action Area

Within or near the proposed Project area, there are 23 extant slickspot peppergrass EOs; part or all of 11 EOs are located within the proposed fuel break footprints (Table 3; see also Figure 1 on p. 5). Occupied Habitat and/or the 1.5 mile kochia buffer zone of six EOs (10, 21, 31, 54, 60, 61, 32, 106, 112, 113 and the new unassigned EO located in T4S, R7E, Section 15) falls within proposed fuel break footprints though the actual EOs themselves do not. The EOs within the Project boundary are varying distances from proposed fuels breaks as denoted in Table 3. Element Occurrences 10, 21, and 61 are located outside the Project area but the 1.5 mile buffer of EO 10 and the 0.5 mile pollinator buffers of Occupied Habitat associated with EOs 21 and 61 fall within the Project area. There are 10,077 acres of proposed critical habitat, 29,088 acres of Occupied Habitat and 88,381 acres of Slickspot Peppergrass Habitat that fall within the proposed Project boundary.

Sixteen of the 23 EOs listed in Table 3 have Habitat Integrity and Population (HIP) transects that are monitored annually by the Idaho Department of Fish and Game (IDFG) Heritage Program on Federal and State lands. Prior to the use of HIP transects, slickspot peppergrass EOs were monitored using Habitat Integrity Index (HII) transects beginning in 1998. Seven of the 77 total HIP transects rangewide (9 percent) fall directly or partially within proposed "non-kochia fuel breaks" on Federal lands: 008A, 008B, 015, 029, 051a, 051b, and 062. The Bureau has chosen

not to reroute the proposed fuel break footprints to avoid these seven HIP transect locations because the IDFG Botanist who manages the annual HIP monitoring effort has stated that HIP monitoring transects would not be representative of the area surrounding the transects if they were avoided during fuel break implementation (Kinter 2013, pers. comm., as cited in USBLM 2015, p. 28).

Table 3. Slickspot peppergrass element occurrences within the Paradigm Fuel Breaks Project area.

EO#	Mgmt. Area	Acres[1]	Distance to edge of fuel break[2]	Fuel break type	EO Rank[3] (year ranked)
8 - PCH	10	1,017	In fuel break	Non-prostrate kochia	B (2005)
10	*	3.9	1.1 mi (5,642 ft)	Prostrate kochia	D (2005)
15	8	155	In fuel break	Non-prostrate kochia	D (2005)
20 - PCH	8	3	In fuel break	Non-prostrate kochia	C (2005)
21	9B	100	0.1 mi (744 ft)	Non-prostrate kochia[4]	C (2004)
26	10	683	In fuel break	Non-prostrate kochia	B (2005)
29	9C	125	In fuel break	Non-prostrate kochia	C (2005)
30 - PCH	8	675	In fuel break	Non-prostrate kochia	B (2005)
31 - PCH	8	71	1.33 mi (7,046 ft)	Prostrate kochia	C (2005)
51 - PCH	9C	4	In fuel break	Non-prostrate kochia	BD (2010)
54	8	0.3	0.3 mi (1,786 ft)	Non-prostrate kochia	F (2005)
60	8	15	0.14 mi (769 ft)	Prostrate kochia	D (2005)
61	*	14.7	0.3 mi (1,508 ft)	Prostrate kochia	C (2005)
62 - PCH	9C	6	In fuel break	Non-prostrate kochia[4]	C (2010)
63	10	8	2 mi (10,608 ft)	Non-prostrate kochia	D (2006)
106	*	< 0.5	0.12 mi (633 ft)	Prostrate kochia	Not Ranked
112	*	< 0.5	0.3 mi (1,745 ft)	Non-prostrate kochia	C (2010)[5]
113 - PCH	*	< 0.5	0.03 mi (154 ft)	Non-prostrate kochia	CD (2010)
115 - PCH	*	< 0.75	0.9 mi (4,582 ft)	Non-prostrate kochia	C (2010)
116 - PCH	*	< 0.5	In fuel break	Non-prostrate kochia	C (2012)
117 - PCH	*	< 0.5	In fuel break	Non-prostrate kochia	CD (2012)
New 4S7E11	9C	0.75	0.6 mi (3,258 ft)	Non-prostrate kochia	Not Ranked
New 4S8E15	*	23	In fuel break	Non-prostrate kochia[4]	Not Ranked

[1] Acreage reflects actual area covered by the EO and does not include the 0.5 mile buffer of occupied habitat surrounding the EO.
[2] Distance to edge of proposed fuel breaks if fully implemented at 300 ft wide.
[3] Ranks are per Idaho Fish and Game ranking system based on size of occurrence, condition of occurrence, and landscape context (Colket et al. 2006).
[4] A prostrate kochia fuel break would be constructed 0.96 miles north of EO 21; the fuel break that runs 0.1 miles from the EO itself would be non-prostrate kochia. A prostrate kochia fuel break would be constructed 1.36 miles east of EO 62; the fuel break that runs through the EO itself would be non-prostrate kochia. A prostrate kochia fuel break would be constructed 1.14 miles north of the new EO in 4S8E15; the fuel break that runs through the EO itself would be non-prostrate kochia.
[5] Element occurrence 112 was located in 2010 and was described as having 2 genets, poor vigor, in a single slickspot with moderate to high non-native plant cover and /or moderate to high anthropogenic disturbance. This EO was subsequently given a ranking of C which is not in line with the EO ranking specifications as described in Colket et al. 2006, though it is still included in the analyses in this Opinion.
* Not located within a Management Area
PCH = Proposed critical habitat for slickspot peppergrass includes this EO plus a surrounding 840 ft buffer.

Annual slickspot peppergrass plant counts since 2004 within HIP monitoring transects are shown in Table 4.

Table 4. Slickspot peppergrass element occurrence population counts within the Paradigm Fuel Break Project area.

EO#	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013[1]	2014[1]
8[2]	494	931	961	1,712	2,139	3,049	2,730	908	139	645	2,674
10	0	0	0	0	0	0	0	0	0	0	0
15	49	37	20	108	417	932	158	3	2	9	177
20	106-155[3]	245	61	337	171	304	282	183	112	46	232
21	0[4]	0	0	0	0	0	0	0	0	0	0
26[2]	372	392	290	289	141	352	640	16	9	40	263
29	161-360[3]	380	287	393	465	1,466	1,414	448	55	33	283
30	1	6	2	3	5	0	0	0	0	0	2
31	5	59	42	458	388	242	51	0	3	0	1
51[2]	193-242[3]	920	87	6	335	98	48	29	9	2	196
54	--	0	0	0	0	0	0	0	0	0	0
60	0	1	1	0	0	0	0	0	0	0	0
61	625	319	221	72	268	444	638	636	11	75	850
62	--	297	9	0	19	8	16	11	3	13	63
63	226-275[3]	86	59	247	223	214	342	29	18	79	164
106[5]	--	--	--	--	0	0	0	0	0	--	--
112[5]	--	--	--	--	--	--	2	--	--	--	--
113[5]	--	--	--	--	--	--	260	--	--	--	--
115[5]	--	--	--	--	--	--	385	--	--	--	--
116[5]	--	--	--	--	--	--	--	--	7	--	--
117[5]	--	--	--	--	--	--	--	--	30	--	--
Sec 11[6]	--	--	--	--	--	--	--	--	--	--	>250
Sec 15[6]	--	--	--	--	--	--	--	--	--	--	127

[1]HIP plant count data compiled by IDFG; HIP reports not yet available.

[2]Multiple HIP transects combined.

[3]Some population sizes from 2004 were counted as a range, rather than an actual count.

[4] "Unknown number" observed 4/2004, "no plants" observed 7/2004.

[5]Count data comes from incidental observations during LEPA surveys. -- No HIP transect data.

[6]New populations in T4S, R7E, Section 11 and T4S, R8E, Section 15.

Plant numbers shown in Table 4 above do not represent total population size, but rather the number of plants encountered along HIP transects during monitoring. The HIP transect data does not reflect the population size of the entire EO but is used here as a relative representation of the population across the years. EOs 106, 112, 113, 115, 116, 117, and the two new EOs do not have established HIP transects; thus, no HIP data are available for these eight EOs. Population counts for EOs 112, 113, 115, 116, 117 and the two new EOs in Table 4 have only been recorded for the year in which they were discovered and represent total plants found.

There are 11 additional slickspot peppergrass EOs with rankings of B, C, or D (Colket et al. 2006, entire) that fall within ten miles of the Project area (Table 5); this 10 mile radius encompasses the action area for the Project. Five EOs (1, 14, 34, 44, and 45) within this area are either ranked as historic or extirpated populations; historic or extirpated EOs are not considered within the analyses in this Opinion.

Table 5. Slickspot peppergrass element occurrences that fall within 10 miles of the Paradigm Fuel Breaks Project area.

Species (BLM Ranking)	EO#	Acres	Distance to edge of fuel break[1]	EO Rank[2] (year ranked)	Type of fuel break
Slickspot Peppergrass (Type 1)	2	2.5	3.2 mi (16,876 ft)	C (2005)	kochia
	27	7,159	2.8 mi (14,564 ft)	B (2005)	non-kochia
	28	0.5	2.4 mi (12,448 ft)	D (2005)	non-kochia
	50	4.2	1.4 mi (7,441 ft)	C (2005)	non-kochia
	53	40.4	8.8 mi (46,687 ft)	C (2005)	non-kochia
	67	9.6	4.8 mi (25,276 ft)	B (2005)	non-kochia
	72	67.3	1.9 mi (9,775 ft)	C (2005)	non-kochia
	77	4.2	3.4 mi (17,812 ft)	C (2005)	non-kochia
	103	0.5	3.2 mi (16,635 ft)	D (2010)	non-kochia
	104	91	0.82 mi (4,321 ft)	C (2006)	non-kochia
	111	< 0.5	7.4 mi (39,173 ft)	D (2009)	kochia

[1] Distance to edge of proposed fuel breaks if fully implemented at 300 feet wide.

[2] Ranks are per Idaho Fish and Game ranking system based on size of occurrence, condition of occurrence, and landscape context (Colket et al. 2006, entire).

As shown in Table 5, EOs 50 and 104 are located near the Project boundary. Although the Occupied Habitat associated with these EOs does not fall within the Project boundary, the 1.5 mile buffer does. No prostrate kochia will be planted within 1.5 miles of the 11 EOs located within 10 miles of the Project boundary. Only two EOs located within 10 miles of the Paradigm Project boundary will be "kochia fuel breaks". A proposed "kochia fuel break" will be located about 3.2 miles from C-ranked EO 2 at the closest point. The other proposed "kochia fuel break" will be located approximately 7.4 miles from D-ranked EO 111 at the closest point.

An overview of habitat categories for slickspot peppergrass by land ownership within the Paradigm Project area is provided in Table 6. The combined acreage of all habitat categories for slickspot peppergrass located within the Paradigm Project boundary is about 174,035 acres, with

an additional 119,856 acres classified as non-habitat for the species. Only about 10 percent (29,088 acres) of the 293,891 total acres within the total Project area are categorized as Occupied Habitat. About 68 percent of the 29,088 total Occupied Habitat acreage (which includes proposed critical habitat and EO acreages) in the Paradigm Project area is located on Federal lands.

Table 6. Habitat categories for slickspot peppergrass located within the Paradigm Fuel Breaks Project area.

Habitat Category	Habitat Acres				
	BLM	BOR	State	Private	Total (%)
Occupied Habitat	19,440	331	1,030	8,287	29,088 (10%)
Proposed Critical Habitat*	[8,954]	[204]	[0]	[919]	[10,077]*
Slickspot Peppergrass Habitat	87,777	604	0	0	88,381 (30%)
Potential Habitat	582	1,489	12,082	42,413	56,566 (19%)
Non-habitat	45,184	904	7,919	65,849	119,856 (41%)
Total Project Acreages*	**152,983 (52%)**	**3,328 (1%)**	**21,031 (7%)**	**116,549 (40%)**	**293,891 (100%)**

*As proposed critical habitat represents a subset of Occupied Habitat, proposed critical habitat acreages are not included within the Total Project Acreage or percentage calculations to avoid double counting.

For analyses within the Bureau and NRCS Assessments, which form the basis for analyses within this Opinion, mileages and acres affected by the proposed Paradigm Project were estimated using Bureau Geographic Information System (GIS) data. For analysis purposes, the maximum area of disturbance within slickspot peppergrass habitat types was used. The maximum total miles and acres of habitat that could be affected by the proposed Project are listed in Table 7.

The combined acreage of all habitat categories for slickspot peppergrass located within the Paradigm Project proposed fuel break footprints is about 11,169 acres. These 11,169 acres encompass 8,693 acres of Federal and State lands, and up to 2,476 acres of private lands. A total of up to 63 miles of fuel breaks will occur in Occupied Habitat (50 miles on Federal and State lands and up to 13 miles on private lands), 27 of which (25 miles on Federal and State lands and up to 2 miles on private lands) are designated as proposed critical habitat for slickspot peppergrass (Table 7). If fuel breaks are fully implemented at 300 feet wide, there will be a maximum of 1,996 acres of Occupied Habitat (1,808 acres on Federal and State lands and up to 188 acres on private lands) that could be impacted by the various fuel break treatment methods. The 1,996 acres represents about 7 percent of the total Occupied Habitat acreage within the

Project boundary (29,088 acres) and about 2 percent of the Occupied Habitat within the Four Rivers Field Office. Roughly 6 miles of fuel breaks fall directly within known EOs[27] (5 miles on Federal and State lands and up to 1 mile on private lands); thus, a maximum of 194 acres of EOs (176 acres on Federal and State land and up to 18 acres on private land) could be impacted by fuel breaks.

Table 7. Estimated extent of habitat categories for slickspot peppergrass located within proposed fuel break footprints in the Paradigm Fuel Breaks Project area.

Habitat Type	Federal and State Lands		Private Lands	
	Miles	Acres	Miles	Acres
Occupied Habitat	50	1,808	13	188
Slickspot Peppergrass Habitat	189	6,885	0	0
Proposed Critical Habitat*	[25]	[920]	[2]	[88]
Potential Habitat	0	0	112	2,288
Total	**239**	**8,693**	**125**	**2,476**
Element Occurrence	5	176	1	18
Element Occurrences Located Within Fuel Breaks	8, 15, 20, 26, 29, 30, 51, 62, 116, 117, T4SR8E Sec. 15		8. 15	

*As proposed critical habitat represents a subset of Occupied Habitat, proposed critical habitat acreages are not included within the total miles and acreages of habitat types located within proposed fuel break footprints to avoid double counting.

Eleven EOs fall directly within proposed fuel breaks located on Federal, State, and private lands, which could be directly impacted by the proposed action. These 11 EOs represent 12 percent of extant EOs range-wide and 16 percent of extant EOs located within the Bureau's Four Rivers Field Office area. Of the 11 EOs that are located directly within proposed fuel breaks, 8 have HIP monitoring transects. The HIP transect slickspot peppergrass plant count data represent a subset of an EO, and therefore, do not reflect the total population size of the entire EO. HIP transect slickspot peppergrass plant count data are used as a relative representation of population size across the years. Available data from the HIP transects located within the Paradigm Project area since 2005 indicate that these eight EOs comprise an average of 13.5 percent of the total slickspot peppergrass population over a total of 80 transects species-wide, ranging from a low of 8 percent in 2008, to a high of 29 percent in 2009. Therefore, roughly 13.5 percent of the total population of slickspot peppergrass rangewide could be impacted by the proposed action.

[27] EOs are a subset of Occupied Habitat, which includes EOs and their surrounding 0.5 mile pollinator buffers.

There are 189 miles of proposed fuel breaks that would fall within Slickspot Peppergrass Habitat on Federal and State lands. A maximum of 6,885 acres of Slickspot Peppergrass Habitat could be directly impacted by fuel break treatment methods. This represents about 8 percent of 88,381 total acres of Slickspot Peppergrass Habitat located within the Project boundary and about 3 percent of the total acreage of Slickspot Peppergrass Habitat within the Bureau's Four Rivers Field Office. No Slickspot Peppergrass Habitat is currently designated on private lands, although Slickspot Peppergrass Habitat may be discovered during pre-project surveys of Potential Habitat for presence of slickspot microsites and/or slickspot peppergrass plants. Up to 112 miles (2,288 acres) of proposed Paradigm Project fuel breaks cross Potential Habitat located on private lands.

2.4.1.2 Factors Affecting the Species in the Action Area

Current condition of the Paradigm Fuel Breaks Project action area relative to slickspot peppergrass and its habitat is described below. Current condition is based in part on available HIP monitoring transect data since 2004 across 17 HIP transects located within the Project area on Federal and State lands.

Wildfire. Wildfire and invasive nonnative plants were identified in the Service's 2009 Federal Register Notice as the two primary reasons for slickspot peppergrass decline and loss of habitat. Bureau fire records show that approximately 75 percent of the 293,891 acre Paradigm Project area has burned at least once in the last 55 years (1957-2012). Since 1980, an estimated 618 ignitions within the Paradigm Project area developed into wildfires. Of those, 131 were lightning caused and 487 (about 80 percent) were human caused. Fires caused by human ignitions are concentrated along transportation corridors and major routes, especially along Interstate 84 (see Figure 1).

Within the Project area, the 2011 Morrow Fire burned 300 acres (about 44 percent) of the 683 acre B-ranked EO 26. During 2012, seven fires in and adjacent to the Project area burned approximately 60,065 acres, including one fire that crossed Interstate 84. The 2012 Benwalk Fire entirely burned BD-ranked EO 51 (4 acres), C-ranked EO 62 (6 acres), and CD-ranked EO 113 (0.5 acres). In addition, 2012 fires also burned a portion of B-ranked EO 8 (4 acres of the total 1,017 acres) and all of C-ranked EO 31 (71 acres) and CD-ranked EO 117 (0.5 acres). Since 1957, all or part of every slickspot peppergrass EO in the Project area except EO 115 (0.75 acres) has burned in a wildfire at least once.

When Wyoming big sagebrush is burned, natural re-establishment can take between 20 to 50 years, and only occurs when an available seed source is nearby. Whisenant (1990, p. 4) estimated historic fire return intervals for Wyoming big sagebrush communities to be between 60 to 110 years. An exponential increase in the density of invasive annual species is typical following a fire when these species occur within or near a burned area, creating a continuous fine fuel load. Balch et al. (2013, pp. 179-180) found that fires were more likely to start in cheatgrass than in other vegetation types, and that cheatgrass is associated with increased fire frequency, size, and duration. Fire return intervals in cheatgrass-dominated areas in the Project area are commonly between five and ten years, and sometimes shorter. In addition, invasive nonnative annual plants are common understory components in some perennial vegetation types and often occur at cover levels of less than 50 percent, but can still dominate an area following fire. Invasive non-native annual grasses and forbs, especially cheatgrass, are more widespread than

broad vegetation type classification maps portray (see Figure 1 on p. 5 of this Opinion) and contribute to the fine fuels that result in repeated wildland fires in the Project area.

In the spring of 2013 the Mountain Home Range Fire Protection Association (RFPA), a non-profit organization established to prevent and suppress range fires, was formed through a collaborative effort with local private landowners, the Bureau's Boise District, and the Idaho Department of Lands (IDL). Landowners that are members of the RFPA can provide initial attack and assist the Bureau in fighting range fires using their own equipment or equipment purchased through IDL. The State of Idaho has informed the Service that RFPAs, including the Mountain Home RFPA (which is located within a portion of the Paradigm Project area), increase the success of fire suppression efforts through more rapid response and increasing the availability of additional fire suppression resources; therefore, fire suppression efforts by RFPAs may benefit slickspot peppergrass over the long term (State of Idaho *in litt.* 2014, pp. 4-6), including within the proposed Paradigm Project area. While the Service acknowledges the benefits increased fire suppression through the RFPAs for conservation of sagebrush steppe habitat, the RFPAs have not been in place long enough for their effectiveness to be measurable with regard to slickspot peppergrass conservation.

The current fire return interval in the Project area is not conducive to rehabilitating or restoring perennial plant communities, and recent attempts at rehabilitation in the Project area have not been successful, mostly due to drought, repeat fires, or invasive annuals.

Ground Disturbance. Approximately 75 percent of the 293,891 acre Paradigm Project area has burned at least once in the last 55 years; thus, much of the Project area (including the proposed fuel break footprints) has a history of soil surface disturbance due to repeated fires and subsequent post-fire emergency stabilization and rehabilitation (ESR) seeding projects. Fire suppression activities, including movement of large engines, as well as disking and blading of control lines, have affected portions of the Project area. In addition, past livestock grazing and drill seeding without depth bands have damaged slickspot soil layers in some areas. Therefore, slickspot microsites within at least some portion of the proposed fuel break treatment segments have likely been disturbed by past fire suppression activities, ESR treatments, and livestock grazing activities. Localized ground disturbance within slickspots associated with Owyhee harvester ant colonies and native ungulate activities has also likely occurred at some level. Owyhee harvester ants, an active and efficient slickspot peppergrass seed predator (White and Robertson 2009, p. 511), are more common within and adjacent to slickspots in areas with little to no shrub cover, such as burned areas. As much of the action area has burned, it is expected that Owyhee harvester ant preferred shrub-free habitat is readily available within the action area, allowing for harvester ant colonies to be present in the vicinity of EOs.

Ungulate and livestock hoof prints also tend to occur across the landscape at relatively low cover levels; there is the potential for trampling impacts at local levels due to proximity to areas where wild ungulates or livestock congregate (e.g., water sources, fence lines, salting areas, staging areas). The average penetrating trampling within slickspot microsites in EOs in the action area, based on HIP transect monitoring data, is a little over 1 percent, ranging from no penetrating hoof prints observed within slickspots at many HIP transects to a high of 16 percent penetrating hoof print cover within slickspots observed at the HIP transect located in EO 60 in 2004.

Monitoring within the General Occurrence Area (GOA) of HIP transects has also documented a range of disturbance levels in the vicinity of HIP monitoring transects. No ground disturbance was observed at the HIP transect associated with EO 29 since 2004, and the three HIP transects associated with EO 15 and EO 51 have had negligible ground disturbance during this time frame (Kinter et al. 2012, Appendix B). However, the majority of the HIP transects have had at least one ground disturbing event observed in the GOA. The most common source of disturbance is from livestock, which included observations of penetrating livestock prints as well as livestock trails outside of HIP transect slickspot microsites. Fire, off highway vehicle tracks, and restoration-related ground disturbance was less common. Seven of the sixteen HIP transects located in the Project area had multiple disturbances in a given year and/or some type of disturbance every year; the HIP transects documented to have multiple disturbances and/or annual ground disturbance were associated with EOs 8, 26, 30, 31, 60, 61 and 63.

HIP monitoring data have shown low levels of deposition of organic matter within slickspot microsites in EOs to date. The level of livestock feces cover within slickspots ranges from none observed within slickspots on many HIP transects across multiple years, with the highest level observed in 2008 (about 7 percent cover) at the HIP monitoring transect associated with EO 60. The average cover of livestock feces in slickspot microsites across all years of available data within all HIP transects located in the Project area is about 0.4 percent cover (USBLM 2015, p. 50; NRCS 2015, p. 48). The average plant litter cover inside of slickspot microsites from 2008 to 2011[28] at all HIP transects within the Project area is about 3 percent, ranging from a low of 0.4 percent observed in 2010 at the HIP transect associated with EO 51 to about 14 percent cover observed in 2009 at the HIP transect associated with EO 26.

Native Plant Species. Multiple fires have resulted in a decrease in Wyoming big sagebrush/native bunchgrass habitat within the action area. Since 1980, there have been over 600 fires documented within the action area, with many locations burning multiple times. These fires have resulted in roughly 20 to 30 percent of the action area being dominated by invasive nonnative annuals, leaving the native habitat highly fragmented. During Bureau surveys of slickspot peppergrass habitat types, data collected at each slickspot or group of slickspots indicate roughly 37 percent of the area being dominated by shrubs. The majority of the understory within this shrub-dominated area consists of cheatgrass and/or bur buttercup. Native grass dominates roughly 7 percent of the area according to the Bureau's data.

Native shrub cover from vegetation frame data at the 16 HIP monitoring transects located within the Project area averaged 16 percent in 2009, average native forb cover was about 1.4 percent, with average native grass cover documented at approximately 3 percent (Kinter et al. 2010, Appendix H). Line intercept data from 2009 at the 16 HIP transects show an average across all transects of about 24 percent shrub cover. The majority of the shrub cover is from Wyoming big sagebrush with minor contributions from *Ericameria nauseosa* (gray rabbitbrush) and *Chrysothamnus viscidiflorus* (green rabbitbrush). One HIP transect associated with EO 8 had the highest shrub cover (about 52 percent); a HIP transect associated with EO 15 had the lowest level of shrub cover, with no shrubs observed (Kinter et al. 2010, Appendix H). Shrub cover has

[28] Plant litter cover data have only been recorded on HIP monitoring transects since 2008.

likely decreased since 2009 due to wildfires in HIP transects associated with EOs 10, 26, 30, 31, 51, and 62, though specific shrub cover data are not currently available.

Bureau surveys of about 127,000 acres of slickspot peppergrass habitat types within the Project area documented the number of native perennial forbs species observed from 0 to 10 with an average of roughly 3 species per square mile section. Abundance of these native perennial forbs ranged from very low to moderate, with 99 percent of native forb abundance ratings being low, very low, or none. It can be inferred from these data that very little native forb cover is present within the Project area. *Lagophylla ramosissima* (common hareleaf), a native annual, was the only native forb observed during the Bureau habitat surveys as being among the dominant species in the area surrounding individual slickspots or groups of slickspots.

HIP monitoring transect data also document low levels of native forb cover in the action area. Across all HIP transects in 2004, 2005 and 2009, mean canopy cover of all native forbs was about 2 percent, ranging from a low of no native forbs observed (0 percent cover) to a high of about 6 percent native forb cover. The two notable transects that had "high" percent cover of native forbs in 2009 were the HIP transects associated with EO 15 and EO 54; the dominant forb species for both of these transects was common hareleaf, the same native forb species observed to dominate areas around slickspot microsites during Bureau's habitat surveys in the Project area. The Bureau and NRCS Assessments state that no perennial forbs were noted in 2006 or 2008 HIP monitoring photos (USBLM 2015, p. 61; NRCS 2015, p. 59).

Line intercept data from HIP transects indicate that over half of the General Occurrence Areas (GOA) surrounding EOs within the action area are dominated by nonnative annual grasses, with little to no native bunchgrass cover. GOA HIP data also document that, where native bunchgrasses are common or dominant, Sandberg bluegrass, an early seral stage native grass, is the most common native grass species present.

Nonnative Plant Species. As previously described, wildfire and invasive nonnative plants were identified in the Service's 2009 Federal Register Notice as the two primary reasons for slickspot peppergrass decline and loss of habitat. Native rangeland in the Paradigm Project area was predominantly Wyoming big sagebrush with an array of perennial grasses and forbs. However, since the late 1890s the Intermountain West has experienced an increase in invasive non-native annual grasses and forbs, such as cheatgrass, medusahead, *Salsola tragus* (Russian thistle), and *Sisymbrium altissimum* (tall tumblemustard). These invasive annual plant species are now widely distributed across the Project area and in some areas dominate the plant community. Conversion from sagebrush-steppe vegetation to invasive annual vegetation has degraded numerous acres of habitat for slickspot peppergrass.

Where invasive annual species dominate, large-scale areas and ecosystem function has been altered to the point of transitioning to a new steady but depleted state. Changes to an ecosystem from invasive annual grasses and forbs can occur in just a few years. Once such a threshold has been crossed, conversion from the depleted state back to a native perennial shrub-steppe plant community is unlikely without human intervention, requiring money, time, and favorable weather patterns. Invasive annual species rapidly fill available open spaces and provide an abundance of continuous fine fuel. Once established, these plants compete with native vegetation for water, nutrients, and space, invade and degrade sensitive plant and animal habitats, and increase wildfire frequency.

The Bureau's Assessment states that, based on a 2007 Tagestad and Downs update of a 2002 vegetation mapping effort using Landsat satellite imagery, approximately 47 percent of the public land (which includes a combined acreage of Federal and State lands) within the Paradigm Project area was classified as "Exotic Annuals", and the remainder identified as "Big Sage" (23 percent), "Big Sage Mix" (12 percent) and "Bunchgrass" (8 percent) (USBLM 2015, p. 23). Similarly, the NRCS Assessment indicates that, for private land within the Paradigm Project area, approximately 25 percent of the private land was classified as "Exotic Annuals", 23 percent as "Big Sage", 12 percent as "Big Sage Mix", and 14 percent as "Bunchgrass" (NRCS 2015, p. 21). However, it is likely that the current percentages of "Big Sage" and "Big Sage Mix" on both public and private lands are lower than those described in the Bureau and NRCS Assessments due to the amount of sagebrush that has burned in the Paradigm Project area since 2007 when these vegetation maps were updated.

Much of the native plant communities that historically inhabited the Project area have been altered by the recurrence of wildfires and livestock grazing. Following large fires on Bureau-managed land, burned areas are typically drill seeded with a mix of introduced perennial grasses and big sagebrush. Past livestock grazing activities as well as drill seeding without rangeland drills being equipped with depth bands have damaged slickspot soil layers in some areas, allowing nonnative plants to invade slickspots.

Areas within the Project boundary are known to be dominated by nonnative invasive species such as cheatgrass, *Lepidium perfoliatum* (clasping pepperweed), tall tumblemustard, *Vulpia myuros* (rattail fescue), *Taeniatherum caput-medusae* (medusahead), and *Ceratocephala testiculata* (bur buttercup); as well as seeded nonnative species such as crested wheatgrass and prostrate kochia. Based on Bureau surveys of slickspot peppergrass habitat types in the Project area, approximately 25 percent of known Slickspot Peppergrass Habitat in the Project area is dominated by invasive nonnative annual grasses and forbs.

Data from HIP monitoring show that nonnative plant cover, including both unseeded and seeded species cover, averaged about 22 percent at the 15 HIP vegetation transects within the proposed action area (Kinter et al. 2010, Appendix H). Based on HIP line intercept data over all years and over all 16 transects, at least 44 percent of the GOAs had greater than 10 percent cover of unseeded nonnative forbs. In roughly one third of the GOAs, unseeded nonnative forb cover has been greater than 25 percent. The majority of the unseeded nonnative forb species present in these 16 HIP transects included clasping pepperweed, tall tumble mustard, and bur buttercup.

The average unseeded nonnative plant cover within slickspot microsites across all HIP transects within the Project area and all years has fluctuated since 2004. The highest average across all HIP transects was recorded in 2011 at about 18 percent cover. The highest average cover of nonnative plants observed within slickspot microsites across all years (about 37 percent) and maximum cover value (about 60 percent observed in 2011) is found in the HIP monitoring transect associated with EO 10. EO 10 is located outside the Paradigm Project area, but is 1.1 miles from the edge of a proposed prostrate kochia fuel break. Six of the HIP transects had an average cover of unseeded nonnative plants within slickspot microsites greater than 10 percent across all years. In addition, the unseeded nonnative canopy cover within slickspots increased by greater than 5 percent at 13 of the 16 HIP transects within the proposed Project area from 2004 to 2011 (Kinter et al. 2012, Appendix H). The average increase of unseeded nonnative canopy

cover within slickspots across all HIP transects was over 500 percent, with 12 of the HIP transects having a greater than 70 percent increase in unseeded nonnative canopy cover.

In contrast, the average seeded nonnative plant cover observed within slickspots across all HIP transects within the Paradigm Project area across all years was low (about 0.04 percent). The highest average cover of seeded nonnative plants was within the HIP transect associated with EO 61 (about 0.4 percent cover composed of *Agropyron cristatum* (crested wheatgrass)). Ten of the 17 HIP transects had no seeded nonnative plants observed within slickspot microsites across all years. It is unknown whether this low level of seeded nonnative species cover within slickspot microsites in EOs is due to the lack of successful ESR treatments overall within the Project area or current Bureau policy that promotes use of native plants in Occupied Habitat during ESR treatments.

Prostrate kochia has been planted within and adjacent to the Project area as part of past greenstrip fuel break and broadcast seeding projects. Some of these past kochia fuel breaks are proposed to be incorporated into the Paradigm Project (see Figure 6 on p. 23 of this Opinion). In our 2009 listing decision as well as in our 2010 proposal for critical habitat designation, the Service identified two primary threats to this endemic Idaho plant: the increased size and frequency of wildfires, and invasive nonnative plants. Invasive nonnative plants as described in the 2009 listing rule include not only invasive unseeded nonnative species such as cheatgrass and medusahead, but also invasive seeded nonnative species such as intermediate wheatgrass and forage kochia (described as "prostrate kochia" in the Bureau and NRCS Assessments and within this Opinion). Prostrate kochia sites that had been seeded 24 years prior to sampling supported high kochia abundance, suggesting that kochia established self-perpetuating populations, However, within seeded areas and recruitment margins, kochia "appeared to be self-limiting; early in the season many seedlings had established around reproductive individuals; however, by late summer many of the seedlings had died" (Gray and Muir 2013, p. 199).

Prostrate kochia is a prolific seed producer, and readily establishes seedlings, especially within saline/alkaline soils characteristic of sites that support slickspot peppergrass EOs (DeBolt *in litt.* 2002, entire; Gray and Muir 2013, p. 200; Colket 2009, pp. 16, 130; Gray 2011, pp. 67-68; Quinney et al. *in litt.*, 2002, pp. 2-3). Seeds of forage kochia have been described as being wind dispersed, and tend to collect in depressions (Stevens and McArthur 1990, p. 177). Prostrate kochia recruitment is often related to the direction of the prevailing winds (Harrison et al. 2000, p. 18, Gray 2011, p. 4), although Harrison indicated that other factors, such as soil disturbance, lack of vegetation competition, and open spaces near established kochia plants are also important conditions associated with successful kochia recruitment (Harrison et al. 2000, pp. 18-19). However, prostrate kochia seed loses viability quickly, even under ideal processing and storage conditions (Tilley et al. 2012, pp. 2-3); and therefore, does not have a persistent seed bank. . Kochia seeds may also be spread by vehicles, if planted near roads or in areas with off road vehicle use (Gray 2011, p. 33; Gray and Muir 2013, pp. 200-201). In contrast, prostrate kochia abundance and spread may be reduced at sites where kochia seed is harvested often (Gray and Muir 2013, p. 201).

Some plants may become invasive due to their adaptations for rapid growth, production of numerous seeds or vegetative propagation, producing seeds early in the growing season, production of chemicals that prohibit growth of other plants, and adaptations to a wide range of environmental conditions (Radosevich 2007, Chapter 3; USFWS 2013a, p. 3). Plant

communities may allow for invasions of plants due to absence of animals or insects that normally feed on plants in its native range; disturbance of vegetation and soils caused by natural (such as fire, flooding) or human-caused (such as land clearing) factors; availability of resources (nutrients, water, light); and the number, distribution, and species of native plants present. Not all nonnative plant species become invasive. Many species that are accidentally or intentionally introduced do not survive in the new environments, and of those plants that do survive, few become invasive.

The Bureau and NRCS Assessments state that slickspot microsites with an intact clay soil surface may be unsuitable or less suitable to prostrate kochia seed germination, and that prostrate kochia may have trouble establishing within intact slickspots, the multi-layered clay soils of which pool water longer than surrounding soils, since kochia "is not tolerant of flooding or soil with a water table (USU 2014)" (UBSLM 2015, p. 49; NRCS 2015, p. 47). However, prostrate kochia has been documented to dominate slickspot microsites within some EOs in southern Idaho (Debolt in litt. 2002, entire; Gray and Muir 2013, p. 200; Colket 2009, p. 22; Gray 2011, pp. 67-68; Quinney et al. *in litt.* 2002, p. 3). Colket (2009, pp. 16 and 130) reported that "photographs of HIP transect 019B in 1999 show prostrate kochia invading a slickspot and not the surrounding habitat. In 2008, the kochia has increased in the same slickspot so much that the slickspot itself is barely visible." The 2008 HIP monitoring photographs showed that prostrate kochia had completely invaded the surrounding landscape, corroborating other accounts that slickspots are highly susceptible to invasion by prostrate kochia (Figure 19). In addition, 2009 monitoring photographs documented prostrate kochia within slickspot microsites in the New Plymouth Management Area (Figure 20). One of these HIP transects where these kochia observations were made (HIP transect 019B in the Kuna Management Area) is located within a past prostrate kochia seeding (USBLM 2015, p. 37, Table 7).

Researchers have found prostrate kochia may spread into disturbed and bare areas, especially on sites with minimal productivity, low elevation, low precipitation, and saline/alkaline soils, including playas and slickspots, but found little evidence that prostrate kochia is an aggressive spreader in established perennial plant communities (Waldron et al. 2001, p. 214). Gray observed that slickspot microsites could often be located visually in unseeded areas in southwestern Idaho due to their high abundance of *K. prostrata* (Gray, 2011, p. 33). At least some of these unseeded areas described by Gray may have been aerially seeded with prostrate kochia as described in DeBolt in litt. 2002 (p. 1). However, dominance of prostrate kochia within slickspot microsites to the detriment of slickspot peppergrass has been clearly documented (Gray, 2011, p.33; DeBolt in litt. 2002, entire, Quinney et al. *in litt.* 2002, p. 3).

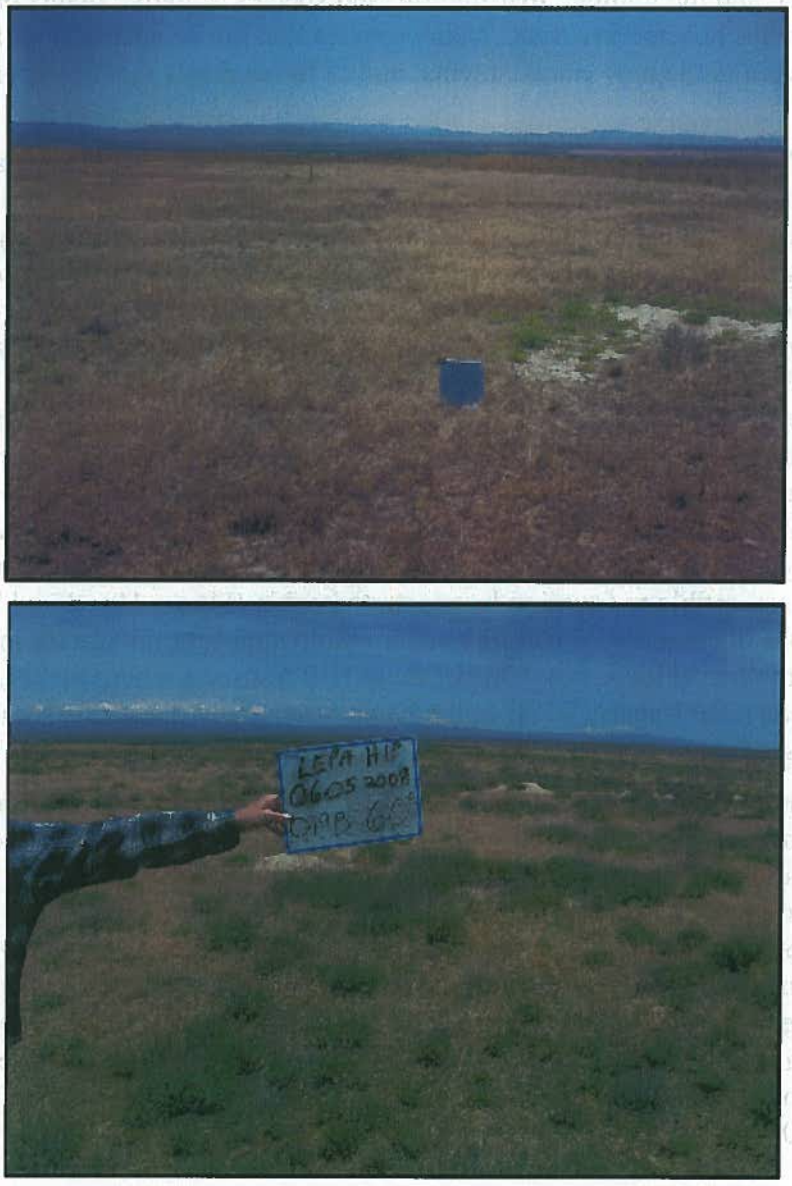

Figure 6.10a. Photographs of HIP 019B in 1999 (above) and 2008 (below). Photographs were taken at the red potato digger rebar in the azimuth of 60°. Note encroachment of forage kochia since 1999.

Figure 19. Habitat Integrity Index (HII) and Habitat Integrity and Population (HIP) monitoring photopoint photographs documenting the spread of prostrate kochia (identifiable in photographs as dark green sub-shrubs) within and adjacent to a slickspot microsite in the Kuna Management Area (from Colket 2009, Figure 6.10a p. 130). Photographs were taken at the same location on HII transect 019B in 1999 (above) and on HIP transect 019B in 2008 (below).

Figure 20. Habitat Integrity and Population (HIP) monitoring photograph showing prostrate kochia invading a slickspot microsites in the New Plymouth Management Area near HIP transect 068 (see Kinter et al. 2010, p. 13).

Prostrate kochia has been documented within slickspot microsites on 12 HIP monitoring transects rangewide (USBLM 2015, p. 37; NRCS 2015, pp. 34-35), including 3 transects (HIP transects 061, 062, and 063) located within the Project area. Of the 12 HIP transects where Kochia has been documented, nine HIP transects have shown a maximum level of kochia cover of less than 1 percent within slickspots (HIP transects 018B, 024, 063) and/or in the general surrounding area of the HIP transects (HIP transects 018B, 032, 042, 052, 061, 062, and 068) in at least one of 8 years of HIP monitoring, only to have the forage kochia plants disappear in subsequent years (see USBLM 2015, p. 37, Table 7). However, plant invasions typically progress from introduction to establishment phases over variable time periods influenced by soil, rainfall, climate, disturbance regime, competition with other plant species, or other environmental factors. During the initial introduction phase, potential plant invasions are most likely to fail due to unpredictable events like drought and disease (Mack 1995), or because of a lack of a minimum critical population size necessary for the population to genetically maintain itself (Latore et al. 1998, as described in Radosevich 2007, Introduction Phase section).

Therefore, it may take several colonization attempts before a species such as prostrate kochia successfully establishes a new founder population in an area, including along HIP transects.

Although there is uncertainty regarding the distance that prostrate kochia may move from seeded areas, it is well documented that the species does move under some environmental conditions, particularly when areas adjacent to established prostrate kochia sites have been disturbed. Documented prostrate kochia movement distances at individual study sites have varied from no movement observed over 10 to 30 years (see Harrison et al. 2000, p. 18, Clements et al., 1997, p. 31, Tilley et al. 2014, p. 7) to observation of an individual prostrate kochia plant 3,168 feet from a seeded area 11 years after seeding at an outlier study site (Harrison et al 2000, p. 14)[29]. After excluding this single outlier study site, Harrison observed individual prostrate kochia plants from 0 to 1,265 feet from the prostrate kochia seeding boundary, with a mean and median movement distance of 93 feet and 50 feet respectively (Harrison et al. 2000, p. 15). In southwestern Idaho, distances of the farthest prostrate kochia individual from the prostrate kochia seeding boundary ranged from 0 – 2,329 feet with a mean distance of 682 feet from 3 to 24 years since seeding prostrate kochia. Distance increased with time since seeding, with an estimated mean rate of spread of 82 feet/year (Gray 2011, p. 21; Gray and Muir 2013, pp. 196, 199). However, the Bureau's Assessment states that Gray and Muir's findings to not accurately represent the distance that prostrate kochia can spread from sites as kochia seeded area boundaries were uncertain and not all seeded areas were incorporated into analyses (USBLM 2015, p. 38). In contrast, photographs taken 12 years following a greenstrip planting near Mountain Home, which is located within the Paradigm Project area, showed very little spread of prostrate kochia into the adjacent cheatgrass stand (Harrison et al. 2000, p. 36).[30]

To date, prostrate kochia within HIP transects has only been documented at levels higher than 10 percent within or near slickspot microsites at 2 of the 12 HIP transects where kochia has been observed rangewide.[31] Neither of the EOs associated with these two HIP transects (EO 18 and EO 68) are located within the Paradigm Project area. However, it is unknown whether the current location of HIP monitoring transects in relation to existing kochia sites are adequate to detect current or future kochia presence within EOs across the range of slickspot peppergrass. In addition, small populations of invasive plants often go undetected when first becoming established during the Introduction Phase (Radosevich 2007, Introduction Phase section), and most invasive plant species have a substantial lag time (average lag time of 131 years for shrubs and 170 years for trees) between initial introduction and subsequent population growth (Radosevich 2007, Chapter 3). For example, Harrison et al. (2000, p. 14) acknowledged that their focus on field surveys of 10-to 30-year old prostrate kochia plantings represented a short ecological time frame to determine prostrate kochia spread and competition in native and introduced plant communities; they stated that additional studies were warranted in order to

[29] Harrison et al. did not include this 3,168 foot movement observation in their analyses of prostrate kochia movement from seeded areas as this site was determined to be a unique outlier (Harrison et al. 2000, p. 14).

[30] The cheatgrass stand shown in this photograph was misidentified in Harrison et al 2000 and in Harrison et al 2002 as a crested wheatgrass seeding.

[31] See Figure 19 for photographs of HIP transect 019B and Figure 20 for a photograph near HIP transect 068.

detect future potential prostrate kochia movement. In addition, with the exception of the Bureau-funded Gray and Muir (2012, entire) study, no recent analyses of potential prostrate kochia movement from existing kochia seeded areas, including existing prostrate kochia greenstrip fuel breaks, has occurred to date in the Project area. Therefore, the 8 years of HIP transect monitoring data available may not span a time period long enough to detect establishment of prostrate kochia within slickspot peppergrass EOs outside of known seeded areas, or may not be distributed such that kochia movement can be detected outside of EOs.

As described above, many invading plant species have extensive lag times following their initial introduction. Early detection and rapid response to invasive plant species establishment has been identified as essential to eradicating these plants before their populations expand (USFWS 2013a, p. 3), including the potential expansion of prostrate kochia into slickspot peppergrass EOs. Bureau and NRCS prostrate kochia movement monitoring and subsequent kochia control outside of fuel break treatment areas are intended to minimize the likelihood of effects of the spread of prostrate kochia into EOs, proposed critical habitat, and Occupied Habitat within the Paradigm Project area. For additional information on the potential effects of prostrate kochia on slickspot peppergrass and its proposed critical habitat, see the Effects section of this Opinion.

Biological Soil Crust. Biological soil crust cover is expected to be variable within the Project area. In areas dominated by invasive nonnative annual plants (such as cheatgrass), biological soil crust cover is typically low (Belnap et al. 2001, p. 47); therefore, biological soil crust cover is expected to be low over the roughly 20 to 30 percent of the Project area currently dominated by invasive nonnative annual grasses. An even greater percentage of the Project area may support low levels of biological soil crust cover due to disturbance associated with frequent fire and past vegetation treatments. Biological soil crust cover levels are expected to be higher within the remaining unburned sagebrush stands in the Project area.

Biological crust cover in the GOA, based on HIP vegetation transect data, averaged about 25 percent across all years and all transects, ranging from a low of 0.3 percent in 2009 at the HIP transect associated with EO 60 to about 64 percent biological soil crust cover observed in 2006 at the HIP transect associated with EO 61. Crust cover has likely decreased within EOs in the Project area since 2009 due to wildfires that burned HIP transects 010, 030B, 031, 051A, 051B, 058 and 062, although specific crust cover data for these HIP transects are not currently available[32].

Livestock Grazing. Ongoing livestock grazing occurs throughout the Paradigm Project area on Federal, State, and private lands. Livestock use has the potential to result in both positive and negative effects on slickspot peppergrass and its habitat. Impacts vary with stocking rate and season of use. Potential positive effects that livestock grazing may have on slickspot peppergrass include herbivory of invasive nonnative plants, which can lower the risk of wildfire through fine fuel reduction as well as lower the risk of nonnative species competition with native plants in the understory (Pellant 1996, p. 6). The potential negative effects of livestock grazing

[32] Annual vegetation HIP transect data were not collected following 2009; instead, vegetation transect data are now collected every five years. The Bureau and NRCS Assessments state that vegetation data collected in 2014 are not currently available; therefore, 2014 vegetation HIP transect data are not used for analyses within this Opinion.

on slickspot peppergrass include trampling of plants, leading to direct mortality of individual slickspot peppergrass plants as well as insect pollinators. Livestock trampling may also damage slickspot microsites as described in the "Ground Disturbance" section above. However, analyses of HIP transect data as well as other information indicate that impacts from livestock trampling tend to be localized and are probably not a significant threat to the survival and recovery of slickspot peppergrass rangewide (USFWS 2010, pp. 41-45). In addition, livestock grazing may result in indirect impacts such as altering habitat, which can thereby create conditions more conducive to other plant species, including invasive nonnative plants.

Development and Associated Infrastructure. The impacts of development on slickspot peppergrass are currently considered moderate in the Project area due to the current density of commercial, residential, and agricultural development. The most extensive commercial and residential development in the Paradigm Project area is the community of Mountain Home, with several ranches and small communities also located within the Project area. Associated infrastructure such as existing electrical transmission lines, railroad tracks, and a network of paved and unpaved roads (including Interstate 84 and State Highway 20), are found throughout the Paradigm Project area.

Additional development and infrastructure has also been proposed for the future in the Paradigm Project area. An extensive new residential development has been proposed for private lands in the Mayfield area, although an implementation date for this development project is unknown (USBLM 2015, p. 67; NRCS 2015, p. 65). In addition, a portion of the preferred location for Segment 8 of the Gateway West Transmission Line project (GWW) is located within the proposed Paradigm Project boundary (Figure 21). The Service determined in our 2013 Conference Opinion that the proposed GWW project is likely to adversely affect slickspot peppergrass due to occasional damage to or loss of individual slickspot peppergrass plants (including seeds) that cannot be avoided; with adverse effects to both the species and its proposed critical habitat associated with damage to or loss of some individual slickspot microsites that cannot be avoided, unintentional fire ignition, Project-generated dust and soil movement, removal of some remnant native vegetation, and the potential introduction or spread of invasive nonnative plants (USFWS 2013b, pp. 68-69).

Residential, commercial, and agricultural development prior to 1955 has been reported as the cause for five documented and four probable extirpations of the slickspot peppergrass (Colket *et al.* 2006, p. 4). All forms of development can affect the slickspot peppergrass and slickspot habitat, whether directly or indirectly, through habitat conversion (resulting in direct loss of individuals and permanent loss of habitat), or through habitat degradation and fragmentation as a result of consequent increased nonnative plant invasions, increased OHV use, increased wildfire, and changes to insect populations (ILPG 1999, *in litt.* pp. 1–3; Robertson and White 2007, pp. 7, 13).

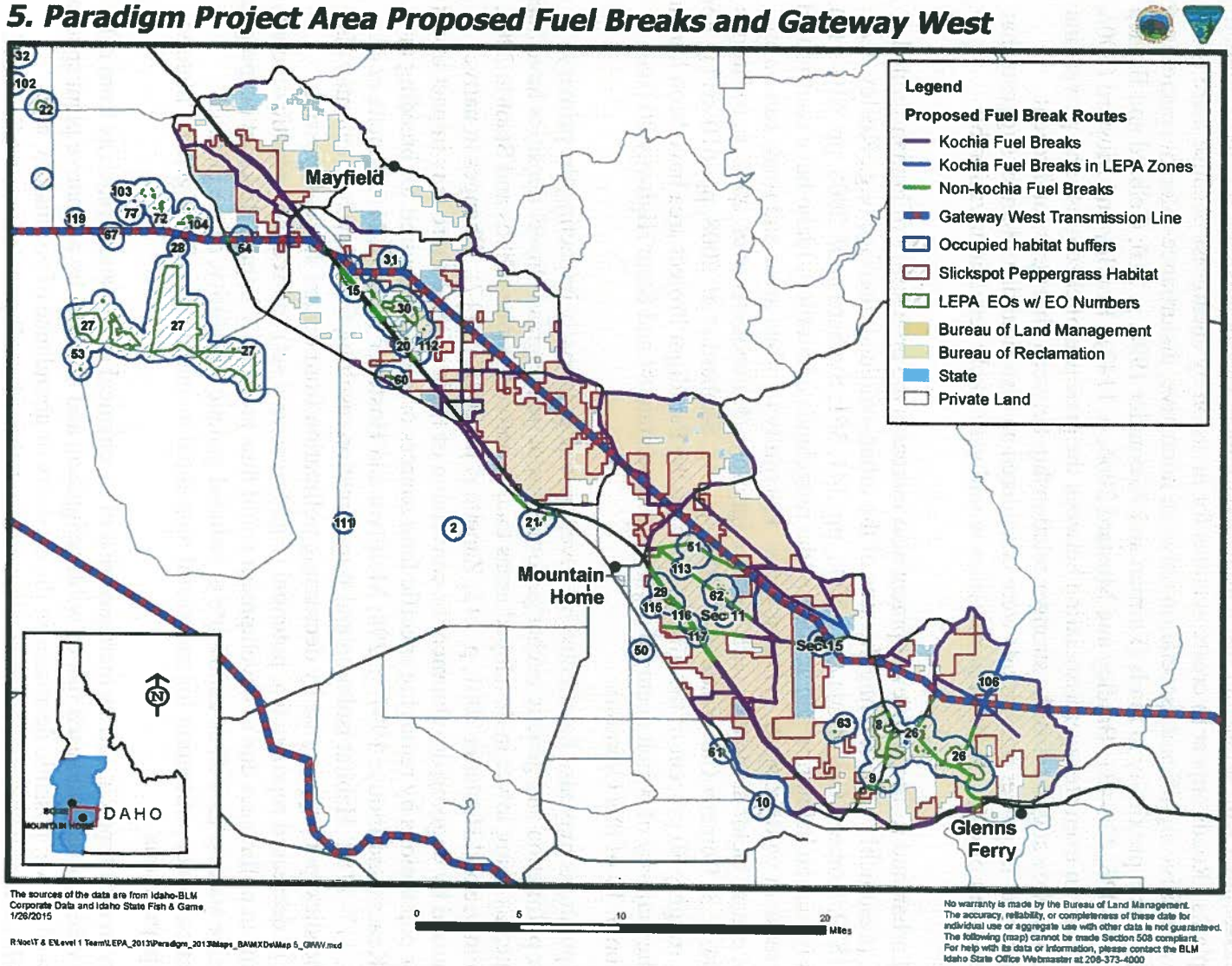

Figure 21. Overview of the proposed Gateway West Transmission Line Project route crossing the Paradigm Fuel Breaks Project area.

The most direct impact of development is the outright loss of slickspot peppergrass populations due to habitat conversion, such as when habitat occupied by slickspot peppergrass is converted to a residential development or an agricultural field, resulting in the permanent loss of the plant population and the habitat. Direct effects to the slickspot peppergrass are also a likely consequence of the linear infrastructure associated with urban and residential development, including road right-of-way corridors such as the proposed action. Transportation and utility corridors associated with urban and residential development can increase the spread of nonnative invasive plants. Roads appear to create avenues for invasion by cheatgrass because there is generally a positive significant association between nonnative, disturbance-tolerant species such as cheatgrass and proximity to roads (Forman and Alexander 1998, p. 210; Gelbard and Belnap 2003, pp. 424-425, 430-431; Bradley and Mustard 2006, p. 1142). Bradley and Mustard (2006, p. 1146) found an even stronger association between the presence of cheatgrass and power-line corridors, and they suggest that the stronger relationship between cheatgrass and recent disturbance (that is, power lines; roads were considered an historical disturbance) suggests that future placement of either roads or power lines would very likely result in invasion by cheatgrass.

Increased urban and residential development also increases the probability of human-ignited wildfires, presumably by increasing the area of the urban-wildland interface (e.g., Keeley *et al.* 1999, p. 1829; Romero-Calcerrada *et al.* 2008, pp. 341, 351; Syphard *et al.* 2008, pp. 610–611). Increases in human habitation and activity in the rangelands of southern Idaho have contributed to the increase in wildfire starts in recent years. Proximity to urban areas and roads can be an important causal factor associated with wildfire ignitions (Kalabokidis *et al.* 2002, p. 6; Brooks *et al.* 2004, p. 3; Romero-Calcerrada *et al.* 2008, p. 351; Syphard *et al.* 2008, pp. 610–611). For example, roughly 80 percent of the fire starts within the Paradigm Project area have been human-caused, the majority of which occurred adjacent to Interstate 84 and State Highway 20 (see Figure 3 on p. 10 of this Opinion).

Insect populations may also be affected by development, potentially impacting the primary vector for pollination and genetic exchange for slickspot peppergrass. Insect densities have been documented as being lower in developed areas than in native habitats (Gibbs and Stanton 2001, p. 82; McIntyre and Hostetler 2001, p. 215; Zanette *et al.* 2005, p. 117). Changes in native habitat caused by ongoing development or conversion of lands to agriculture may impact insect pollinator populations by removing specific food sources or habitats required for breeding or nesting (Kearns and Inouye 1997, p. 298; McIntyre and Hostetler 2001, p. 215; Zanette *et al.* 2005, pp. 117–118). Habitat isolation and fragmentation resulting from development may also impact the slickspot peppergrass by decreasing pollination from distant sources, possibly resulting in decreased reproductive potential (e.g., lower seed set) and reduced genetic diversity. Reductions in pollinators due to development could thus potentially impact slickspot peppergrass reproductive success as well as contribute to reduced genetic variability, as the plant is dependent on insect pollination for successful reproduction and the transfer of genetic material between populations.

Proximity to development carries increased risk of mechanical disturbances (such as from off highway vehicle use); increased risk of wildfire ignition and invasion by nonnative plant species, as discussed above; possible decreases in the diversity or abundance of pollinators; and vulnerabilities associated with fragmentation and isolation of small populations, as discussed

below. The Service considers development to be a significant threat within the Snake River Plain portion of the range of the slickspot peppergrass (which also includes the Paradigm Project area), as the outcome of this threat is severe where it occurs and likely results in the permanent loss of populations and irreplaceable slickspot microsite habitats. However, this threat is not so imminent or sweeping in scope as to pose an immediate risk of extirpation to the populations of slickspot peppergrass in these regions, nor does the Service consider the threat of development to be equal to the magnitude and intensity of the primary threats of the modified wildfire regime and invasive nonnative plants. Development is considered to pose a significant but lesser threat to the species.

2.4.2 Slickspot Peppergrass Proposed Critical Habitat

2.4.2.1 Status of Slickspot Peppergrass Proposed Critical Habitat in the Action Area

Critical habitat receives protection under Section 7 of the Endangered Species Act through the prohibition against federal agencies carrying out, funding, or authorizing the destruction or adverse modification of critical habitat. Critical habitat designations identify, to the extent known using the best scientific data available, habitat areas that provide essential life-cycle needs of the species (USFWS 2011). Proposed critical habitat (PCH) is habitat that has been proposed in the Federal Register to be designated as critical habitat, or habitat proposed to be added to an existing critical habitat designation, under Section 4 of the Endangered Species Act for any listed or proposed species [50 CFR §402.02].

The Paradigm Project area includes Subunits 3a and 3c in their entirety as well as a portion of Subunit 3b in Critical Habitat Unit (CHU) 3 (Elmore County) of proposed critical habitat for slickspot peppergrass (Figures 21 and 22). The Project area contains approximately 10,077 acres of proposed critical habitat for slickspot peppergrass, with approximately 8,954 acres located on Bureau lands, 203 acres located on BOR lands, and 919 acres located on private lands (see Table 6 on p. 78 of this Opinion). No proposed critical habitat is located on State lands within the Paradigm Project area. The 10,077 acres of proposed critical habitat located within the Paradigm Project area represents about 16 percent of the total proposed critical habitat acreage for slickspot peppergrass rangewide (61,301 acres).

A total of up to 27 miles of proposed fuel breaks (1,008 acres) are located within Subunits 3a, 3b, and 3c in Critical Habitat Unit (CHU) 3 (Elmore County) of proposed critical habitat for slickspot peppergrass (Figures 21 and 22). Of these 27 miles of fuel breaks, 25 miles occur on Federal lands (Figure 22) and up to 2 miles will occur on private lands (Figure 23; Table 7). Of the 10,077 acres of proposed critical habitat located within the Paradigm Project area, 1,008 acres are within proposed Paradigm Project fuel break footprints. These 1,008 acres represent about 9 percent of the 10,999 acres of proposed critical habitat within CHU 3 (Elmore County), and about 2 percent of the proposed critical habitat acreage for slickspot peppergrass rangewide (61,301 acres).

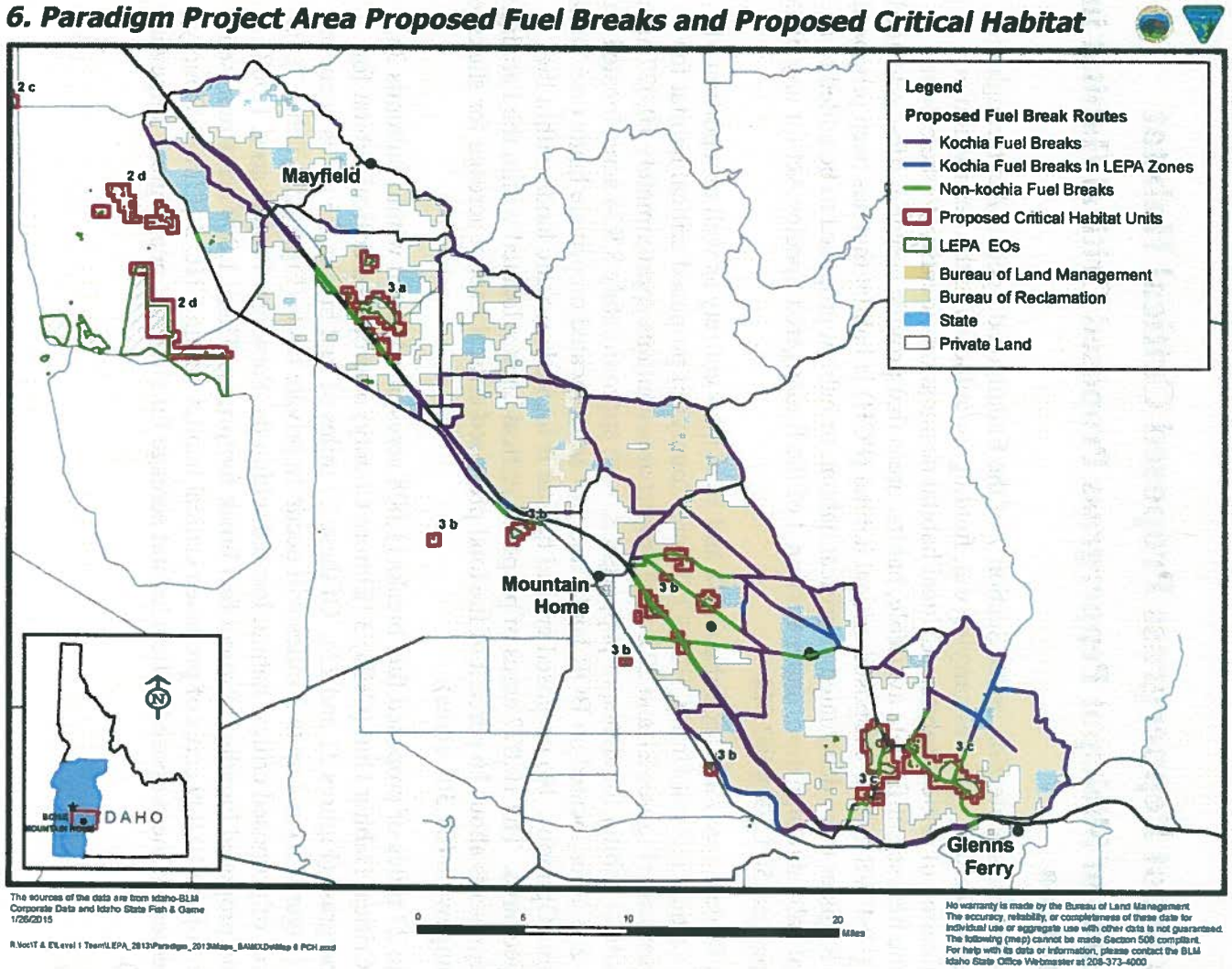

Figure 22. Proposed critical habitat for slickspot peppergrass in relation to proposed fuel breaks on Federal and State lands within the Paradigm Fuel Breaks Project area.

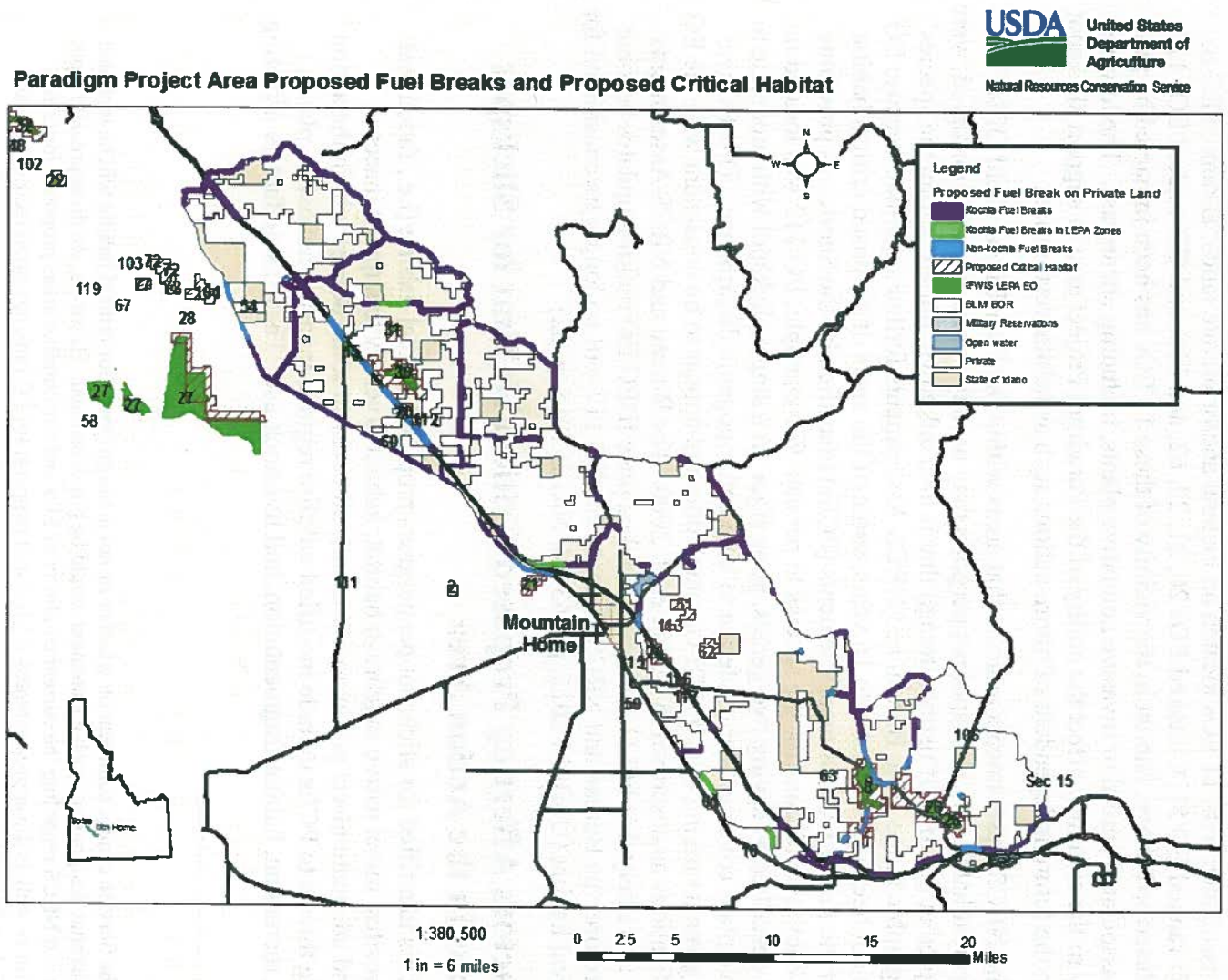

Figure 23. Proposed critical habitat for slickspot peppergrass in relation to proposed fuel breaks on private lands within the Paradigm Fuel Breaks Project area.

Approximately 920 acres of the 1,008 acres of proposed fuel break footprints are located within proposed critical habitat on Federal lands, and would be subjected to the fuel break treatment methods identified for Bureau-managed lands (Figure 22). An additional 88 acres of proposed fuel breaks are located within proposed critical habitat on private lands that could be subjected to the fuel break treatment methods for privately-managed land (Figure 23). No Paradigm Project prostrate kochia greenstrip fuel breaks will be located within proposed critical habitat on any lands regardless of ownership.

The 1,008 acres of proposed critical habitat within proposed Paradigm Project fuel break footprints are associated with 11 EOs located on Federal and/or private lands: B-ranked EO 8, 26, and 30; BD-ranked EO 51; C-ranked EOs 20, 21, 29, 62, and 116; and CD-ranked EOs 113 and 117. As described above, habitat in the vicinity of these 11 EOs has been impacted by past wildfires and associated spread of invasive nonnative plants, including cheatgrass. The lowered habitat quality in the area may affect the ability of the Paradigm Project area to support slickspot peppergrass in the future independent of future actions such as habitat restoration.

The Bureau and NRCS Assessments indicate that areas within the Four Rivers Field Office proposed as critical habitat for slickspot peppergrass may or may not be currently occupied, were possibly occupied at the time of listing, though that is also unknown, but are within the species' historical geographic range. The Bureau and NRCS Assessments further state that, because EO rankings have not been updated for 9 to 16 years, some of the areas of proposed critical habitat do not support the Primary Constituent Elements (PCEs) identified by the Service as providing the necessary habitat conditions for the species to persist. For example, EO 112 was located in 2010 and was described as having two genets, poor vigor, in a single slickspot with moderate to high non-native plant cover and /or moderate to high anthropogenic disturbance. This EO was subsequently given a ranking of C by IDFG, which does not appear to be consistent with the EO ranking specifications as described in Colket et al. 2006. The Bureau and NRCS Assessments also state that it is likely that EO 112 will be D-ranked once IDFG EO ranking updates become available; therefore, the Bureau and NRCS indicate that EO 112 will no longer be considered for proposed critical habitat (USBLM 2015, pp. 63-64; NRCS 2015, p. 62)[33].

2.4.2.2 Factors Affecting Proposed Critical Habitat for Slickspot Peppergrass in the Action Area

Of the four PCEs identified for slickspot peppergrass proposed critical habitat (i.e., functional slickspot microsites, intact native sagebrush habitat, habitat diversity to support insect pollinators, and adequate insect pollinators present), all occur to some degree within the action area. Ongoing threats to PCEs include modified wildfire regime, invasive nonnative plants, development, recreation, habitat fragmentation, and livestock use. These same factors affecting

[33] At this time, the Service cannot comment on whether or not areas proposed for critical habitat will be included in the final critical habitat designation; such a statement would be pre-decisional. However, we do appreciate input from the Bureau and NRCS regarding the current condition of EOs and surrounding areas proposed for critical habitat designation as well as the appropriateness of slickspot peppergrass EO rankings provided by the Idaho Department of Fish and Game.

the PCEs of proposed critical habitat have been previously described in detail for the species in section 2.4.1.2 above. The primary threats of modified wildfire regime and invasive nonnative plants have significantly impacted the functionality of PCEs of proposed critical habitat within the action area, and may continue to impact critical habitat PCEs in the future.

Data used by the Bureau and NRCS to determine the current condition of slickspot microsites and habitat in the action area surrounding occupied slickspots included HIP monitoring data collected within EOs (Colket 2009, entire; Kinter *et al.* 2012, Appendix H and L). As described above, multiple EOs and their surrounding proposed critical habitat in the Paradigm Project area have been impacted by frequent wildfires and subsequent replacement of native sagebrush steppe species by invasive nonnatives such as cheatgrass and medusahead. In addition, the understories of many dense sagebrush stands remaining within proposed critical habitat are currently dominated by cheatgrass, annual *Vulpia* species and/or bur buttercup. Development and infrastructure can eliminate slickspot microsites (PCE 1), and remove or further degrade native sagebrush steppe habitat (PCE 2), habitat components required by insect pollinators (PCE 3), and presence of insect pollinators (PCE 4) through loss of native vegetation as well as increased human-caused fire ignitions and the introduction or spread of invasive nonnative plants.

The Bureau and NRCS rated PCE 1 as being in moderate condition within the Paradigm Project area, primarily based on the low level of organic debris and the moderate level of ground disturbance observed in slickspot microsites of proposed critical habitat in the Project area. Condition of PCE 2, PCE 3, and PCE 4 was rated as low quality due to the high levels of habitat fragmentation and nonnative plant cover in concert with the extremely low native forb cover documented within proposed critical habitat in the Project area (Table 8). The overall status of the PCE Environmental Baseline condition for proposed critical habitat in the Paradigm Project area was rated as low quality.

Table 8. Current condition of Primary Constituent Elements of proposed critical habitat for slickspot peppergrass located within the Paradigm Fuel Break Project.

PCE	Corresponding Pathway Indicators[1]	Ranking of Pathway Indicators[1]	Ranking of PCE (H, M, L)
1. Ecologically functional slickspots.	A-1. Non-native plants	L	M
	A-2. Ground disturbance	M	
	A-3. Organic debris	H	
2. Intact native Wyoming big sagebrush vegetation.	B-1. Ground disturbance	M	L
	B-2. Habitat fragmentation	L	
	B-3. Non-native plants	L	
	B-4. Biological crust	M	
	B-5. Native forbs	L	
3. Diversity of native plants.	B-3. Non-native plants	L	L
	B-5. Native forbs	L	
4. Sufficient pollinators for successful fruit and seed production.	B-1. Ground disturbance	M	L
	B-2. Habitat fragmentation	L	
	B-3. Non-native plants	L	
	B-5. Native forbs	L	
Summary of Overall Status of PCE Baseline within the Action Area			L

[1]Described in Appendix D (L = low quality, M = moderate quality, H = high quality).

For more detailed information regarding the factors affecting proposed critical habitat for slickspot peppergrass in the Paradigm Project area, see the "Factors Affecting the Species" section above.

Overview of Threats to Slickspot Peppergrass and its Proposed Critical Habitat

Threats to slickspot peppergrass and its habitat, inclusive of proposed critical habitat, within the action area of the proposed Paradigm Fuel Breaks Project identified in the Bureau and NRCS Assessments include wildfire, presence of invasive nonnative plants, fire rehabilitation activities, pesticide use, livestock grazing, off highway vehicle (OHV) use, and development and agricultural conversion (USBLM 2015, p. 31; NRCS 2015, p. 29).

Several threat factors are contributing to the destruction, modification, or curtailment of slickspot peppergrass habitat across the range of the species, including within the Paradigm Project area. The sagebrush-steppe habitat of the Great Basin where slickspot peppergrass occurs is becoming increasingly degraded due to the impacts of multiple threats, including increased fire frequency and the subsequent invasion of nonnative annual grasses, such as cheatgrass. Effects of the modified wildfire regime and the invasive nonnative plants were identified as the primary threats identified in the Service's decision to list slickspot peppergrass as threatened. Cheatgrass can impact slickspot peppergrass directly through competition but also indirectly by providing continuous fine fuels that contribute to the increased frequency and extent of wildfires. Frequent wildfires have numerous negative consequences in the sagebrush-steppe system, which is

adapted to much longer fire-return intervals, ultimately resulting in the conversion of the sagebrush community to nonnative annual grasslands with associated losses of native species diversity and natural ecological function. Because the modified wildfire regime and invasion of cheatgrass create a positive feedback loop, independently separating the effects of each of these threats is difficult. For a more detailed description of the effects of wildfire and invasive nonnative plants on slickspot peppergrass, see the Service's listing decision.

Even though slickspot peppergrass occurs in naturally patchy microsite habitats, the increasing degree of fragmentation produced by wildfires and development may result in the separation of populations beyond the distance that its insect pollinators are capable of traveling (Robertson *et al.* 2004, pp. 2-4). Genetic exchange in slickspot peppergrass is achieved through either seed dispersal or insect-mediated pollination, and plants that receive pollen from more distant sources demonstrate greater reproductive success in terms of seed production (Robertson and Ulappa 2004, pp. 1705, 1708; Stillman et al. 2005, pp. 1, 6-8). As all indications are that seeds are dispersed over only a very small distance and insect pollinators are also limited in their dispersal capabilities, habitat fragmentation and isolation of populations poses a threat to slickspot peppergrass in terms of decreased reproductive success (lower seed set) (Robertson et al. 2004, p. 1705), reduced genetic variability (Stillman et al. 2005, pp. 1, 6-8), and greater local extinction risk (Barrett and Kohn 1991, pp. 4, 28). The Service considers the threat of habitat fragmentation to be significant, but not as severe as the threats posed by the modified wildfire regime and invasive nonnative plant species; the threat of habitat fragmentation and isolation of small populations is pervasive throughout the range of slickspot peppergrass.

Climate change is expected to exacerbate this feedback loop between the primary threats of invasive nonnative plants (e.g., cheatgrass) and changes in wildfire regime. As there is some degree of uncertainty regarding the potential effects of climate change on slickspot peppergrass specifically, climate change in and of itself was not considered a significant factor in the Service's 2009 determination to list slickspot peppergrass as a threatened species. However, the Service recognizes that the severity and scope of the primary threats to slickspot peppergrass of frequent wildfire and invasion by nonnative plants such as cheatgrass are likely to magnify, depending on the realized outcome of climate change within the foreseeable future; thus, we consider climate change as playing a potentially important supporting role in intensifying the primary threats to the species.

Secondary threats of residential and commercial development and the emerging threat of seed predation by Owyhee harvester ants (*Pogonomyrmex salinus*); and other factors, including livestock use, wildfire management activities, and post-fire stabilization and restoration activities; also may affect slickspot peppergrass. These factors may result in effects that may occur both directly through the damage or mortality to individual plants and loss of slickspot microsites and indirectly through habitat fragmentation and isolation. The loss of slickspot microsites is a permanent loss of habitat for slickspot peppergrass since the species is specialized to occupy these unique microsite habitats that were formed in the Pleistocene; once lost, slickspot microsites likely cannot be re-created on the landscape.

The effects of the proposed Paradigm Project on slickspot peppergrass and its proposed critical habitat are described below. For a more detailed discussion of other threat factors, refer to the final listing rule for slickspot peppergrass (74 FR 52014, October 8, 2009).

2.5 Effects of the Proposed Action

Effects of the action considers the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action. These effects are considered along with the environmental baseline and the predicted cumulative effects to determine the overall effects to the species. Direct effects are defined as those that result from the proposed action and directly or immediately impact the species or its habitat. Indirect effects are those that are caused by, or will result from, the proposed action and are later in time, but still reasonably certain to occur. An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation.

2.5.1 Overview of the Effects of the Action Analysis

In analyzing the effects of implementation of the proposed Paradigm Fuel Breaks Project on slickspot peppergrass and its proposed critical habitat, the Bureau and NRCS used *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Slickspot Peppergrass (Lepidium papilliferum)* (Framework) (USFWS 2006a, entire). The Framework is a tool developed to assist Federal agencies when working with the Service to assess effects of their actions on slickspot peppergrass. The Framework was developed based on the species' life history, ecological requirements, and threats. As described above, using the Framework includes providing a description of baseline conditions for the species and its habitat in the action area and changes in conditions for the species resulting from the action. Since the vast majority of individual slickspot peppergrass plants are desert annuals (as opposed to the number of individual plants that exhibit the biennial life form), emphasis is placed on the condition of the habitat rather than on the number of plants present in a given year. Populations of desert annuals change drastically in response to annual weather conditions; therefore, habitat condition is a much better long-term measure of the annual plants' potential ecological health (Elzinga *et al.*1998, p. 55). The Framework is intended for analyzing an individual action's potential effects on the species and may be applied to ongoing and proposed actions. The Framework consists for three major components: (1) a Matrix of Pathways and Indicators, (2) a Checklist of Diagnostics, and (3) a Dichotomous Key of Effects Determinations. To complete the effects analyses, the Bureau consistently applied the Matrix of Pathways and Indicators from the Framework (see Appendix B of this Opinion) to the action to review both the baseline conditions and the action's effects on slickspot peppergrass and its habitat. This matrix considers indicators that reflect resource characteristics and their condition that are described as a quality ranking. The effects of the action on each pathway indicator generated by this analysis process are provided in the Bureau and NRCS Assessments (USBLM 2015, pp. 82-95; NRCS 2015, pp. 81-94; see also Appendix C in this Opinion). The Framework matrix categorizes a series of habitat quality indicators both within and outside of slickspots for the proposed action. High, moderate, and low quality rankings of habitat represent points on a gradation of habitats rather than absolute thresholds for habitat quality.

Slickspot peppergrass survival and recovery is dependent on maintaining and enhancing Wyoming big sagebrush-steppe habitat and slickspot microsites located within this ecosystem in

southern Idaho. The long-term conservation of slickspot peppergrass is dependent upon the maintenance or improvement of ecological function of the higher quality (C- through A-ranked) EOs rangewide, including maintaining or improving the connectivity within and between EOs which may involve the maintenance or enhancement of currently lower ranked EOs (D- through F-ranked). Maintaining the ecological function of higher quality habitat for slickspot peppergrass is necessary to facilitate insect pollinator activity, maintain genetic diversity, and limit the establishment of invasive nonnative plant species.

As described in the "Conservation Needs" section above (section 2.3.1.6), the Service used the State of Idaho's INHP EO rankings to characterize the conservation value of the fuel breaks action area, along with more recent habitat condition information from HIP monitoring data and Bureau pre-Project surveys. These INHP criteria address population size of individual EOs, habitat condition within EOs, and the landscape condition of the area surrounding EOs. The State of Idaho's INHP EO rankings were last updated in 2005; thus, the Service also considered habitat condition data from recent surveys and HIP monitoring in the Paradigm Project area to rate the conservation value of the Paradigm Project area to slickspot peppergrass. Due to the extent of recent wildfire within the majority of EOs in the Paradigm Project area, the Service assigned a lower conservation value (moderate to high) than what would have been assigned through the consideration of EO rankings alone (high).

Once the conservation value of habitat in an action area is identified, effects of the action are examined to determine whether the action was expected to increase, maintain, or decrease the current conservation value of the action area over time. These analyses are then used to make our jeopardy determination for the species. We acknowledge that information gaps and disagreement exist with respect to the available information on slickspot peppergrass; however, in accordance with Service policy, the best information available was used to develop this Opinion. Page 1-6 of the *Endangered Species Consultation Handbook* states that "Where significant data gaps exist there are two options: (1) if the action agency concurs, extend the due date of the biological opinion until sufficient information is developed for a more complete analysis; or (2) develop the biological opinion with the available information giving the benefit of the doubt to the species." Researching the effects of various fuel break management actions to gather missing effects data on a plant with a seed bank cohort that is viable for up to 12 years would likely delay this conference for many years. Thus, the Service has provided the benefit of the doubt to slickspot peppergrass with respect to data gaps regarding the potential effects of the Project considered in this analysis.

The indicators and quality rankings used to determine the effects of the proposed Paradigm Fuel Breaks Project on slickspot peppergrass and its proposed critical habitat are based on best available science. Due to the variable habitat condition for slickspot peppergrass within the treatment footprints of the Project as well as the quality of existing EOs within the Project area, the action area is considered to have a moderate to high conservation value for slickspot peppergrass. Slickspot peppergrass plants as well as slickspot microsites are documented as occurring within the Paradigm Project area, including within proposed treatment footprints, and the proposed Project fuel break footprints will be located within EOs, Occupied Habitat, Slickspot Peppergrass Habitat, and proposed critical habitat for the species. As noted earlier, the Service has provided the benefit of the doubt to slickspot peppergrass regarding the potential effects of the action considered in this Opinion. Therefore, if there is a reasonable likelihood that

an adverse impact could occur to a single slickspot peppergrass plant (including seeds) or any loss or degradation of slickspot microsite habitat associated with the proposed Paradigm Fuel Breaks Project, our analysis will reflect that adverse effects are expected.

The Bureau's recommended three years of survey to determine presence or absence of slickspot peppergrass (USBLM 2010, entire) have not occurred within Slickspot Peppergrass Habitat within the Paradigm Project area. As adequate survey efforts have not been completed in the 88,381 acres of Slickspot Peppergrass Habitat within the Project area (which is inclusive of the 6,885 acres of Slickspot Peppergrass Habitat within the Project footprint), for the purposes of this Opinion, the Service assumes that viable slickspot peppergrass seeds may also be present within slickspot microsites within Slickspot Peppergrass Habitat in the Project area.

The 2014 Conservation Agreement (CA) between the Bureau and the Service states that potentially invasive nonnative species such as prostrate kochia may be used if an environmental analysis determines that the benefits of its use outweigh the risk of invasion to slickspot peppergrass and its habitat relative to other alternative fuel break methods (USBLM and USFWS 2014, Appendix A, pp. 18, 20). The Bureau and NRCS Assessments state that prostrate kochia is the best tool available for use in the degraded habitat conditions of the Project area. However, as discussed in the effects section below, there is conflicting information regarding the ability of prostrate kochia to establish outside of seeded areas and displace native species, including slickspot peppergrass. When information is lacking or conflicting scientific information exists, the Service's policy is to err on the side of the species when conducting section 7 effects analyses. While we acknowledge Bureau and NRCS use of Project Design Features such as a monitoring and subsequent control if prostrate kochia is discovered to have established outside fuel break boundaries, based on varying findings on movement of prostrate kochia under certain environmental conditions, use of prostrate kochia in fuel breaks may result in effects to slickspot peppergrass and its habitat, including proposed critical habitat. We have considered this information within our effects analyses below.

2.5.2 Slickspot Peppergrass

2.5.2.1 Direct and Indirect Effects of the Proposed Action

The proposed Paradigm Fuel Breaks Project may result in both adverse and beneficial effects to slickspot peppergrass. Fuel breaks are placed on the landscape by altering or removing vegetation (native or nonnative), and/or planting specific types of vegetation, with the intention of creating conditions that limit the spread of wildfire under normal fire conditions. The utility of fuel breaks is to slow fires, not stop them (Stratton 2004, p. 32; Agee 2000, p. 56), and under extreme fire conditions, fuel breaks are likely of limited value related to suppression activities. However, strategically placed and properly maintained fuel breaks are expected to provide beneficial effects to native species, including slickspot peppergrass, by giving an advantage to fire management personnel, resulting in smaller fire footprints, and addressing, in part, threats to native sagebrush-steppe species from the current modified fire regime. Minimizing the size, frequency, and intensity of wildfire in the sagebrush steppe ecosystem will contribute to maintaining the natural ecology of the landscape by decreasing fire impacts and decreasing habitat recovery time in an ecosystem which historically experienced few fire events; this will benefit slickspot peppergrass and its habitat and other sagebrush steppe obligate species.

The potential effects of the proposed Paradigm Project on slickspot peppergrass and its habitat may be both adverse and beneficial. Adverse effects are possible associated with injury to or mortality of individual slickspot peppergrass plants or seeds, the loss of slickspot microsites and native vegetation (including sagebrush) within vegetation treatment segments, and prostrate kochia establishment within slickspot microsites. Beneficial long-term effects are possible via the establishment of effective fuel breaks, which can reduce fire frequency and intensity. While it is acknowledged that prostrate kochia could impact slickspot peppergrass and its habitat, the Bureau and NRCS believe that, based on current fire trends and loss of sagebrush steppe plant communities in the area, the use of prostrate kochia in the Paradigm Project area is warranted and will result in the large-scale benefits of reduced fire activity and increased suppression opportunity, with low risk to slickspot peppergrass and its habitat through Monitoring and Control protocols (USBLM 2015, p. 47, NRCS 2015, p. 45).

The Project area contains 23 extant EOs (11 of which are within fuel break footprints), 29,088 acres of Occupied Habitat (up to 1,996 acres of which are within the proposed fuel break footprints) and the 88,381 acres of Slickspot Peppergrass Habitat (6,885 acres of which are within the proposed fuel break footprints). The potential beneficial and adverse effects of the proposed Paradigm Fuel Breaks Project are described in detail below.

Direct Loss of or Damage to Individual Plants (Including Seeds)

Vegetation treatments, including projects such as fuel breaks, can result in direct loss of or damage to individual slickspot peppergrass plants by crushing (by equipment or vehicles) or trampling (by workers) during fuel break implementation and maintenance activities. Plants or habitat may also be impacted by being buried during Project-related disking or other earth-moving activities, including viable slickspot peppergrass seeds being buried too deep into the soil for subsequent germination and emergence. Use of prescribed fire and applications of herbicide during seedbed preparation and maintenance activities may also result in damage or mortality of individual slickspot peppergrass plants or seeds.

Pre-project surveys of fuel break footprints have been completed on Federal and State lands, and will be completed on an individual project specific basis on private lands as private landowners choose to participate in the Paradigm Project. Survey results have been and will continue to be used to avoid or minimize the likelihood of impacts to individual slickspot peppergrass plants through use of siting and associated appropriate fuel break methods that minimize the likelihood of impacts to individual plants as well as to inform where specific fuel break methods and Project Design Features will be used.

Although not specifically addressed in the Bureau and NRCS Assessments, pre-Project surveys and post-Project implementation/effectiveness monitoring activities have the potential to result in direct effects to individual slickspot peppergrass plants or the seed bank through uninformed individuals trampling or driving over slickspot peppergrass plants or through associated ground disturbance within slickspot microsites that can bury the seed bank. However, individuals conducting surveys and monitoring on Federal, State, and private lands will be agency natural resource staff (as well as landowners on private lands) trained to avoid impacts to individual slickspot peppergrass plants and the seed bank, including stepping on plants, driving in slickspots, and disturbing slickspot soils. Therefore, it is extremely unlikely that slickspot peppergrass plants will be crushed or injured or the seed bank buried by trained survey or

monitoring crews and private landowners during Paradigm Project survey and monitoring activities. Effects due to direct injury or mortality of slickspot peppergrass plants, including seeds, associated with Project-related surveys and monitoring will be discountable. Therefore, pre-Project surveys and implementation/effectiveness monitoring activities for the proposed Paradigm Project may affect, but are not likely to adversely affect, slickspot peppergrass.

For the remainder of work tasks associated with the proposed Paradigm Project, Design Features proposed for use on Federal, State, and private lands will minimize the likelihood of Project-related mechanical injury to or mortality of individual slickspot peppergrass plants within EOs and proposed critical habitat. These Design Features include flagging slickspots within EOs and proposed critical habitat for avoidance by machinery and personnel. In addition, fuel break implementation will be overseen by qualified agency natural resources staff to ensure avoidance of potential impacts to slickspot peppergrass and slickspot microsites for all fuel break treatment methods (mechanical thinning/mowing, herbicide use, prescribed burning[34], and seeding) located within EOs and proposed critical habitat. In addition, prescribed burn treatments will not occur in extant EOs, and will only occur in proposed critical habitat and Occupied Habitat through site-specific annual coordination with the Service to avoid impacts to individual slickspot peppergrass plants. Furthermore, the likelihood of mechanical damage from machinery, workers, or livestock trampling associated with the Paradigm Project will be minimized through refraining from use of disking, targeted grazing, or prostrate kochia seeding treatment methods within extant EOs and proposed critical habitat where plants are known to occur.

On Federal and State lands, only 1 of the 3 years of slickspot peppergrass surveys[35] recommended to determine the presence or absence of slickspot peppergrass in the 6,885 acres of Slickspot Peppergrass Habitat within the Project footprint have been completed to date. It is also likely that a single year of slickspot peppergrass surveys will be completed prior to fuel break implementation on private lands.[36] Although no Slickspot Peppergrass Habitat has been located on private lands to date, Potential Habitat may be re-categorized once site-specific pre-Project surveys have been completed in fuel break footprints. The majority of the slickspot peppergrass population is present within its persistent seed bank, and above-ground plants may not be present every year. Therefore, it is possible that areas where no slickspot peppergrass plants were observed during surveys of Slickspot Peppergrass Habitat as well as within the 0.5 mile pollinator buffer portion of Occupied Habitat may contain viable slickspot peppergrass seeds where located within proposed fuel break footprints. The probability of slickspot peppergrass

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[34] No prescribed burning will take place within extant EOs; therefore flagging of slickspot microsites and the presence of natural resources staff during fuel break implementation apply only to prescribed burning treatments that may occur within that portion of proposed critical habitat located outside of EO boundaries.

[35] Three years of inventory when spring rainfall is at least 60 percent of average are required to classify Slickspot Peppergrass Habitat as "Unoccupied" (USBLM 2010, p. 4).

[36] Although no Slickspot Peppergrass Habitat is located on private lands to date, Potential Habitat may be re-categorized once site-specific pre-Project surveys have been completed within fuel break footprints.

plants or viable slickspot peppergrass seeds being present within Slickspot Peppergrass Habitat is higher due to the presence of multiple extant EOs within the Paradigm Project area.

Slickspot peppergrass viable seeds located outside of EOs or proposed critical habitat may be impacted by the proposed Project through burying seeds beyond the depth where seedlings can emerge to the soil surface (about 1 inch) during ground disturbing treatments or through direct injury or mortality. However, Design Features will minimize the risk of direct impacts to the seed bank from treatments and maintenance activities; thus, effects are expected to be discountable. For example, disking treatments, which could bury the slickspot peppergrass seed bank if present within fuel break treatment areas, are prohibited in EOs, proposed critical habitat, and portions of Occupied Habitat outside of EOs and proposed critical habitat that are devoid of slickspot microsites. Disking treatments are also prohibited in Slickspot Peppergrass Habitat unless 3 years of survey confirm that the species is not present. Seeding within fuel break footprints will use minimum or moderate soil disturbance techniques in EOs, proposed critical habitat, Occupied Habitat and Slickspot Peppergrass Habitat, minimizing the likelihood of deep burial of seeds.

Targeted grazing is likely to only be used in areas where other treatment methods are not feasible due to terrain, or other resource concerns. Targeted livestock grazing (inclusive of associated gathering, bedding, and trailing) could bury slickspot peppergrass seeds through trampling when soils are saturated. However, targeted grazing treatments will not be authorized within EOs or proposed critical habitat; therefore, damage to individual plants and/or slickspots will not occur. Furthermore, slickspot microsites outside of EOs, but within the Occupied Habitat 0.5 mile pollinator buffer as well as in Slickspot Peppergrass Habitat may contain viable slickspot peppergrass seeds. However, targeted grazing will not occur within either Slickspot Peppergrass Habitat or within the 0.5 mile pollinator buffer portion of Occupied Habitat during periods when slickspot soils are saturated; therefore, impacts to the seed bank due to deep burial of viable slickspot peppergrass seeds during Paradigm Project targeted grazing treatments are extremely unlikely to occur.

Prescribed fire fuel break treatments used in Slickspot Peppergrass Habitat prior to completing the 3 years of surveys has the potential to impact seeds located close to the soil surface as well as to result in deep burial of viable seeds due to equipment operation within slickspots. Furthermore, because slickspots are becoming increasingly colonized by invasive annual plants (Kinter et al. 2013, p. 11), heat from prescribed burning through slickspot microsites containing invasive annual grasses and forbs, such as cheatgrass, has the potential to damage the seed bank. However, potential impacts from prescribed fire treatments within Slickspot Peppergrass Habitat and within the 0.5 mile pollinator buffer portion of Occupied Habitat are expected to be extremely unlikely to occur. Prescribed burn treatments will occur in late fall through early spring, therefore, soils will likely be frozen and air temperatures will be lower so fire will burn "cooler" during prescribed fire treatments. Due to the cool environmental conditions expected during prescribed fire treatment periods, potential impacts to the seed bank and slickspot microsite soils within fuel break footprints will be extremely unlikely to occur.

Overall, Paradigm Project-related direct loss of or damage to individual slickspot peppergrass plants or the seed bank will be extremely unlikely to occur. Therefore, pre-Project surveys, monitoring, targeted grazing, and prescribed fire treatments in the Paradigm Project area may affect, but are not likely to adversely affect, slickspot peppergrass and its habitat.

Fire

Change in the natural fire regime (frequency, intensity, and patch size) has been identified as one of the two primary threats to slickspot peppergrass. Frequent wildfires have numerous negative consequences in the sagebrush-steppe system, which is adapted to much longer fire-return intervals. Frequent fire ultimately results in the conversion of the sagebrush community to nonnative annual grasslands (including cheatgrass) with associated losses of native species diversity and natural ecological function. Evidence suggests a significant negative association between wildfire and the abundance of slickspot peppergrass (Sullivan and Nations 2009, pp. 114–118, 137). A combined total of approximately 162,866 acres of habitat categories for slickspot peppergrass within the Paradigm Project boundary are located outside of the fuel break footprints. These 162,866 acres of habitat, particularly any areas containing remnant unburned sagebrush steppe habitat, are expected to have a Project-related reduced risk of loss due to fire when compared to the current condition. Successfully established, effective fuel breaks are expected to result in a long-term decrease in future fire-related impacts throughout the action area, which will benefit slickspot peppergrass and its habitat over the long term.

Use of prescribed fire to prepare seedbeds for fuel breaks could benefit some habitat components important to slickspot peppergrass. Native seeds within the seed bank that are currently under a dense sagebrush canopy or a heavy mat of non-native invasive annual grasses, such as cheatgrass or medusahead, may germinate due to the removal of biomass from fuels reduction activities. However, seeds of both native and nonnative plants could also move into the prescribed burn treatment areas from offsite, resulting in either beneficial or negative effects to slickspot peppergrass and its habitat, depending on the plants that become established.

Use of prescribed fire treatments will also result in the loss of vegetation, including remnant native grasses, forbs, and shrubs (such as sagebrush) important to slickspot peppergrass and its insect pollinators located within fuel break footprints (see detailed discussion of effects in the "Removal of Native Vegetation" section below). In addition, prescribed fire may also result in direct loss of insect pollinators overwintering in vegetation or litter burned during prescribed fire treatments. Prescribed fire may also damage or kill biological soil crust, an important component of slickspot peppergrass habitat. In addition, if prescribed fires escape outside of the treatment areas or if fires are inadvertently ignited by equipment or vehicles when hot machinery comes into direct contact with fine fuels or by generating sparks when metal equipment strikes rocks, habitat for slickspot peppergrass outside of proposed fuel break footprints could be impacted. However, timing or locations of treatments (such as operating seeding equipment on bare soil areas) will reduce the risk of inadvertent Project-related fire ignitions. In addition, application of agency standard operating procedures such as having fire suppression equipment on site during implementation and maintenance activities will minimize the risk of inadvertent Project-related fire ignitions and unintended fire spread. Therefore, Project-related impacts from inadvertent fire ignitions will be extremely unlikely to occur, and are not likely to adversely affect slickspot peppergrass.

Furthermore, Design Features for prescribed fire use such as adherence to a prescribed burn plan, use of fire control lines, and implementation during late fall, winter, or early spring to maximize consumption of standing and ground litter while minimizing risk of unintended spread will limit the potential impacts of prescribed fire seedbed treatments to within fuel break footprints in the Project area. Potential impacts to biological soil crust will be reduced as prescribed burning will

likely take place during winter and early spring months when biological soil crusts are dormant. If the ground is frozen during prescribed burning, crust could survive with minimal damage. However, use of prescribed fire will result in adverse effects to slickspot peppergrass and its habitat associated with the removal of or damage to remnant native grasses, forbs, shrubs, and biological soil crusts within the fuel break footprints. Therefore, prescribed fire treatments may affect, and are likely to adversely affect slickspot peppergrass and its habitat. However, a network of effective fuel breaks is expected to result in a long-term decrease of future fire-related impacts throughout the Paradigm Project area, which will benefit slickspot peppergrass and its habitat over the long term.

Ground Disturbance

Ground disturbance can result in the loss or reduction of native plant cover and biological soil crusts (see detailed discussion of effects in the "Removal of Native Vegetation" section below) and the destruction or reduced function of slickspot microsites, affecting habitat quality for slickspot peppergrass. As described above in the Environmental Baseline section, the Project area has experienced high levels of past ground disturbance due to past fires, post-fire drill seeding, and vegetation conversion projects over the past 50 years.

A combined total of approximately 162,866 acres of habitat categories for slickspot peppergrass within the Paradigm Project boundary are located outside of the fuel break footprints. These 162,866 acres of habitat, particularly any areas containing remnant unburned sagebrush steppe habitat, are expected to have a Project-related reduced risk of loss due to fire when compared to the current condition. This projected future reduction in the threat of fire across the Paradigm Project area will also reduce the potential for fire-related deposition of wind-blown plant litter and sediment deposition by wind or water into slickspot microsites over the long-term. Successfully established, effective fuel breaks are expected to result in a long-term decrease in future fire-related ground disturbance throughout the Paradigm Project area, which will benefit slickspot peppergrass and its habitat over the long term.

Outside of the proposed fuel break footprints, no direct disturbance of slickspot microsites associated with the Project will occur. However, both increased soil deposition into, and soil erosion out of slickspots has been observed immediately following disturbances such as wildfire and post-fire seeding (Amy Stillman personal observation, South Trail Fire 2010). Therefore it is likely that either effect could occur, at some level, following disking, seeding, and/or prescribed burning treatments in the vicinity of fuel break footprints. After seedings become established, soil deposition and/or erosion will be reduced. Design Features, such as minimal ground disturbing seeding methods, will be used to minimize soil movement associated with fuel break treatments. In addition, existing vegetation in untreated areas is expected to filter sediment that may move from treatment areas into untreated areas. Therefore, Project-related soil movement originating from fuel break footprints onto surrounding areas is not likely to adversely affect slickspot peppergrass.

The proposed fuel break footprints will cross up to about 6 percent (about 11,169 acres) of the 174,035 total acres of slickspot peppergrass habitat types located on Federal, State, and private lands within the Project boundary. Slickspot microsites within the proposed fuel break footprints will be disrupted by ground-disturbing seedbed preparation treatments (including use of

prescribed fire, disking of fire lines prior to prescribed burn treatments, and pre-seeding disking) and seeding treatment activities (inclusive of drill seeding, harrow, and cultipacker use). The majority of fuel break footprints, including prostrate kochia greenstrips within Slickspot Peppergrass Habitat, will use minimal ground disturbing seeding techniques, thereby protecting slickspot soil structure and reducing the likelihood of penetrating the slickspot clay layer. While drill seeding native species into Occupied Habitat using moderate soil disturbing techniques could result in some moderate ground disturbance, and mowing within Occupied Habitat could result in ground disturbance due to vehicles tracks, these activities will not take place in Occupied Habitat (inclusive of EOs plus the 0.5 mile pollinator buffer surrounding EOs) when soils are saturated. Furthermore, direct effects to insect pollinators of slickspot peppergrass, (inclusive of ground-dwelling insects) associated with seeding ground disturbance are expected to be low in areas known to contain slickspot peppergrass populations as minimal ground-disturbing seeding methods will be used in EOs and proposed critical habitat. Thus, direct effects from mowing and drill seeding related ground disturbance are expected to be minimal. In addition, while caution will be taken to avoid all driving, walking, and/or physically disturbing slickspot microsites in any way, a minor possibility of unintended slickspot soil disturbance still exists.

Creation of non-kochia seeded fuel breaks within habitat categories for slickspot peppergrass habitat will result in minimal ground disturbance of slickspot microsites. Seeding species that require less than an inch of soil cover in Occupied Habitat using minimum till drills or standard rangeland drills equipped with depth-bands will help protect slickspot microsites from damage to the restrictive layer. Breaking through the restrictive layer during seeding will be possible, though the likelihood of this occurring is discountable. For example, no perceptible breaking through to the restrictive clay layer was observed during post-fire seeding using depth bands or minimum-till drills following the 2012 Benwalk Fire (Amy Stillman, personal observation, as cited in USBLM 2015, p. 65 and NRCS 2015, pp. 66-67).

Ongoing livestock activity could increase in the areas surrounding occupied slickspots where sagebrush is thinned or mowed. Livestock activity could also increase in fuel break footprints that are seeded with both native and nonnative plant species that could be used by livestock for forage, particularly if seeded species are preferred by livestock. Livestock will be fenced out of seeded fuel break footprint areas until plants are established to reduce the risk of seeded fuel break failure. However, livestock congregating within fuel break footprints within previously inaccessible or less preferred portions of EOs, proposed critical habitat, Occupied Habitat, or unsurveyed Slickspot Peppergrass Habitat, may result in indirect effects associated with trampling of slickspot microsites and native vegetation as well as ground disturbance that may facilitate the spread of invasive nonnative plants. The proposed action could also result in increased livestock feces within slickspot microsites if access to slickspots becomes easier through thinning or removal of sagebrush or if livestock congregate within seeded fuel break areas, although based on HIP transect results rangewide, effects of increased livestock feces on slickspot peppergrass are expected to be insignificant. However, localized ground disturbance from increased livestock-related trampling may adversely affect slickspot peppergrass through

potential trampling impacts to slickspot microsites when soils are saturated. If livestock are attracted to and congregate within seeded or mowed fuel break footprints, slickspot microsites within EOs, Occupied Habitat, and Slickspot Peppergrass Habitat[37] will likely be adversely affected. Therefore, indirect effects of thinning/mowing and seeded greenstrip fuel break treatments are likely to adversely affect slickspot peppergrass and its habitat.

Some fuel break treatments, such as disking or drill seeding without depth bands, will result in mixing of slickspot soil layers, which can affect slickspot function and the suitability of a microsite for successful support of the species. Deep mixing of slickspot layers during ground disturbing treatments such as blading or disking would likely result in loss of slickspot microsites within the fuel break footprints. Disking could result in major permanent ground disturbance within the action area surrounding occupied slickspots, if disking is implemented within Occupied Habitat. While disking is unlikely to occur within Occupied Habitat, disking had been suggested as a possible fuel break treatment alternative in this habitat type. Some soil disturbing treatments may occur within that portion of Occupied Habitat devoid of slickspot microsites that is also located outside of EOs and proposed critical habitat on a case by case basis following further coordination with the Service. No disking will occur in EOs or proposed critical habitat. In addition, disking will not occur in Slickspot Peppergrass Habitat until 3 years of survey determine that slickspot microsites within the fuel break footprints are unoccupied by slickspot peppergrass. With implementation of Design Features, effects of ground disturbance associated with direct fuel break implementation and maintenance treatments are discountable.

Removal of Native Vegetation

Native shrubs, grass, forbs, and biological soil crust are important habitat components for slickspot peppergrass and its insect pollinators. Insects are the primary vector for pollination and genetic exchange for slickspot peppergrass. Native seeds within the seed bank that are currently under a dense sagebrush canopy may germinate due to the removal of biomass from fuels reduction activities. Seeds of both native and nonnative plants could also move into fuel break treatment areas from offsite, resulting in either beneficial or negative effects to native vegetation, depending on the plants that become established. Slickspot peppergrass insect pollinator habitat may improve with the release of native forbs following prescribed burn treatments. Additionally, planting forbs species such as alfalfa within seeded treatment areas will serve to increase forb diversity and availability for insect pollinators in fuel break footprints, benefiting slickspot peppergrass over the long term.

Native grass cover could increase within Occupied Habitat located in fuel breaks proposed as native species greenstrip fuel breaks. Native grasses and forbs could also increase as a result of release and decreased competition from invasive annuals due to herbicide and prescribed fire

[37] Adverse impacts from trampling are only considered for slickspot microsites of unknown occupancy (less than 3 years of survey completed) located within Slickspot Peppergrass Habitat. The Service does not consider damage or loss of "unoccupied slickspots" in Slickspot Peppergrass Habitat to result in adverse effects to slickspot peppergrass or its habitat.

pre-seeding or maintenance treatments. Long-term benefits of reduced fire could decrease habitat fragmentation within the Project area, especially once the time period between fires increases, allowing for future vegetation restoration efforts to be conducted to establish perennial grass, forb, and shrub communities within and adjacent to slickspot peppergrass EOs and proposed critical habitat.

Mowing, mechanical thinning, prescribed fire, and fuel break seeding treatments will reduce remnant sagebrush cover around occupied slickspots within the Paradigm Project area, increasing habitat fragmentation. All attempts will be made by the Bureau and NRCS to maintain sagebrush cover in areas surrounding and within extant slickspot peppergrass EOs and Occupied Habitat. However, if the benefits of reducing sagebrush cover to achieve effective fuel breaks within some areas are deemed to outweigh the risks to slickspot peppergrass, some portion of sagebrush cover remaining in the Project area will be lost. The potential loss of sagebrush habitat to wildfire is expected to be much greater than the removal or mowing of sagebrush within fuel break footprints as effective fuel breaks are expected to decrease fire size and frequency within the Paradigm Project area. Nevertheless, adverse effects will occur due to the reduction of sagebrush cover within fuel break treatment areas.

Loss of native vegetation within fuel break footprints has the potential to impact insect pollinators by removing specific food sources or habitats required for breeding or nesting (Kearns and Inouye 1997, p. 298; McIntyre and Hostetler 2001, p. 215; Zanette *et al.* 2005, pp. 117–118). Habitat isolation and fragmentation may also impact slickspot peppergrass by decreasing pollination from distant sources, possibly resulting in decreased reproductive potential (e.g., lower seed set) and reduced genetic diversity. For example, mowing could fragment habitat between slickspot peppergrass EOs thus changing pollinator flight patterns and disrupting pollinator movement between EOs.

Removal of native vegetation in the Project footprint on Federal, State, and private lands will occur primarily with seedbed preparation treatments (prescribed fire use, herbicide applications, and disking) as well as with targeted grazing treatments[38], mechanical thinning / mowing treatments, and fuel break maintenance activities. Mechanical thinning is expected result in a lower degree of effects on native vegetation as some native plants will remain following thinning; mowing is expected retain all native plants, but plants will have a lower stature, which could have some short-term impacts on plant vigor and seed set. In contrast, prescribed fire use, herbicide applications, and disking fuel break treatments will remove all vegetation present within the proposed fuel break footprints, including biological soil crusts. At least some of the vegetation removed for implementation and maintenance of the proposed fuel break footprints will include remnant sagebrush, native grasses and forbs.

At a landscape level, it is not expected that native vegetation will be fragmented substantially beyond current levels by fuel break implementation and maintenance; all fuel break footprint

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[38] Targeted grazing may occur in Slickspot Peppergrass Habitat, within that portion of Occupied Habitat located outside of EOs and proposed critical habitat, and within non-habitat. Targeted grazing will not occur in EOs or proposed critical habitat. Potential effects of targeted grazing treatments will occur in Slickspot Peppergrass Habitat and within the 0.5 mile pollinator buffer portion of Occupied Habitat only.

areas have previously had some level of fragmentation impacts as they are located adjacent to maintained roads and railroad rights-of-way. In addition, many of the proposed fuel break footprint areas have burned in the past (see Figure 4 on p. 11 of this Opinion). However, removal of some native vegetation will occur within the fuel break segments within the Project area. The location of these fuel breaks along existing maintained roads and railroad rights-of-way rather than across the landscape will reduce potential fragmentation of remaining remnant native vegetation stands as many roadside areas have been previously disturbed.

Although, over the long-term, fuel breaks will maintain or improve habitat condition within the action area by reducing fire frequency and total acres burned, the proposed Paradigm Project will expand existing disturbed areas. Remnant patches of native grasses, forbs, and shrubs will be removed within fuel break footprints under some treatment methods. In addition, disking, mowing, seeding, and targeted grazing could result in mechanical damage to biological soil crusts. Design features that limit soil disturbing activities to times when soils are wet or frozen will minimize the likelihood of most damage, although targeted grazing treatments will likely occur when soils are dry and biological crusts are most susceptible to damage and less able to repair themselves (Belnap and Eldridge 2001, pp. 364-365). Therefore, removal of native vegetation, including localized loss of or damage to biological soil crusts, within fuel break footprints is likely to adversely affect slickspot peppergrass and its habitat. In addition, activities associated with pre-Project surveys and fuel break monitoring work tasks will not result in removal of native vegetation: thus, no adverse effects to slickspot peppergrass from pre-Project surveys or monitoring will occur.

Invasive Nonnative Plants

In the 2009 listing decision for slickspot peppergrass, the Service identified two primary threats to the species: the increased frequency and extent of wildfires, and invasive nonnative plant species. Invasive nonnative plants, as described in the listing rule, include not only invasive unseeded species such as cheatgrass and medusahead, but also potentially invasive seeded nonnative species such as *Agropyron intermedium* (intermediate wheatgrass) and prostrate kochia. Effects of Project- related establishment or spread of nonseeded and seeded invasive nonnative plants on slickspot peppergrass and its habitat are described below.

The proposed Paradigm Project could decrease invasive annual plants such as cheatgrass and clasping pepperweed within slickspots by decreasing non-native unseeded plant biomass and seed sources in the areas surrounding slickspot microsites within EOs, Occupied Habitat, and Slickspot Peppergrass Habitat through the establishment of effective fuel breaks. With reduced potential for future wildfire in the Paradigm Project area, it is expected that plant litter accumulations within slickspot microsites will decrease as nonnative invasive annual plant biomass decreases and the seed sources for these plants decreases following fuel break treatments as well as over the long term.

Native species listed in Methods section above will be seeded within the 1.5 mile buffer and within EOs, if such a seeding would result in a fuel break that fits the fuel break criteria. These native plant species are not currently known to compete with slickspot peppergrass or to establish widely within slickspot microsites, though all native species proposed for use in fuel breaks have been observed to occur sporadically within slickspot microsites that have sustained physical damage from livestock, wildlife, and/or past drill seedings (Amy Stillman, personal

observation, as cited in USBLM 2015, p. 46 and NRCS 2015, p. 44). If native plants are seeded within EOs or Occupied Habitat, litter could increase within slickspots if the native plants become established therein, however, it is assumed that this would result in fewer negative effects than caused by invasive nonnative species.

Although some areas of the Project are currently dominated by both seeded and unseeded nonnative plants, some areas of remnant native vegetation remain that may be lost or decreased in size due to Project-related disturbance and subsequent competition from invasive nonnative plants. Both seeded and unseeded invasive nonnative plants may be introduced or may increase in density when soils are exposed during disking or other ground-disturbing activities such as fire. In addition, invasive plants and noxious weeds may also be introduced and spread by vehicles during Project implementation and subsequent maintenance activities as vegetated treatment segments are located adjacent to existing roads. Roads appear to create avenues for invasion of nonnative plants because there is generally a positive significant association between nonnative, disturbance-tolerant species such as cheatgrass and proximity to roads (Forman and Alexander 1998, p. 210; Gelbard and Belnap 2003, pp. 424-425, 430-431; Bradley and Mustard 2006, p. 1142). The proposed fuel breaks have the potential to harbor invasive nonnative plant species and to act as corridors for movement and establishment of both seeded and nonseeded invasive nonnative plant species into adjacent habitat, as well as provide a seed source for lateral spread into surrounding intact areas (Keeley 2006, p. 6; Merriam et al. 2006, pp. 520-524; Gray 2011, entire, Gray and Muir 2013, entire). Travel along or within vegetative treatment segments by Project construction or maintenance work crews as well as by the general public may further contribute to the dissemination and dispersal of noxious weeds and invasive nonnative plants.

In addition, habitats are particularly susceptible to establishment or spread of invasive nonnative plants following a natural disturbance such as fire (Merriam et al. 2006, p. 516). Fires, both intentional and inadvertently ignited during Project implementation or maintenance activities, could also result in increased nonnative plant cover, which may impact insect pollinators of native forbs, including slickspot peppergrass (see insect pollinator discussion in the "Removal of Native Vegetation" section above). As described in the Fire effects section above, effects of inadvertent fire ignitions during Project implementation and maintenance will be discountable.

Over the short-term, invasive nonnative annuals and noxious weeds could increase as a result of failed seedings within fuel break footprints. However, seedings would be monitored and evaluated for success and re-seeded if necessary, and noxious weeds would be chemically treated. If fuel break seedings are deemed a failure then the seeding area will be seeded with a mix of native grasses, forbs, and shrubs. In addition, targeted grazing outside of EOs but within the Occupied Habitat 0.5 miles pollinator buffer could lead to the spread of invasive annuals and noxious weeds through both physical transport and soil disturbance. However, monitoring will trigger subsequent control treatments if invasive annuals and noxious weeds establish within fuel break footprints, regardless of the fuel break treatment method used. Nevertheless, some adverse effects associated with short term increase of unseeded invasive nonnative plants are likely to occur.

Prostrate Kochia Greenstrips. Prostrate kochia is described in the Bureau and NRCS Assessments as a preferred fire break species due to its shorter stature, longer period of moisture retention (remaining green), and spacing, which translate to reduced rate of fire spread, intensity, and flame length. While this species is already present in seedings within the Project area (see

Figure 5 on p. 18 of this Opinion), the proposed kochia fuel break seedings will substantially increase the distribution of prostrate kochia across the Project area. The Project proposes to seed prostrate kochia within up to 163 miles (5,662 acres) of greenstrip fuel breaks located on Federal, State and private lands. Of this total, the Project proposes up to 36 miles (1,349 acres) within the "kochia fuel breaks within 1.5 mile – slickspot peppergrass zone" on Federal, State, and private lands.

As described above, the limited monitoring information available has not documented kochia movement into extant EOs within the Project area to date, however, prostrate kochia has outcompeted slickspot peppergrass in occupied slickspot microsites in other areas within the Snake River Plain population (Debolt *in litt.* 2002, entire). The Service has raised concern over the possibility that, over time, prostrate kochia may establish outside of the proposed fuel break footprints, eventually spreading into slickspot peppergrass EOs.

Plant invasions typically progress from introduction to establishment phases over variable time periods influenced by soil, rainfall, climate, disturbance regime, competition with other plant species, or other environmental factors. During the initial introduction phase, potential plant invasions are most likely to fail due to unpredictable events like drought and disease (Mack 1995), or because a minimum critical population size necessary for the population to genetically maintain itself was lacking (Latore et al. 1998, as described in Radosevich 2007, Introduction Phase section). Therefore, it may take several colonization attempts before a species successfully establishes a new founder population in an area. In addition, the probability of persistence of a plant founder population increases through: (1) an increase in the number of propagules (such as seeds), an increase in their points of introduction, and the number of introduction attempts; (2) alteration of the environment; or (3) some combination of (1) and (2) (Guerrant 1996; Mack 2000 as cited in Minton and Mack 2010, p. 406). Therefore, as more prostrate kochia is planted across a fire-altered landscape, such as the Paradigm Project area, the probability of kochia movement and subsequent potential establishment outside of fuel break footprints is increased.

As described in the Bureau and NRCS Assessments, prostrate kochia is known for its ability to compete with aggressive exotic species such as cheatgrass and medusahead (Gray 2011, pp. 3-5 and 26-27; Gray and Muir 2013, pp. 191, 198, 201; Tilley et al. 2006, p. 1). However, the mechanisms that enable prostrate kochia to be an aggressive competitor against exotic annuals could potentially result in negative impacts to native species (Gray 2011, pp. 4-5 and Gray and Muir 2013, pp. 192, 198), including slickspot peppergrass and its habitat. Establishment of prostrate kochia fuel breaks in areas that contain slickspot microsites may result in both positive and negative effects on the species. These effects depend on the degree that prostrate kochia becomes established within slickspot microsites and competes with slickspot peppergrass as well as the effectiveness of prostrate kochia fuel breaks in limiting future wildfire spread.

Although there is disagreement about the distance that prostrate kochia may establish outside of seeded areas, it is well documented that the species does move outside of seeded areas under some environmental conditions, particularly when areas located adjacent to established kochia sites have been disturbed (Gray 2011, p. 21; Gray and Muir 2013, pp. 196, 199; McArthur et al. 1990, p. 63; Harrison et al 2000, p. 17; Waldron et al. 2001, p. 213). Documented kochia movement distances at individual study sites have varied from no movement observed over 10 to 30 years (see Harrison et al. 2000, p. 18, Clements et al., 1997, p. 31, Tilley et al. 2014, p.7)

to the observation of a single kochia plant 3,168 feet from a seeded area 11 years after seeding[39] (Harrison et al 2000, p. 14). For example, prostrate kochia spread 1,312 feet (0.25 miles; about 77 feet per year) across a cheatgrass–invaded field and into a sagebrush community over 17 years (McArthur et al. 1990, p. 63). In contrast, demonstration plantings near Challis, Idaho documented lower distances of prostrate kochia movement of 0 feet to 50 feet (about 1-2 feet per year) from the original planted area over a 30+ year period since seeded (Tilley et al. 2014, p. 7).

Under some environmental conditions, prostrate kochia could establish outside seeded areas in specialized habitats with little vegetation, including within slickspot microsites. Once established, prostrate kochia has been observed to move into previously unoccupied areas and may dominate slickspot microsites (Gray and Muir 2013, p. 200; Colket 2009, pp. 16, 130; Gray 2011, pp. 67-68; Quinney et al. *in litt.* 2002, p. 3) and displace slickspot peppergrass in a prostrate kochia seeding in the Snake River Plain physiographic region of southern Idaho (Debolt *in litt.* 2002, entire). Based on observations of prostrate kochia establishment in slickspot microsites, slickspot peppergrass plants are likely unable to successfully compete for water, nutrients, and space once prostrate kochia becomes established within slickspot microsites; these slickspots will likely no longer be available as habitat for slickspot peppergrass until such time that the prostrate kochia is no longer present.

Prostrate kochia will naturally recruit, like most plant species, mainly into disturbed soils or in areas lacking competition from perennial vegetation, both within and outside the seeded area (Harrison et al 2000, p. 17; Waldron et al. 2001, p. 213). While Waldron and others found little evidence that prostrate kochia is an aggressive spreader in established perennial plant communities (Waldron et al. 2001, p. 214), kochia is also described as establishing and growing best on disturbed sites at lower elevations with low precipitation where competition consists mostly of annuals (Harrison, et al., 2000, pp.15, 17; Waldron et al. 2001, p. 213). The Snake River Plain physiographic region, inclusive of the Paradigm Project area, exhibits extensive areas with similar environmental conditions (low annual precipitation levels, lower elevation, high percent cover of invasive annual plants, and disturbed soils) to those that allow for kochia establishment and spread. As described above; prostrate kochia has been observed to dominate slickspot microsites and appeared to have displaced slickspot peppergrass in a kochia seeding near Initial Point, Idaho (Debolt *in litt.* 2002, entire). Furthermore, in many exotic species invasions, spread can occur via satellite patches that in turn become new seed sources for invasion (Moody and Mack 1988, p. 1017; Archer and Pyke 1991, p. 580).

Prostrate kochia recruitment has been observed as being in a pattern of fingers or pockets as opposed to continuous movement along the outer edge of a seeded area (Waldron et al. 2001. p. 212), which may make kochia movement detection problematic. In addition, as most invasive plant species have a substantial lag time (average lag time of 131 years for shrubs and 170 years

[39] Harrison et al. did not include this 3,168 foot movement observation in their analyses of kochia movement from seeded areas as this site was determined to be a unique outlier (Harrison et al. 2000, p. 14).

for trees[40]) between initial introduction and subsequent population growth (Radosevich 2007, Chapter 3), monitoring may be required over an extensive time period in order to detect kochia movement in areas with favorable environmental conditions for establishment.

It is expected that fuel breaks within the Paradigm Project area, inclusive of kochia greenstrip fuel breaks, will experience disturbance up to their edges, whether from wildfire burning up to the fuel break or through use of kochia fuel breaks as a safe point for igniting backfires during wildfire suppression actions. Thus, these fire disturbed areas could allow for potential kochia colonization/movement outside of kochia greenstrip fuel break footprints, which may impact slickspot peppergrass and its habitat within the Paradigm Project area, particularly if kochia becomes established within EOs or proposed critical habitat. Therefore, the Service considers the limitation on kochia use within 1.5 miles of extant EOs in combination with post-treatment kochia movement monitoring and subsequent control as essential for conservation of slickspot peppergrass and its habitat within the Paradigm Project area.

The Bureau and NRCS Assessments state that the greatest maximum spread distance reliably measured for prostrate kochia is less than 400 meters (less than 0.25 miles) (Harrison et al. 2000 as cited by USBLM 2015 p. 46 and NRCS 2015, p. 43). However, Harrison observed an individual prostrate kochia plant 3,168 feet from a seeded area 11 years after seeding at a single outlier study site (Harrison et al 2000, p. 14)[41]. Prostrate kochia movement at this outlier site over an 11 year period is calculated at about 288 feet per year. Harrison described this site as unique because the area had severe degradation by fire and excessive wind that removed 2 to 5 inches of topsoil; fire and erosion rendered this site entirely devoid of vegetation prior to the prostrate kochia plantings. Based on this outlier site described in Harrison et al. 2000 (p.18), under a worst case scenario, prostrate kochia could move up to 14,400 feet (up to 2.7 miles) over a 50 year period under degraded habitat conditions. As some portions of the Snake River Plain physiographic region for slickspot peppergrass, including the Paradigm Project area, exhibit similar degraded habitat conditions (frequent fire, windy conditions, eroding soil), it is reasonable that over time, prostrate kochia could establish well outside of seeded areas, including within or adjacent to EOs.

As described above, prostrate kochia seed could be transported by vehicle traffic along fuel breaks. However, in most instances, seeded fuel break species, including prostrate kochia, will not be planted up to the immediate edge of a given road or rail line due to right-of-way considerations, reducing the probability of motorized vehicle spread along road or railroad rights-of-way. In addition, prostrate kochia seed does not remain viable if passed through the digestive tract of cattle (Schauer et al. 2004, p. 10), and therefore viable kochia seeds will not be transported outside of fuel break footprints by cattle through their feces. However, as prostrate kochia recruitment has been observed in the direction of prevailing winds, viable seed produced by established kochia plants during a given year may be transported outside of fuel break footprints by wind. In Mountain Home, Idaho which is located in the central portion of the

[40] Prostrate kochia is described by St John and Ogle 2009 (p. 10) as a "sub-shrub".

[41] Harrison et al. did not include this 3,168 foot movement observation in their analyses of prostrate kochia movement from seeded areas as this site was determined to be a unique outlier (Harrison et al. 2000, p. 14).

Paradigm Project area, typical wind speeds over the course of the year vary from 0 miles per hour (mph) to 18 mph (calm to fresh breeze), rarely exceeding 27 mph (strong breeze) (WeatherSpark 2015). Therefore, kochia seed dispersal could occur in the Project area from kochia fuel breaks into adjacent untreated areas.

Slickspot peppergrass plants and its habitat, inclusive of insect pollinator habitat, could be lost to competition from prostrate kochia, particularly in areas that have been burned or otherwise disturbed. Prostrate kochia has a fibrous root system with a deep taproot (Harrison et al. 2000, p. 6); prostrate kochia is known to be highly competitive with cheatgrass (Monaco et al. 2003, p. 28). As previously described, these characteristics could also allow prostrate kochia to compete with native grasses and forbs within disturbed areas. Prostrate kochia has also been reported to establish well in slickspots within areas that were drill and/or aerially seeded with prostrate kochia (Debolt *in litt.* 2002, entire; Gray and Muir 2013, p. 200; Colket 2009, pp. 16, 22, 130; Gray 2011, pp. 67-68), potentially displacing slickspot peppergrass (Debolt *in litt.* 2002, p. 2 + attached figures).

Because of its documented ability to establish within at least some slickspot microsites, prostrate kochia will likely compete with slickspot peppergrass plants and seeds for water and nutrients within slickspot microsites if planted directly in slickspot peppergrass EOs. However, prostrate kochia would not be seeded within 1.5 miles of slickspot peppergrass EOs, with exceptions for the following eight EOs: 1.1 miles east of EO 10, 0.96 miles north of EO 21, 1.33 miles north of EO 31, 0.14 miles southeast from EO 60, 0.3 miles northeast and across the railroad tracks from EO 61, 1.36 miles east of EO 62, 0.12 miles east of EO 106, and 1.14 miles northeast of the new EO in T4S, R8E, Section 15. Use of alternative species for greenstrip fuel breaks within 1.5 miles of most EOs (including through portions of eleven EOs) will reduce the risk of Project-related increase of prostrate kochia in slickspot microsites within extant EOs. Monitoring and Control protocols will further decrease the likelihood of prostrate kochia establishing in EOs or Occupied Habitat. Focus of monitoring and control efforts in the vicinity of the "kochia fuel breaks within 1.5 mile buffer – slickspot peppergrass zone" will provide increased assurance that any kochia established outside of fuel breaks will be controlled prior to prostrate kochia becoming naturalized within EOs or Occupied Habitat.

As described above, many invading plant species have extensive lag times following their initial introduction, and early detection and rapid response to invasive plant species establishment is essential to eradicating these plants before their populations expand (USFWS 2013a, p. 3), including the potential expansion of prostrate kochia into slickspot peppergrass EOs. For example, medusahead was first documented in the United States in the 1880s, but the species did not rapidly spread until the 1950s (Archer 2001, p. 1). In contrast, cheatgrass was first documented southern Idaho in about 1900, but had dominated many areas by the 1940s (Stewart and Hull 1949, p. 58). Thus, lag times for invasion have varied between nonnative species that are known to impact slickspot peppergrass and its habitat. Similarly, prostrate kochia may increase in the Project area following a species-specific lag time, increasing the risk of impacts to slickspot peppergrass and its habitat. However, Bureau and NRCS prostrate kochia movement monitoring and subsequent kochia control outside of fuel break treatment areas are intended to minimize the likelihood of adverse effects due to the spread of prostrate kochia into EOs, proposed critical habitat, and Occupied Habitat within the Paradigm Project area.

To further ensure that slickspot peppergrass and its habitat are not impacted by potential prostrate kochia establishment outside of fuel break footprints, the proposed Project includes long-term monitoring for potential prostrate kochia spread on Federal and State lands; NRCS will monitor projects on private lands for the 5 year term of the individual projects, and will request a site visit to collect additional monitoring data on private lands if Bureau monitoring detects kochia movement outside of treatment areas on Federal and State lands. On Federal, State, and private lands, prostrate kochia that has migrated outside of the treatment area will be physically removed, or spot treated with application of chemicals using appropriate herbicides and methodologies to minimize the likelihood of adverse effects to slickspot peppergrass and its habitat from forage kochia competition with native vegetation, including slickspot peppergrass, within EOs and proposed critical habitat. The Service considers Bureau and NRCS prostrate kochia movement monitoring and subsequent kochia control outside of fuel break treatment areas as high priorities for the conservation of slickspot peppergrass and its proposed critical habitat within the Paradigm Project area.

Although requested, documentation of Bureau-approved herbicide effectiveness for successful control of prostrate kochia has not been provided to the Service to date, increasing uncertainty as to the effectiveness of chemical control efforts if kochia is found outside of treatment areas in the Paradigm Project area. This concern is amplified since an associated nonnative congener species (*Kochia scoparia*) is resistant to 2,4,D herbicide (Casey 2009, p. 2); 2,4,D herbicide has been described by the Bureau as a potential herbicide to be used in forage kochia control efforts. The Service continues to encourage the Bureau to initiate a small pilot study to identify herbicides that can be used to effectively control prostrate kochia, should the species be documented as moving outside of Paradigm Project fuel break footprints. Such a pilot study will reduce uncertainty regarding effectiveness of future kochia control efforts, and may reduce the need for multiple treatments of a kochia control site as the most effective chemical treatment is identified. However, the Service does not consider this uncertainty regarding the effectiveness of herbicides for control of prostrate kochia to result in adverse effects to slickspot peppergrass or its habitat within the Paradigm Project area as the Bureau and NRCS have committed to the kochia control efforts by either mechanical or chemical methods for the Paradigm Project.

As described above, prostrate kochia is proposed to be seeded within the up to 5,662 acres of Slickspot Peppergrass Habitat within proposed prostrate kochia greenstrip fuel break footprints, provided that 3 years of survey verify that the plant is not present in slickspot microsites. As described in the "Ground Disturbance" effects section above, seeding of prostrate kochia within fuel break footprints will use minimal ground-disturbing techniques; therefore, ground disturbance within slickspot microsites in Slickspot Peppergrass Habitat within prostrate kochia fuel breaks will be minimal. However, slickspot microsites within prostrate kochia seeded fuel breaks will likely be colonized by prostrate kochia, particularly if slickspots have been disturbed by livestock, wildlife, or past drill seeding activities. It is unknown at this time if slickspot microsites can be effectively planted or seeded with slickspot peppergrass to allow re-introduction of this plant, although research is ongoing. If reintroduction of slickspot peppergrass into unoccupied slickspots becomes a possibility in the future, it may be possible to control prostrate kochia within the area using herbicides to make these slickspots available for slickspot peppergrass reintroduction. However, potential changes to slickspot microsite soil physical attributes, chemistry, and soil micro-flora associated with kochia establishment in

slickspot microsites are unknown; thus, it is uncertain how kochia presence within slickspot microsites may influence future suitability for reintroduction of slickspot peppergrass.

In addition, if prostrate kochia plants become established within slickspots in Slickspot Peppergrass Habitat, soil deposition could increase if soil collects around plant stems. Conversely, plant litter accumulations within prostrate kochia seedings will decrease within slickspot microsites as nonnative invasive annual plant biomass and the seed sources for these plants decrease.

In addition, prostrate kochia could also establish within unsurveyed slickspot microsites that may contain seeds outside of kochia greenstrip fuel break footprints located within Slickspot Peppergrass Habitat. However, due to kochia monitoring and subsequent control of kochia that has moved outside of proposed fuel breaks, adverse effects to any slickspot peppergrass seeds located in unsurveyed Slickspot Peppergrass Habitat adjacent to kochia greenstrip fuel breaks will be discountable. Therefore, use of prostrate kochia greenstrip fuel breaks in Slickspot Peppergrass Habitat with unoccupied slickspots, may affect, but is not likely to adversely affect, adjacent slickspot peppergrass and its habitat.

Over the long-term, successful establishment of functional fuel breaks is anticipated to increase fire suppression success to facilitate recovery of native shrub, grass, and forb cover in burned areas located outside of the fuel breaks, and to preserve slickspot microsites and existing native vegetation, including biological soil crust, that may be lost in future wildfires or impacted by post-fire increased invasive nonnative annual plant and noxious weed cover in the Paradigm Project area. Reduced fire frequency associated with a network of effective fuel breaks in the Paradigm Project area is expected to maintain remnant intact habitat and could provide opportunities for future vegetation restoration, benefitting sagebrush steppe obligate species, including slickspot peppergrass. However, some level of adverse effects to remnant native plants within and adjacent to fuel break footprints due to competition from unseeded nonnative plants associated with Project-related ground disturbance and occasional failed seeded fuel breaks are expected to occur. Therefore, effects from invasive nonnative plants due to Project-related ground disturbance and failed seedings, may affect, and are likely to adversely affect, slickspot peppergrass and its habitat. However, these adverse effects will be short term as re-treatment and maintenance activities will control these invasive nonnative plants in fuel break footprints soon after their establishment, reducing the risk of invasive nonnative plant spread outside of fuel break footprints.

Herbicide Use

The proposed Project includes the use of herbicides as a method to prepare seedbeds for fuel breaks. Benefits of herbicide application include enhancing slickspot peppergrass EOs, Occupied Habitat, and Slickspot Peppergrass Habitat by decreasing invasive annual plant biomass and seed sources, and improving pollinator habitat with the removal of invasive annual grasses and forbs, if native forbs become reestablished. Herbicide applications and subsequent seeding of native and nonnative species following mechanical seedbed preparation will reduce the risk of Project-related increases in unseeded invasive nonnative plant cover in the proposed fuel breaks as well as within the larger Project area. The Bureau will also continue to aggressively treat noxious weeds in the Project area, and the NRCS will report noxious weed locations to private landowners for appropriate treatment, including locations within fuel break

footprints, minimizing Project-related effects due to unseeded invasive nonnative plant spread on slickspot peppergrass and its habitat.

Remnant perennial grasses and forbs may be released from competition from nonnative invasive annual grasses such as cheatgrass or medusahead following herbicide treatments. In addition, native perennial grass and forb seed may successfully germinate and grow due to the reduced competition from invasive nonnative annual plants within fuel breaks. Native grass and forb seeds could also move into the fuel break footprints from offsite after herbicide treatments have occurred. Slickspot peppergrass insect pollinator habitat will improve with the removal of nonnative annual invasive plants and subsequent anticipated release of native forbs, resulting in long term benefits for the species.

Herbicide use also has the potential to impact slickspot peppergrass and its habitat due to direct chemical contact with slickspot peppergrass plants as well as impacts to native sagebrush steppe plants, which may impact the insect pollinators upon which slickspot peppergrass depends. Potential direct loss of individual slickspot peppergrass plants would be at most a loss of two-year's growth if the biennial form of the plant were damaged, and loss of seeds from any damaged plants. However, the likelihood of direct contact of herbicides with slickspot peppergrass plants will be minimized through the use of Design Features that specify the buffer distances and wind speed parameters for use of herbicides within EOs, especially near occupied slickspot microsites. Herbicides will be selected that do not persist in the soil and therefore will not affect future generations of plants or seeds. In addition, all herbicide treatments will be ground based, so chemical application will be better controlled, minimizing potential drift and unintended exposure of slickspot peppergrass and other native plants.

Herbicide use is expected to result in the loss of some native plants, including native forbs, which provide forage for insect pollinators. As described above in the "Removal of Native Vegetation" section, loss of native shrubs, grasses, forbs and biological soil crusts can adversely affect slickspot peppergrass, particularly through potential impacts to insect pollinators. Although the short and long-term effect of herbicide application to existing biological soil crusts is largely unknown, Metting (1981) indicated that, based on experimental results on individual species isolated from biological soil crusts, herbicide exposure could decrease and/or alter species composition of biological soil crusts (Belnap et al. 2001, p. 47). Therefore, use of herbicides in fuel break footprints in the Paradigm Project area may affect, and is likely to adversely affect slickspot peppergrass and its habitat. However, over the long term, use of herbicides to implement and maintain a network of functional fuel breaks is expected to benefit slickspot peppergrass and its habitat by reducing fire frequency and size within the Paradigm Project area.

Summary of Potential Effects of the Action on Baseline Conditions within the Action Area

The effects determination for the proposed Paradigm Project is May Affect, Likely to Adversely Affect slickspot peppergrass and its habitat. Potential adverse impacts include loss of remnant native vegetation due to seedbed preparation treatments (disking, herbicide applications, and prescribed fire use) and short-term establishment of invasive nonnative perennial plants within the proposed fuel break footprints on Federal, State and private lands. Indirect adverse effects from localized increased livestock access or congregation in EOs, Occupied Habitat, and

Slickspot Peppergrass Habitat following mowing or seeding fuel break treatments may also occur. Project Design features as well as post-implementation monitoring that informs maintenance as well as other treatment measures will avoid or minimize the likelihood of the majority of adverse impacts to the slickspot peppergrass and its habitat. For example, the potential risk of prostrate kochia spread will be reduced through rigorous monitoring for kochia movement and subsequent prompt removal of kochia recruits originating from the fuel break footprints by hand pulling or chemical means. In addition, the potential for the transport of prostrate kochia seeds and subsequent establishment into known EOs, Occupied Habitat, and proposed critical habitat is considered low due to the 1.5 mile buffer between kochia greenstrip fuel breaks and EOs over the majority of the Project area in conjunction with rigorous monitoring and kochia control if kochia establishes outside of treatment areas. Habitat conditions in areas where kochia will be seeded closer than 1.5 miles are such that the likely effects will not be appreciably different than those that retain the 1.5 mile buffer; monitoring and kochia control will occur in these areas as well, which will limit the potential for kochia expansion toward occupied habitats.

The majority of potential adverse impacts are anticipated to be restricted to the up to 11,169 acres of habitat categories for slickspot peppergrass within fuel break footprints, which comprise about 4 percent of the total 293,891 acre Paradigm Project area. Potential fragmentation impacts associated with the Project are reduced as proposed treatments will occur along existing road and railroad rights-of-way (currently fragmented baseline) rather than through patches of remaining higher quality habitat.

Successful establishment of functional fuel breaks is expected to reduce fire frequency and the associated disturbances that result in the introduction and spread of nonnative vegetation over the long-term. Establishment of successful fuel breaks could also provide opportunities for future vegetation restoration in the vicinity of the Project. The proposed fuel breaks could also reduce fire spread to other areas outside the Paradigm Project area that support high quality habitat for sagebrush steppe obligate species, such as slickspot peppergrass and the greater sage-grouse. In addition, information gained from fuel break effectiveness and prostrate kochia movement monitoring will be valuable for planning and implementation of future fuel break proposals within the range of slickspot peppergrass. Although it has been requested from the Bureau in the past, to date, the Service is not aware of any long-term data regarding the suppression effectiveness of fuel breaks in sagebrush steppe habitats or data that compare and contrast the effectiveness of different fuel break strategies. We remain hopeful that data collected within the Paradigm Project area, including any information that demonstrates the ability of various types of fuel breaks to facilitate effective fire suppression in sagebrush communities, will be available for consideration in future proposals to enhance conservation of sagebrush steppe obligates.

The Service continues to encourage use of the best available information to address short- and long-term needs associated with managing fire on the landscape while conserving native habitats and species, including slickspot peppergrass. We anticipate that data regarding the effectiveness of the proposed prostrate kochia fuel breaks in altering fire behavior relative to other vegetation alternatives for fuel breaks may be useful in making future fire management decisions for sagebrush steppe habitats within southern Idaho. Monitoring will also provide

valuable data on the rate and distance of potential prostrate kochia spread from seeded areas. These data can be considered by land managers when making decisions regarding use of prostrate kochia fuel breaks in other areas that also contain habitat components important for slickspot peppergrass survival and recovery.

2.5.2.2 Effects of Interrelated or Interdependent Actions

The effects of the Paradigm Fuel Breaks Project are considered in whole within the Opinion for both Bureau actions on Federal and State land as well as for NRCS actions located on private lands. Therefore, no additional effects from interrelated or interdependent actions on slickspot peppergrass or its habitat are anticipated.

2.5.3 Slickspot Peppergrass Proposed Critical Habitat

2.5.3.1 Direct and Indirect Effects of the Proposed Action

As previously described, the Paradigm Project area includes Subunits 3a and 3c in their entirety as well as a portion of Subunit 3b in Critical Habitat Unit (CHU) 3 (Elmore County) of proposed critical habitat for slickspot peppergrass (Figures 20 and 21). The Project area contains approximately 10,077 acres of proposed critical habitat for slickspot peppergrass, with approximately 8,954 acres located on Bureau lands, 203 acres located on BOR lands, and 919 acres located on private lands (see Table 6 on p. 78 of this Opinion). About 1,008 acres (10 percent) of the 10,077 total acreage of proposed critical habitat within the Paradigm Project boundary is located within proposed fuel break footprints. No proposed critical habitat is located on State lands within the Paradigm Project area. The 10,077 acres of proposed critical habitat located within the Paradigm Project area represents about 16 percent of the total proposed critical habitat acreage for slickspot peppergrass rangewide (61,301 acres).

Similar to effects to the species, direct and indirect effects on proposed critical habitat for slickspot peppergrass may result from Paradigm Project implementation and maintenance activities. Direct and indirect effects on PCEs of proposed critical habitat could result from introduction or spread of invasive nonnative plants, damage to slickspot microsites, degradation of surrounding native sagebrush-steppe communities, and loss of native vegetation, which may impact insect pollinators. In addition, increases in invasive nonnative species cover may also result in increased wildfire risk over time. Beneficial effects of the Paradigm Project on PCEs of proposed critical habitat include the reduction of fire frequency and intensity over the long term due to implementation and maintenance of an effective fuel break network. Effects of the Paradigm Project on each of the four PCEs for slickspot peppergrass proposed critical habitat are as follows.

Ecologically Functional Slickspots (PCE 1)

Potential effects to slickspot microsites (PCE 1) associated with the Paradigm Project are similar to effects to slickspot microsite habitats important to the species, which are discussed in detail above. As previously described, fuel break implementation has the potential to impact the function of slickspot microsites primarily through: 1) mechanical damage to and potential loss of slickspot microsites; 2) damage to biological soil crusts, both in the slickspots and the surrounding area; and 3) spread and continued persistence of invasive annuals and noxious

weeds through both physical transport and soil disturbance, which can establish within and adjacent to slickspot microsites.

The nearly 9,000 acres of proposed critical habitat in the Paradigm Project area that fall outside of fuel break footprints are expected to have reduced risks of impacts due to fire as a result of project implementation. Successfully established, effective fuel breaks are expected to result in a long-term decrease in future fire-related impacts throughout the action area, which is expected to benefit PCE 1 of proposed critical habitat over the long term.

As previously described, there are 1,008 acres (27 miles[42]) of proposed critical habitat within fuel break footprints in the proposed Paradigm Project area. Approximately 920 acres of the 1,008 acres of proposed fuel break footprints are located within proposed critical habitat on Federal lands, and will be subjected to the fuel break treatment methods identified for Bureau-managed lands. In addition, up to an additional 88 acres of fuel breaks may be located within proposed critical habitat on private lands; if implemented under the Paradigm fuel Breaks Project, these 88 acres will be implemented subject to the fuel break treatment methods identified for privately-managed land. No Paradigm Project prostrate kochia greenstrip fuel breaks will be located within proposed critical habitat on any lands regardless of ownership. In addition, Design Features will be implemented on Federal, State, and private lands to minimize the likelihood of effects to PCE 1.

No direct adverse effects to slickspot microsites (PCE 1) will occur from disking, targeted grazing, and kochia greenstrip treatments as these treatments are prohibited in proposed critical habitat. In addition, potential for prostrate kochia to impact PCE 1 of proposed critical habitat within the Paradigm Project area through kochia movement into proposed critical habitat will be discountable as no kochia fuel breaks will be created within 1.5 miles of EOs (which will also result in kochia fuel break buffers around proposed critical habitat, since proposed critical habitat includes EOs), and kochia monitoring and subsequent control of kochia that moves outside of fuel break footprints will minimize the likelihood of kochia establishment within slickspot microsites in proposed critical habitat. In addition, implementation of non-kochia seeded fuel breaks within proposed critical habitat will result in minimal ground disturbance of slickspot microsites. Seeding species that require less than an inch of soil cover in proposed critical habitat using minimum till drills or standard rangeland drills equipped with depth-bands will help protect slickspot microsites from damage to the restrictive layer. As previously described, while breaking through the restrictive layer during seeding with minimal ground disturbing methods will be possible, the likelihood of this occurring is considered discountable; no adverse effects to PCE 1 are anticipated from use of minimal ground disturbing seeding techniques within proposed critical habitat. In addition, herbicide application in preparation for seeding is expected to decrease non-native invasive biomass and seed sources surrounding slickspot microsites within proposed critical habitat, which would benefit PCE 1 of proposed critical habitat. The implementation of the proposed fuel breaks is expected to aid in the maintenance or

[42] Of these 27 miles of fuel breaks, 25 miles occur on Federal lands and up to 2 miles will occur on private lands (Table 7).

improvement of slickspots within proposed critical habitat over the long term as fire recurrence is reduced and existing slickspot microsites are protected through design features.

However, as described for the species above, livestock use could increase in the areas surrounding occupied slickspots where sagebrush is thinned or mowed or where fuel breaks are seeded with desirable forage species, which will result increased risk of localized trampling of slickspots within areas of proposed critical habitat previously not accessible or attractive to livestock. Therefore, indirect effects of mowing and seeding of fuel break footprints in the Paradigm Project area may affect, and are likely to adversely affect PCE 1 of proposed critical habitat.

As described above, the 1,008 acres of proposed critical habitat within fuel break footprints on Federal, State, and private lands within the Paradigm Project area represent about 9 percent of the 10,999 total acres of proposed critical habitat within CHU 3 (Elmore County), and about 2 percent of the total proposed critical habitat acreage for slickspot peppergrass rangewide (61,301 acres). However, due to the small portion of proposed critical habitat that may be impacted by the Paradigm Project footprint relative to the total acreage of proposed critical habitat subunits, units, and rangewide (about 2 percent), the functionality of PCE 1 in Subunits 3a, 3b, and 3c within CHU 3 as well as proposed critical habitat rangewide will not be reduced by the proposed Paradigm Project.

Relatively Intact Native Wyoming Big Sagebrush (PCE 2)

Effects to sagebrush habitat (PCE 2), inclusive of native shrubs, grasses, and forbs, associated with fuel breaks implementation and maintenance in the Paradigm Project area are similar to effects to sagebrush habitat important to the species, which are discussed in detail above.

The nearly 9,000 acres of proposed critical habitat in the Paradigm Project area that fall outside of fuel break footprints are expected to have reduced risks of impacts due to fire as a result of project implementation. Successfully established, effective fuel breaks are expected to result in a long-term decrease in future fire-related impacts throughout the action area, which is expected to benefit PCE 2 of proposed critical habitat over the long term. However, given the current degraded condition of the habitat in the Paradigm Project area, impacts to PCE 2 are expected and will be primarily associated with remnant stands of native Wyoming big sagebrush or scattered areas containing native perennial grasses, forbs, and biological soil crusts.

Fuel break treatments within proposed critical habitat may result in some beneficial effects on PCE 2. For example, implementation of non-kochia fuel breaks though proposed critical habitat may increase cover of native grasses and reduce invasive nonnative annual grass cover from current conditions in some areas through use of native species in greenstrip fuel breaks. Potential impacts of proposed fuel break footprints on remnant intact sagebrush habitat will include removal of some shrubs or the reduced stature of remnant native shrubs to a 6 to 12 inch height within proposed critical habitat that crosses thin/mow fuel break treatment segments. In addition, remnant scattered native perennial grass and forb plants may be lost or damaged during pre-seeding or maintenance herbicide treatments within fuel break footprints that cross proposed critical habitat. Furthermore, the spread of invasive nonnative plants (such as cheatgrass) may be facilitated over the short term associated with Project-related ground disturbance or failed seeded fuel breaks within proposed critical habitat. However, any increases in invasive nonnative plants will be addressed by fuel break re-treatment and maintenance activities that will control invasive

nonnative plants within fuel break footprints. Furthermore, no prostrate kochia fuel breaks will be created within 1.5 miles of EOs (which will also result in kochia fuel break buffers around proposed critical habitat, since proposed critical habitat includes EOs), and kochia movement monitoring and subsequent control of kochia that establishes outside of fuel break footprints will minimize the likelihood of kochia establishment and competition with native shrubs, grasses, and forbs within proposed critical habitat.

No direct adverse effects to native shrubs, grasses, and forbs (PCE 2) will occur from disking, targeted grazing, and kochia greenstrip treatments as these treatments are prohibited in proposed critical habitat. Design Features, such as emphasis on the use of native species for non-kochia fuel break treatments, will reduce the risk of adverse effects of other fuel break treatment methods on remnant intact sagebrush steppe habitat in the Project area. As described above for the species in the "Removal of Native Vegetation" and "Herbicide" effects sections, some localized adverse effects to remnant sagebrush steppe native vegetation associated with Project activities are likely to occur during thinning/mowing and herbicide treatments used in fuel break implementation and maintenance. Therefore, thinning/mowing and herbicide use in the Paradigm Project area may affect, and is likely to adversely affect PCE 2 of proposed critical habitat. However, due to the small portion of proposed critical habitat that may be impacted by the Paradigm Project footprint relative to the total acreage of proposed critical habitat subunits, units, and rangewide (about 2 percent), overall the functionality of PCE 2 of proposed critical habitat in Subunits 3a. 3b, and 3c in CHU 3, as well as proposed critical habitat rangewide, will not be reduced by the proposed Paradigm Project.

Diversity of Native Plants for Insect Pollinator Habitat Requirements (PCE 3)

Effects to native plant diversity (PCE 3) associated with the Paradigm Project are similar to effects to native plants important to the species, which are discussed in detail above. As previously discussed, loss of pollinator habitat has the potential to result from any of the proposed fuel break implementation and maintenance methods. Lack of forbs in proposed critical habitat could constitute a barrier that reduces the effective range of insects important to slickspot peppergrass pollination (Robertson et al. 2004, pp. 2-4). Barriers to insect pollinators can include large areas of degraded sagebrush steppe habitat that do not support sufficient forb diversity necessary for insect pollinators to be available for slickspot peppergrass pollination.

The nearly 9,000 acres of proposed critical habitat in the Paradigm Project area that fall outside of fuel break footprints are expected to have reduced risks of impacts due to fire as a result of project implementation. Successfully established, effective fuel breaks are expected to result in a long-term decrease in future fire-related impacts throughout the action area, which is expected to benefit PCE 3 of proposed critical habitat over the long term. However, native forb cover is extremely low within the Project area, including within proposed critical habitat. Understories of many dense sagebrush stands in proposed critical habitat are currently dominated by cheatgrass, annual *Vulpia* species and/or bur buttercup. Given the current degraded condition of the habitat in the Paradigm Project area, impacts to PCE 3 will be primarily associated with reductions in current habitat quality of remnant native shrubs, grasses, and forbs.

Similar to effects on the species as described in the "Herbicide Use" effects section above, herbicide use or limited prescribed fire treatments in proposed critical habitat has the potential to decrease the abundance of already lacking native forbs. However, dormant native forb seeds

within the seed bank currently under a dense sagebrush canopy, or a heavy mat of nonnative invasive annual grasses such as cheatgrass or medusahead may be released within fuel break footprints. Herbicide and prescribed fire treatments as well as thinning and mowing could release dormant native forb seeds for germination. The removal of invasive nonnative annual grasses and associated organic matter as well as thinning of dense sagebrush stands will allow for more light, water and nutrients to become available for plant establishment. Opening up the canopy during herbicide treatments could also provide both native and nonnative plant seeds originating from outside of fuel break footprints a suitable seedbed for germination and establishment; this may result in either beneficial or negative effects to insect pollinator habitats depending on the plant species established. In addition, while not a native, alfalfa planted in treated areas will provide a food source for pollinators, which could benefit PCE 3 by reducing pollinator habitat fragmentation.

However, the Paradigm Project may reduce remnant native vegetation cover, including native forbs, through implementation- or maintenance-related vegetation reduction or clearing within fuel break footprints. Fuel break treatments such as thinning and mowing, herbicide use and limited prescribed fire use in proposed critical habitat may impact insect pollinators through removal or reduction in stature of remnant native shrubs, grasses, and forbs within fuel break footprints that cross proposed critical habitat. Furthermore, the spread of invasive nonnative plants (such as cheatgrass) may be facilitated over the short term associated with Project-related ground disturbance or failed seeded fuel breaks within proposed critical habitat. However, these increases in invasive nonnative plants will be relatively short term as they will be addressed by fuel break re-treatment and maintenance activities that will control invasive nonnative plants within fuel break footprints. In addition, no prostrate kochia fuel breaks will be created within 1.5 miles of EOs (which will also result in kochia fuel break buffers around proposed critical habitat, since proposed critical habitat includes EOs), and kochia movement monitoring and subsequent control of kochia that establishes outside of fuel break footprints will minimize the likelihood of kochia establishment and competition with native shrubs, grasses, and forbs within proposed critical habitat upon which insect pollinators depend.

No direct adverse effects to native plant diversity available for insect pollinators (PCE 3) will occur from disking, targeted grazing, and kochia greenstrip treatments as these treatments are prohibited in proposed critical habitat. Design Features, such as emphasis on the use of native species for non-kochia fuel break treatments, will reduce the risk of adverse effects of other fuel break treatment methods on remnant intact sagebrush steppe habitat in the Project area. As described above for the species in the "Removal of Native Vegetation" and "Herbicide" effects sections, some localized adverse effects to remnant sagebrush steppe native vegetation associated with Project activities are likely to occur during thinning/mowing and herbicide treatments used in fuel break implementation and maintenance. Therefore, thinning/mowing and herbicide use in the Paradigm Project area may affect, and is likely to adversely affect PCE 3 of proposed critical habitat. However, due to the small portion of proposed critical habitat that may be impacted by the Paradigm Project footprint relative to the total acreage of proposed critical habitat subunits, units, and rangewide (about 2 percent), overall the functionality of PCE 3 of proposed critical habitat in Subunits 3a. 3b, and 3c in CHU 3, as well as proposed critical habitat rangewide, will not be reduced by the proposed Paradigm Project.

Sufficient Insect Pollinators for Successful Fruit and Seed Production (PCE 4)

Effects to insect pollinators (PCE 4) associated with Paradigm Project activities are similar to effects to insect pollinators previously described for the species. As described above, the nearly 9,000 acres of proposed critical habitat in the Paradigm Project area that fall outside of fuel break footprints are expected to have reduced risks of impacts due to fire as a result of project implementation. Successfully established, effective fuel breaks are expected to result in a long-term decrease in future fire-related impacts throughout the action area, which is expected to benefit PCE 4 of proposed critical habitat over the long term. However, diversity and numbers of insect pollinators may be locally impacted through native vegetation removal that could occur during herbicide use, limited use of prescribed fire, and thinning/mowing treatments for fuel break implementation and maintenance activities in proposed critical habitat. Reduced cover of remnant native vegetation and litter within fuel break footprints crossing proposed critical habitat will subsequently reduce its availability for insect pollinator foraging or shelter.

Herbicide treatments will decrease the amount of both native and nonnative biomass and seed sources in proposed critical habitat, which could be either beneficial or negatively impact insect pollinators. In addition, prescribed fire could also result in direct loss of insect pollinators overwintering in vegetation or litter burned during prescribed fire treatments. Direct effects to PCE 4, (inclusive of ground-dwelling insects) associated with seeding ground disturbance is expected to be discountable as minimal ground-disturbing seeding methods will be used in proposed critical habitat.

No direct adverse effects to insect pollinators (PCE 4) will occur from disking, targeted grazing, and kochia greenstrip treatments as these treatments are prohibited in proposed critical habitat. Design Features, such as minimal ground disturbing seeding methods and emphasis on the use of native species for non-kochia fuel break treatments in proposed critical habitat, will reduce the risk of adverse effects of other fuel break treatment methods on insect pollinators in the Project area. Although impacts to PCE 4 will be minimized to the extent practicable, some localized adverse effects to insect pollinators associated with Project activities are likely to occur during limited prescribed burning, thinning/mowing, and herbicide treatments used for fuel break implementation and maintenance. These adverse effects are expected to be of relatively short duration as potential loss of insect pollinators during mowing, herbicide use, and prescribed fire treatments is expected to be remediated through re-colonization from adjacent areas as vegetation is reestablished in fuel break footprints. Therefore, prescribed burning, thinning/mowing, and herbicide use treatments in the Paradigm Project area may affect, and are likely to adversely affect PCE 4 of proposed critical habitat. However, due to the small portion of proposed critical habitat that may be impacted by the Paradigm Project footprint relative to the total acreage of proposed critical habitat subunits, units, and rangewide (about 2 percent), overall the functionality of PCE 4 of proposed critical habitat in Subunits 3a. 3b, and 3c in CHU 3, as well as proposed critical habitat rangewide, will not be reduced by the proposed Paradigm Project.

Summary Description of Potential Effects of the Action within the Action Area

Effects to PCEs of proposed critical habitat for slickspot peppergrass are generally limited to localized areas within and immediately adjacent to the Paradigm Project fuel break footprints,

and are expected to diminish with increased distance from the Project footprints. While some localized effects are likely to occur, Design Features as well as fuel break and kochia monitoring and kochia control measures will substantially diminish Project-related effects on PCEs of proposed critical habitat for slickspot peppergrass. Because there is likely some modification of baseline conditions expected to occur over the course of the 50-year permitted term of the Project, some adverse effects to PCEs related to short term increased invasive nonnative plant cover, and removal or reduction in remnant native vegetation cover are expected to occur in fuel break footprints that cross proposed critical habitat.

As described above for the species, factors that may affect PCEs of proposed critical habitat for slickspot peppergrass in the Project action area are related to Paradigm Project implementation and maintenance activities that may result in damage or mortality of insect pollinators during limited prescribed fire treatments, removal or reduction of remnant native vegetation, and the potential introduction or spread of invasive nonnative plants. Some localized adverse effects to PCEs 2, 3, and 4 of proposed critical habitat are likely to occur associated with removal of remnant native vegetation and increased nonnative invasive plant cover. PCH 4 will be adversely impacted in small areas by limited prescribed fire treatments within proposed critical habitat. Localized Project-related adverse impacts to PCE 1 may also occur due to increased livestock access or concentration in portions of proposed critical habitat that are mowed or seeded with desirable forage species, which could result in reduced native plant cover and trampling of slickspot microsites in areas of proposed critical habitat not previously accessible or attractive to livestock.

Effects to PCEs of proposed critical habitat within the Paradigm Project area are expected to be minimized through use of Design Features, including avoidance of all slickspot microsites during treatments (PCE 1). In addition, weed control activities are expected to address the spread of invasive nonnative plants associated with ground-disturbing activities, reducing potential effects on PCEs 1, 2, 3, and 4. Although the use of Design Features will greatly minimize potential impacts to PCEs of proposed critical habitat, some Project-related adverse effects to PCEs will occur. As adverse impacts will be localized due to Design Features that minimize the likelihood of impacts to PCEs, the Paradigm Project will maintain the current condition and moderate to high conservation value of the action area for PCEs of proposed critical habitat over the permitted term of the action (50 years on Federal and State lands and 5 years on private lands).

2.5.3.2 Effects of Interrelated or Interdependent Actions

The effects of the Paradigm Fuel Breaks Project on proposed critical habitat for slickspot peppergrass are considered in whole within the Opinion for both Bureau actions located on Federal and State land as well as for NRCS actions location on private lands. Therefore, no additional effects from interrelated or interdependent actions on proposed critical habitat are anticipated.

2.6 Cumulative Effects

The implementing regulations for section 7 define cumulative effects to include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are

not considered in this section because they require separate consultation pursuant to section 7 of the Act.

2.6.1 Slickspot Peppergrass Cumulative Effects

Livestock grazing, fire suppression actions, post-fire seeding treatments, development, recreational off road vehicle use, and chemical treatments for weed or insect control that may directly or indirectly affect the slickspot peppergrass can occur on State and private lands in the vicinity of the Paradigm Project. In addition, prostrate kochia has been used in past seedings on private lands in the Paradigm Project area, and private landowners may choose to implement kochia broadcast seedings or seeded fuel breaks without financial or technical assistance from the NRCS. If landowners choose to implement fuel breaks, including prostrate kochia seedings, independent of NRCS, fuel break methods and associated Design Features for conservation of slickspot peppergrass included in the Paradigm Fuel Breaks Projects may not be used, depending on the decision of individual landowners. It is unknown whether individual private landowners will embrace the collaborative Paradigm Project, of if they will implement fuel breaks independently from this Project.

As previously described in this Opinion, the Mountain Home RFPA, a non-profit organization established to prevent and suppress range fires located within the Paradigm Project area, was formed in 2013 through a collaborative effort with local private landowners, the Bureau's Boise District, and the Idaho Department of Lands (IDL). Efforts of the Mountain Home RFPA may increase the success of fire suppression efforts through more rapid response and increasing the availability of additional fire suppression resources; therefore, fire suppression efforts by the RFPA may benefit slickspot peppergrass over the long term within the proposed Paradigm Project area[43].

The Service recognizes that some actions on non-Federal lands may have adverse effects on the slickspot peppergrass at the individual plant or EO level. Some non-Federal lands within the Paradigm Project area are known to contain slickspot peppergrass, although adequate surveys to determine presence of the species on non-Federal lands rangewide, including within the Paradigm Project area, have not occurred to date. Within the entire range of slickspot peppergrass, only 2,095 acres of non-Federal lands are documented to contain portions of EOs. Of these 2,095 acres, about 1,269 acres (61 percent) are managed under the OCTC's INRMP; conservation implementation and effectiveness for slickspot peppergrass and its habitat on these 1,269 acres is considered high within the OCTC INRMP area. The remaining 826 non-Federal acres located outside of the OCTC INRMP area constitute only about 6 percent of the total EO acreage within the Snake River Plain Plateau physiographic region and about 5 percent of the total EO acreage rangewide (see Table 2), the Service expects that any cumulative effects occurring on non-Federal lands located outside of the Paradigm Project area are not likely to

[43] While the Service acknowledges the benefits increased fire suppression through RFPAs for conservation of sagebrush steppe habitat, RFPAs have not been in place long enough for their effectiveness to be measurable with regard to slickspot peppergrass conservation.

significantly alter habitat conditions for the slickspot peppergrass either within the Paradigm Project area, the Snake River Plains physiographic region, or rangewide.

2.6.2 Slickspot Peppergrass Proposed Critical Habitat Cumulative Effects

Impacts of the Paradigm Project on PCEs of proposed critical habitat for slickspot peppergrass will add cumulatively to the impacts of future State, tribal, local or private actions that are reasonably certain to occur in the Project area. As described above for the species, these actions include livestock grazing, fire suppression actions, post-fire seeding treatments, development, recreational off road vehicle use, and chemical treatments for weed or insect control. The impacts of these future actions on PCEs of slickspot peppergrass proposed critical habitat will be the same as those described for slickspot peppergrass habitat above, and therefore are not repeated here.

The Service recognizes that some actions on non-Federal lands may have adverse effects on PCEs of proposed critical habitat for slickspot peppergrass. Non-Federal lands in the vicinity of the Project may contain PCEs of proposed critical habitat for the species. However, only about 2 percent of the total proposed critical habitat acreage rangewide occurs on non-Federal lands in the proposed critical habitat subunits that are located in the Project action area [critical habitat Subunits 3a (596 acres on non-Federal land), 3b (359 acres on non-Federal land), and 3c (319 acres on non-Federal land)]]. Therefore, similar to cumulative effects to the species and its habitat as described above, the Service expects that any cumulative effects occurring in the vicinity of the Project action area considered herein are not likely to significantly alter the functionality of PCEs of proposed critical habitat for slickspot peppergrass within CHU 3 or rangewide.

2.7 Conclusion

2.7.1 Slickspot Peppergrass Conclusion

The Service has reviewed the current status of slickspot peppergrass, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize the continued existence of slickspot peppergrass.

The Service concludes that direct and indirect effects to slickspot peppergrass will be limited to removal of remnant native vegetation within fuel break footprints, and short term increases in invasive nonnative species following vegetation removal or seeding failures. Indirect adverse effects may also occur associated with localized trampling ground disturbance from the redistribution of livestock following thinning/mowing and seeded fuel break treatments, which can increase livestock access to and congregation within EOs, Occupied Habitat, and Slickspot Peppergrass Habitat. The proposed action is expected to benefit slickspot peppergrass over the long-term as the fuel break network within the Paradigm Project area is expected to contribute to fire suppression success by effectively limiting the number and extent of wildfires that may burn EOs or sagebrush steppe habitat that may support the species. Design Features and the kochia

movement monitoring and subsequent control measures will minimize the likelihood of adverse impacts of prostrate kochia greenstrip fuel breaks on slickspot peppergrass and its habitat. The Service expects that the numbers, distribution, and reproduction of slickspot peppergrass in the action area, in the Snake River Plain physiographic region, and for the species rangewide, will not be significantly changed as a result of this action. As such, we have concluded that the survival and recovery of slickspot peppergrass will not be jeopardized by the proposed Paradigm Fuel Breaks Project.

The Service reached the no-jeopardy determination on the basis that the aggregate effects of the proposed Paradigm Project, inclusive of Design Features and prostrate kochia movement monitoring and control measures as well as applicable conservation measures set forth in the Conservation Agreement (CA) (USBLM and USFWS 2014, entire) for conservation of slickspot peppergrass, taken together with cumulative effects, are compatible with maintaining the ecological function of occupied slickspot microsites within the action area. However, this conclusion is predicated and dependent on the robustness of the monitoring and kochia control programs; full and consistent implementation of these action components, over the long term, are necessary to ensure ecological function is maintained within the Snake River physiographic region. The conservation value of the Project area is considered to be moderate to high for slickspot peppergrass. As noted in the "Status of the Species" section of this Opinion, the long-term conservation of slickspot peppergrass is likely to depend on the maintenance or improvement of the ecological function of the higher quality (A- through C-ranked) EOs rangewide, including maintaining or improving the connectivity within and between EOs to facilitate pollinator activity, maintain genetic diversity, and minimize the effects of activities that promote the establishment of invasive nonnative plant species.

Due to the moderate to high conservation value of this area as well as the Design Features and kochia monitoring and control measures included within the Paradigm Project, risks to slickspot peppergrass associated with the Paradigm Project are expected to be low, although there is some risk that individual plants or seeds may be damaged or lost. Design Features such as no use of kochia fuel breaks within 1.5 miles of EOs and the use of kochia movement monitoring and control measures are expected to reduce the risk of prostrate kochia spread into EOs and associated Occupied Habitat. In addition, fuel breaks are expected to increase fire suppression success in the Paradigm Project area, which may prevent fire from spreading into EOs or into sagebrush steppe habitat that could support slickspot peppergrass. The action is expected to maintain the moderate to high slickspot peppergrass conservation value of the Project area over its implementation and monitoring periods (about 50 years on Federal and State lands and at least 5 years on private lands).

In our 2009 listing decision for slickspot peppergrass, we identified two primary threats to this species; the increased frequency and extent of wildfires and invasive, nonnative plant species. Invasive nonnative plants, as described in the listing rule, include not only invasive unseeded species such as cheatgrass and medusahead, but also invasive seeded nonnative species such as intermediate wheatgrass and prostrate kochia. Based on this information, the Service does not typically support the use of prostrate kochia in habitat categories for slickspot peppergrass. However, the Service expects post-implementation kochia movement monitoring will provide insight as to the degree of spread of prostrate kochia from roadside fuel breaks that can be used to make wise management decisions on the placement and species composition of future fuel

breaks within habitat categories for slickspot peppergrass with similar environmental conditions to the proposed Project. In addition, both the Bureau and NRCS are committed to prompt control of kochia that moves from Paradigm Project fuel break footprints. Project monitoring will also provide information on the relative effectiveness of this fuel break method; this information can be used by managers in making decisions on future fuel break proposals.

Design Features being implemented by the Bureau and NRCS in conjunction with the fuel break treatments considered in this document are either specific measures designed to reduce impacts to the species and its habitat at the local level, or general measures designed to improve the ecological condition of native sagebrush-steppe vegetation at a landscape scale. The specific measures include actions such as prohibiting disking, prescribed fire, or targeted grazing within EOs to reduce ground disturbance-related impacts to individual slickspot peppergrass plants and the seed bank and specific application and wind speed parameters for herbicide treatments to minimize the likelihood of chemical contact with slickspot peppergrass plants. These specific conservation measures are intended to reduce the amount or extent of impacts, although adverse effects are not completely eliminated. General conservation measures include fuel break placement parameters designed to maintain or increase the cover of native forbs, grasses, and sagebrush through fire protection or suppression, allowing for future habitat restoration opportunities. General conservation measures are intended to incrementally improve rangeland conditions across the range of the species. As general conservation measures are implemented over the long term, their effectiveness will be evaluated and modified as appropriate through an adaptive management process. In addition, the 2014 CA provides direction for monitoring to assess effectiveness of conservation measures and an adaptive management program to respond to new information and ongoing actions, as appropriate.

2.7.2 Slickspot Peppergrass Critical Habitat Conclusion

The Service has reviewed the current status of slickspot peppergrass proposed critical habitat, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed Paradigm Project is not likely to destroy or adversely modify proposed critical habitat for slickspot peppergrass. Similar to our conclusion regarding the species as described above, the Service concludes that direct and indirect effects to proposed critical habitat for slickspot peppergrass will be limited to removal of some remnant native vegetation and the potential introduction or spread of invasive nonnative plants. Indirect adverse effects may also occur associated with localized trampling ground disturbance from the redistribution of livestock following thinning/mowing and seeded fuel break treatments, which can increase livestock access to and congregation within proposed critical habitat. Adverse effects of the proposed action on PCEs 1, 2, 3, and 4 will occur at a localized level relative to the rangewide extent of proposed critical habitat for slickspot peppergrass. The Service expects that the function of all PCEs of proposed critical habitat in the Paradigm Project area and rangewide in southwestern Idaho will not be significantly changed as a result of proposed fuel break implementation and maintenance activities, inclusive of Design Features and kochia movement monitoring and subsequent control measures. Therefore, we have concluded that the proposed Paradigm Project will not appreciably diminish the value of the PCEs of proposed critical habitat for slickspot peppergrass.

The Service reached the no destruction or adverse modification determination on the basis that the aggregate effects of the proposed Paradigm Project, inclusive of Design Features and prostrate kochia movement monitoring and subsequent control measures as well as applicable conservation measures set forth in the 2014 CA (USBLM and USFWS 2014, entire), taken together with cumulative effects, are compatible with maintaining the ecological function of slickspot microsites, remnant sagebrush stands, remnant native plants, and insect pollinators within proposed critical habitat in Critical Habitat Subunits 2b, 2d, 3a, and 3b, Critical Habitat Units 2 and 3, and proposed critical habitat rangewide. As described above, the long-term conservation of slickspot peppergrass is likely to depend on the maintenance or improvement of ecological function of the higher quality (A- through C-ranked) EOs rangewide, including maintaining or improving the connectivity within and between EOs, to facilitate pollinator activity, maintain genetic diversity, and minimize the effects of activities that promote the establishment of invasive nonnative plant species and fire frequency in intact Wyoming big sagebrush communities.

Design Features being implemented by the Bureau and the NRCS in conjunction with Paradigm Project activities also serve to minimize the likelihood of impacts to PCEs of proposed critical habitat. Measures such as such as avoidance of slickspot microsites during fuel break implementation, use of minimal ground disturbing seeding techniques, and emphasis on seeding native species in fuel break footprints that cross proposed critical habitat will minimize the likelihood of impacts to slickspot microsites (PCE1), and reduce the risk impacts to remnant intact sagebrush steppe habitat (PCE 2), habitat components important to insect pollinators (PCE 3), and adequate insect pollinators for slickspot peppergrass seed production (PCE 4) in the Paradigm Project area. These specific measures are intended to reduce the amount or extent of impacts, although some localized adverse effects to PCEs will not be completely eliminated.

Due to the moderate to high conservation value of this area as well as the Design Features and kochia monitoring and control measures included within the Paradigm Project, risks to PCEs of proposed critical habitat associated with the Paradigm Project are expected to be low, although there is some risk that small components of PCEs may be impacted within fuel break footprints. Design Features such as no use of kochia fuel breaks within 1.5 miles of EOs (about 1.35 miles from proposed critical habitat) and the use of kochia movement monitoring and control measures are expected to reduce the risk of prostrate kochia spread into EOs and associated Occupied Habitat. In addition, fuel breaks are expected to increase fire suppression success in the Paradigm Project area, which may prevent fire from spreading into proposed critical habitat, and thereby impacting PCEs. The action is expected to maintain the moderate to high conservation value of the Project area for slickspot peppergrass, inclusive of PCEs of proposed critical habitat, over its implementation and monitoring periods (about 50 years on Federal and State lands and at least 5 years on private lands).

In our 2011 critical habitat proposal for slickspot peppergrass, we identified four primary threats to PCEs of proposed critical habitat: the increased frequency and extent of wildfires; invasive, nonnative plant species; livestock use; and residential and agricultural development. Invasive nonnative plants, as described in the proposed critical habitat rule, include not only invasive unseeded plant species such as cheatgrass and medusahead, but also invasive seeded nonnative plant species. Based on this information, the Service does not typically support the use of prostrate kochia in habitat categories for slickspot peppergrass. However, as described above for

the species, the Service expects post-implementation kochia movement monitoring will provide insight as to the degree of spread of prostrate kochia from roadside fuel breaks that can be used to make wise management decisions on the placement and species composition of future fuel breaks near proposed critical habitat for slickspot peppergrass with similar environmental conditions to the proposed Project. In addition, both the Bureau and NRCS are committed to prompt control of kochia that moves from Paradigm Project fuel break footprints. Project monitoring will also provide information on the relative effectiveness of this fuel break method; this information can be used by managers in making decisions on future fuel break proposals.

Design Features being implemented by the Bureau and NRCS in conjunction with the fuel break treatments considered in this document are either specific measures designed to reduce impacts to the species and its habitat, including proposed critical habitat, at the local level, or general measures designed to improve the ecological condition of native sagebrush-steppe vegetation at a landscape scale. The specific measures include actions such as prohibiting disking, prescribed fire, or targeted grazing within proposed critical habitat to reduce ground disturbance-related impacts to slickspot microsites (PCE 1) as well as to reduce the spread of invasive nonnative plants (PCES 2, 3, and 4) and specific application and wind speed parameters for herbicide treatments to minimize the likelihood of chemical contact with desirable native plants (PCEs 2, 3, and 4). These specific conservation measures are intended to reduce the amount or extent of impacts, although adverse effects are not completely eliminated. General conservation measures include fuel break placement parameters designed to maintain or increase the cover of native forbs, grasses, and sagebrush (PCES 2, 3, and 4) through fire protection or suppression, allowing for future habitat restoration opportunities. General conservation measures are intended to incrementally improve rangeland conditions across the range of the species. As general conservation measures are implemented over the long term, their effectiveness will be evaluated and modified as appropriate through an adaptive management process. In addition, the 2014 CA provides direction for monitoring to assess effectiveness of conservation measures and an adaptive management program to respond to new information and ongoing actions, as appropriate.

2.8 Incidental Take Statement

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species, respectively, without specific exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm in the definition of take in the Act means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.

Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited

taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Because the "take" prohibitions detailed under section 9(a)(1) of the Act do not apply to listed plants, those sections of the Act dealing with incidental "take", Sections 7(b)(4) and 7(0)(2), generally do not apply to listed plants either. Therefore, we are not including an Incidental Take Statement for slickspot peppergrass in this Opinion.

However, section 9(a)(2) of the Act prohibits, among other actions, the removal and reduction to possession of plants listed as endangered or threatened from areas under Federal jurisdiction. The Act prohibits the malicious damage of Federally listed endangered plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulations or in the course of any violation of a State criminal trespass law. These protections may apply to slickspot peppergrass as well if State regulations are promulgated.

2.9 Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery programs, or to develop new information on listed species. The conservation recommendations listed below are applicable to both the Bureau and NRCS unless specifically indicated.

- Use fuel break effectiveness monitoring data, available studies, and fuels modelling to demonstrate the ability and cost effectiveness of various types of fuel breaks to facilitate fire suppression in sagebrush communities; share this information with the Service and other partners.
- Use monitoring data, published research, and available studies to identify effective treatments for reestablishment of functional sagebrush steppe communities following wildfire.
- Avoid use of prostrate kochia in areas that are documented as Occupied Habitat or that may contain slickspot peppergrass.
- Report Bureau concerns with kochia movement distances described in the Gray and Muir 2013 prostrate kochia journal article to the authors, and encourage re-analyses of data to incorporate additional Bureau information on past kochia seeding locations in southwestern Idaho (applicable to the Bureau only). Develop a prostrate kochia movement monitoring and control program independent of the Paradigm Project to address potential prostrate kochia establishment that has a likelihood of impacting slickspot peppergrass and its habitat.
- Promptly remove seeded nonnative plants, such as prostrate kochia, that may compete with slickspot peppergrass or impact PCEs and have inadvertently established near extant EOs or proposed critical habitat. For example, the Service encourages the Bureau to promptly remove the kochia plants that have been reported near HIP transect 061 (EO 61) in the Paradigm Project area, regardless of the probable source of the kochia plants (control actions recommended for EO 61 are applicable to the Bureau only).

- Continue to manage native re-seeded areas, as appropriate, to ensure that impacts of invasive nonnative plants, including noxious weeds, are minimized in failed or unnecessary fuel break footprints that have been reclaimed using native grass, forb, and shrub seeds.
- Implement a small pilot study to determine which Bureau-approved herbicides and their associated concentrations will effectively control prostrate kochia (applicable to the Bureau only).
- Use the conservation measures and associated implementation actions in the 2014 CA as a basis for developing conservation measures for future revised Land Use Plans (LUP) in order to continue recovery of slickspot peppergrass. Given new information resulting from implementation actions identified in the 2014 CA (e.g., completion of surveys) and recent and ongoing research on habitat restoration, insect pollinators, wildfire, and invasive nonnative plants, LUPs may be revised to include more stringent conservation measures and implementation actions, as appropriate (applicable to the Bureau only).
- Continue to implement conservation measures for slickspot peppergrass, regardless of future listing status, to ensure continued species conservation and population expansion over time. The Service's interpretation of the 2014 CA is that the conservation measures apply to Bureau actions regardless of the species' status under the Act.
- Continue monitoring efforts to ensure that conservation measures are implemented and to assist in determining if these measures are effective in the conservation of the species and report these annual findings to the Service.
- Conduct surveys in cooperation with the Service, Idaho Department of Fish and Game, and other parties to determine slickspot peppergrass locations and densities in Slickspot Peppergrass Habitat and Potential Habitat.
- Encourage research and projects to restore sagebrush-steppe habitat within the range of slickspot peppergrass.
- Actively participate in critical habitat and recovery planning efforts for slickspot peppergrass.
- Continue to participate in the LEPA Technical Team and other cooperative forums for sharing information, developing partnerships, and encouraging research to facilitate the survival and recovery of slickspot peppergrass, including restoration techniques for sagebrush-steppe habitat and methods to reintroduce slickspot peppergrass into areas capable of supporting the species.
- Conduct annual coordination meetings between the Bureau and the Service to address new information; provide perspective regarding the relationship of new information to ongoing actions; use this information, as appropriate, to modify actions or conservation measures via the established adaptive management strategy; and consider whether this information may modify the analyses in this Opinion and/or the appropriateness of the Service's conclusions. Encourage NRCS participation in these annual coordination meetings to allow for information sharing on the status of the Paradigm Project as well as any other collaborative fuel break projects within the range of slickspot peppergrass.
- Consider establishing conservation reserves for slickspot peppergrass to maintain high quality sagebrush-steppe habitat and for use as research areas.
- Exercise section 7(a)(1) of the Act to maintain or enhance plant communities in a manner compatible with the needs of slickspot peppergrass and its critical habitat, which includes

maintaining a functional sagebrush-steppe ecosystem, minimizing ground disturbance in slickspot habitats, and providing native forb cover to maintain or enhance insect pollinator populations.

- Prioritize fire suppression to protect remaining large sagebrush stands within the range of slickspot peppergrass (applicable to the Bureau only).
- Avoid or minimize ground-disturbing activities within EOs when soils are saturated and/or when slickspot peppergrass is flowering (May-June).
- Avoid pesticide contact with slickspot peppergrass plants or insect pollinators near EOs.
- For upcoming Bureau permit renewals and reissuances and the Four Rivers Resource Management Plan effort, cooperate with the Service, the Idaho Department of Fish and Game, permit holders, and other parties to identify strategies for avoiding or minimizing adverse impacts to slickspot peppergrass (applicable to the Bureau only).
- Restore degraded native sagebrush steppe habitat (inclusive of the Paradigm Project area), as current ecological condition allows, to enhance conservation efforts for species native to this habitat type, such as slickspot peppergrass.
- Conduct annual reporting on fire suppression activities, monitoring results, and any revegetation planned or implemented on Bureau lands in relation to potential impacts to slickspot peppergrass and slickspot microsites as part of annual coordination meetings between the Bureau and the Service (applicable to the Bureau only).
- Consider use of conservation measures for slickspot peppergrass on Bureau lands that also complement conservation of the other sagebrush steppe habitat obligates, including greater sage-grouse (*Centrocercus urophasianus*), a candidate species, and pygmy rabbit (*Brachylagus idahoensis*), a species of concern (applicable to the Bureau only).

To remain informed about actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

2.10 Reinitiation Notice

This concludes formal consultation on slickspot peppergrass and its proposed critical habitat. Because the "take" prohibitions detailed under section 9(a)(1) of the Act do not apply to proposed/listed plants, requirements for reinitiation of formal conference/consultation associated with incidental "take" as described below are not applicable to proposed/listed plants, including slickspot peppergrass.

As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if:

1. The amount or extent of incidental take is exceeded.
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion.
3. The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion.
4. A new species is listed or critical habitat designated that may be affected by the action.

In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service considers a reduction in prostrate kochia movement monitoring and control activities from that described in the Bureau and NRCS Assessments as a substantial modification of the action that may affect slickspot peppergrass and its proposed critical habitat to an extent not considered in this Opinion (see Item 3 above). Therefore, reductions in the prostrate kochia movement monitoring and control activities should trigger reinitiation of formal consultation, if outside of a collaborative adaptive management approach as agreed to with the Service.

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3.3 Personal Communications

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4. APPENDICES

Appendix A. Herbicides Proposed for Use in the Paradigm Fuel Breaks Project EA+

Herbicide	Herbicide Characteristics*
2,4-D	Selective; foliar absorbed; post-emergent; annual/perennial broadleaf weeds
Chlorsulfuron	Selective; inhibits enzyme activity, broadleaf weeds and grasses
Clopyralid	Selective, mimics plant hormones; annual and perennial broadleaf weeds
Dicamba	Growth regulator; annual and perennial broadleaf weeds and grasses
Imazapic	Selective pre and post-emergent systemic; inhibits annual grasses and some perennial grasses and broadleaf forbs
Glyphosate	Non-selective systemic, annual and perennial grasses and broadleaf weeds, sedges, shrubs, and trees
Metsulfuron methyl	Selective; post-emergent; inhibits cell division in roots and shoots; annual and perennial broadleaf weeds, brush, and trees
Picloram	Selective; foliar and root absorption; mimics plant hormones; certain annual and perennial broadleaf weeds, vines, and shrubs
Triclopyr	Growth regulator; broadleaf weeds and woody plants

+As additional alternative herbicides are approved for use by the Bureau in the future, they may be used on Federal, State and private lands as part of the Paradigm Project following coordination and mutual agreement with the Service.

*Information compiled from PEIS (US BLM 2007).

Appendix B. Matrix of Diagnostics / Pathways and Indicators for Slickspot Peppergrass

(Criteria values are NOT absolute; they may be adjusted for local areas given supporting documentation.)

POTENTIAL EFFECTS PATHWAYS	INDICATORS	HIGH QUALITY	MODERATE QUALITY	LOW QUALITY	CITATION
A. Slickspot Conditions	A-1. Density of nonnative annual and/or nonnative perennial plants established within slickspots	Rare or absent <10 nonnative annual plants per square foot and/or 3 or fewer nonnative perennial plants established within slickspots, if using HII data; OR <5% cover of nonnative annual or perennial plants within the slickspot, if using HIP data	Sparse or common 10-25 nonnative annual plants per square foot and/or 3 or fewer nonnative perennial plants established within slickspots, if using HII data; OR 5 - 10 % cover of nonnative annual or perennial plants within the slickspot, if using HIP data	Abundant >25 nonnative annual plants per square foot and/or greater than 3 nonnative perennial plants established within slickspots, if using HII data; OR ≥10% cover of nonnative annual or perennial plants within the slickspot, if using HIP data	Billings 1990, Pyke 1994, West and Yorks 2002, Mancuso and Moseley 1998a, Mancuso 2002, Colket 2005
	A-2. Level of ground disturbance within slickspots	< 5% of the total area of slickspots exhibit evidence of ground disturbance.	5-10% of the total area of slickspots exhibit evidence of ground disturbance.	> 10% of the total area of slickspots exhibit evidence of ground disturbance.	Seronko in litt. 2004, Meyer et al 2004, Meyer et al 2006, Colket 2005, Herrick et. al. 2001, Belnap and Eldridge 2001, Young

POTENTIAL EFFECTS PATHWAYS	INDICATORS	HIGH QUALITY	MODERATE QUALITY	LOW QUALITY	CITATION
					1988, Fisher, et.al. 1996, Eckert et.al. 1986, Mancuso and Moseley 1998b (Must extract data from individual HII/HIP data sheets),
	A-3. Level of organic debris (litter or feces) and/or soil deposition and accumulation within slickspots	<10% of slickspot surface area exhibiting organic debris (litter or feces) and/or soil deposition and accumulation	10 to 30% of slickspot surface area exhibiting organic debris (litter or feces) and/or soil deposition and accumulation	Greater than 30% of slickspot surface area exhibiting organic debris (litter or feces) and/or soil deposition and accumulation	Rosentreter 1994, Pyke 1999, Herrick et. al. 2001, Mancuso and Moseley 1998
B. Habitat Characteristics within the Action Area Surrounding Occupied Slickspots	B-1. Level of ground disturbance within the action area	Soil surface in plant interspaces has visible signs of disturbance on <20% of the area.	Soil surface in plant interspaces has visible signs of disturbance on 20-50% of the area.	Soil surface in plant interspaces has visible signs of disturbance on greater than 50% of the area.	Colket 2005, Young 1988, Belnap et.al. 2001 (a), Young and Evans 1978, Mancuso and Moseley 1998

POTENTIAL EFFECTS PATHWAYS	INDICATORS	HIGH QUALITY	MODERATE QUALITY	LOW QUALITY	CITATION
	B-2. Condition of native vegetation within the action area - Level of habitat fragmentation	Sagebrush steppe habitat/shrubs with minimal fragmentation and/or modification. ≥75% of the project area contains shrub dominated vegetation types	Sagebrush steppe habitat/shrubs is moderately fragmented or somewhat modified 50 to 74% of the project area contains shrub dominated vegetation types.	Sagebrush steppe habitat/shrubs is highly fragmented or highly modified. ≤50% of the project area contains shrub dominated vegetation types	Colket 2005, Pyke 1994, Mancuso and Moseley 1998, Elzinga et.al. 1998, Baskin and Baskin 1978, MacArthur and Wilson, 1967
	B-3. Condition of native vegetation within the action area - presence of nonnative annuals and/or nonnative perennial plants	Nonnative annuals and/or nonnative perennials sparse or infrequent in the general area	Nonnative annuals and/or nonnative perennials with patchy distribution in the general area	Nonnative annuals and/or nonnative perennials wide-spread and abundant in the general area	Colket 2005, Pyke 1994, Mancuso and Moseley 1998, Harrison et. al. 2000
	B-4. Condition of native vegetation within the action area - % cover of biological soil crusts	Biological soil crust cover (if present in ecological site potential) are generally intact (> 20% cover).	Biological soil crust cover (if present in ecological site potential) are moderately fragmented (10 to 20% cover).	Biological soil crust cover (if present in ecological site potential) are highly fragmented and/or present primarily under shrub canopies (<10% cover).	Colket 2005, Belnap et.al. 2001, Memmott et. al. 1998, Kaltenecker et.al. 1999, Habich 2001

POTENTIAL EFFECTS PATHWAYS	INDICATORS	HIGH QUALITY	MODERATE QUALITY	LOW QUALITY	CITATION
	B-5. Condition of native vegetation within the action area - % cover of native forbs	Native forb cover greater than or equal to 4%	Native forb cover 1.5 – 3.9%	Less than 1.5% native forb cover	Meyer et al. 2004, Robertson and Klemash 2003, Robertson and Ulappa 2004, Aguilar et al. 2006, Shepherd et al 2003

Appendix C. Bureau and NRCS Effects Determination Checklist for Slickspot Peppergrass and its Proposed Critical Habitat

SLICKSPOT PEPPERGRASS PHYSIOGRAPHIC REGION NAME: Snake River Plain

NAME OF PROJECT BEING EVALUATED: Paradigm Fuel Break Project

PROJECT STATUS: Proposed Action (implementation of fuel break network in project area)

Element Occurrence Number(s):

EOs that are intersected by or within 1.5 miles of the fuel break treatment footprint: 8, 10, 15, 20, 21, 26, 29, 30, 31, 51, 54, 60, 51, 62, 63, 106, 112, 113, 115, 116, 117, new EO in T4S, R7E, Section 11, and new EO in T4S, R7E, Section 15.

HIP Transect Number(s):

Environmental baseline condition is based on eight years of HIP data from the following 17 HIP transects associated with EOs within the project boundary (these HIP transect data are not currently available for 2012, 2013 or 2014):

008A-B (EO 8)
010 (EO 10)
015 (EO 15)
020B (EO 20)
026 (EO 026)
029 (EO 29)
030B (EO 030)
031 (EO 31)
051 A&B (EO 51)
054 (EO 054)
058 (EO 026)
060 (EO 60)
061 (EO 61)
062 (EO 062)
063 (EO 63)

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
A. Slickspot Conditions	A-1. Density of nonnative annual and/or nonnative perennial plants established within slickspots	The average unseeded non-native plant cover within slickspots across all HIP transects within the project area and all years has fluctuated since 2004. The highest average across all transects was recorded in 2011 at 17.76%. The highest average across all years (36.64%) and maximum value of cover (59.8% in 2011) is found in HIP 010 in EO 10, which is outside the project area but is 1.1 miles from the edge of a proposed prostrate kochia fuel break. Six of the HIP transects had an average cover across all year of unseeded non-natives greater than 10%. From 2004 to 2011 the unseeded nonnative canopy cover within slickspots increased by greater than 5% at 13 of the 16 HIP transects within the proposed project area (Kinter et al. 2012). The average increase over all transects was over 500%, with 12 of the HIP transects having a greater than 70% increase. The average seeded non-native plant cover within slickspots across all HIP transects within the project area and all years was 0.04%. The highest average cover was within HIP transect 61 at 0.37%, less than half a percent of crested wheatgrass. Ten of the seventeen HIP transects had zero seeded non-native plant cover across all years.	L	The proposed action could decrease invasive annual plants such as cheatgrass and clasping pepperweed within slickspots by decreasing non-native unseeded plant biomass and seed sources in the areas surrounding slickspots within EOs, occupied, and slickspot peppergrass habitat by establishing fuel breaks that meet the desired characteristics of effective fuel breaks discussed in the Description of the Proposed Action and Methods sections. Prostrate kochia would not be planted within 1.5 miles of extant EOs, except where previously indicated, so an increase in this seeded non-native perennial in slickspots within extant EOs is unlikely. Monitoring and Control protocols would further decrease the likelihood of prostrate kochia establishing in EOs or within Occupied Habitat. The greatest maximum spread distance reliably measured for prostrate kochia is less than 400 meters (<0.25 miles) (Waldron et al. 2001). Native species listed in Methods would be seeded within the 1.5 mile buffer and within EOs if such a seeding would result in a fuel break that fits the fuel break criteria. These species are not currently known to compete with slickspot peppergrass or to establish widely within slickspots, though all native species listed in Methods have been observed to occur sporadically within slickspots that have sustained physical damage from livestock, wildlife, and/or past drill seedings (Amy	D	↓

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
				Stillman, personal observation). Prostrate kochia would be planted in slickspot peppergrass habitat in all areas that are outside of the 1.5 mile buffer surrounding extant EOs. Prostrate kochia would likely become established in slickspots within prostrate kochia seedings. Slickspots within prostrate kochia seedings could be lost for future reintroduction of slickspot peppergrass due to competition for water and nutrients. It is unknown at this time if slickspots can be planted or seeded with slickspot peppergrass to allow re-introduction of this plant. If this becomes a possibility in the future then it may also be possible to control kochia within the area using herbicides to make these slickspots available for slickspot peppergrass reintroduction. Monitoring and Control protocols would be implemented along all fuel break routes. While it is acknowledged that prostrate kochia could impact habitat for slickspot peppergrass, the Bureau strongly believes that based on current fire trends and loss of sagebrush steppe plant communities in the area, the use of prostrate kochia is warranted and would result in the large-scale benefits of reduced fire activity and increased suppression opportunity, with low risk to slickspot peppergrass and its habitat (US BLM 2012) through Monitoring and Control protocols.		
	A-2. Level of ground disturbance within	Average livestock print cover within slickspots across all HIP transects across all years is	M	Design features to protect slickspots within EOs and occupied habitat would minimize the	D	↓

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
	slickspots	2.65% ranging from 0 at many transects over many years to 22.3% at HIP transect 060 in 2007. Transect 60 is the only area that has an average across all years greater than 5%. Only two slickspot peppergrass plants have been documented in HIP transect 060 since 2004.		potential for ground disturbance from most fuel break implementation methods; if slickspots are disked they could be permanently lost or changed to the point where they are no longer hospitable habitat for slickspot peppergrass. Slickspots within prostrate kochia seedings in slickspot peppergrass habitat would likely be colonized by prostrate kochia depending on the condition of the slickspots. Slickspots with an intact clay soil surface may be unsuitable or less suitable to prostrate kochia seed germination. Prostrate kochia may also have trouble establishing within intact slickspots since it is not tolerant of flooding or soil with a water table (USU 2014). Slickspots with pre-existing damage to the surface clay layer, due to livestock, wildlife, or past drill seeding would provide a more suitable environment in which prostrate kochia seed could germinate and establish. Prostrate kochia would be broadcast seeded and imprinted into slickspot peppergrass habitat therefore ground disturbance due to seeding to slickspot clay soil layers would be minimal. It is unknown at this time if slickspots can be planted or seeded with slickspot peppergrass to allow re-introduction of this plant. If this becomes a possibility in the future then it may be possible to control kochia within the area using herbicides to make these slickspots available for slickspot peppergrass reintroduction. While caution would be taken to avoid all		

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
				driving, walking, and/or physically disturbing slickspots in any way, a minor possibility of unintended disturbance still exists.		
A. Slickspot Conditions (continued)	A-3. Level of organic debris and/or soil deposition and accumulation within slickspots	The level of livestock feces cover within slickspots ranges from 0 in many HIP transects across many years to 6.7% at HIP transect 060 in 2008. The average feces cover across all years and all HIP transects is 0.39%.	H	The proposed action could result in increased livestock feces within slickspots in areas with sagebrush cover if access to slickspots becomes easier through thinning or removal of sagebrush. Plant litter accumulations would decrease within slickspots as non-native invasive annual plant biomass decreases and the seed sources for these plants decreases. Both increased soil deposition into, and soil erosion out of slickspots has been observed immediately following disturbances such as wildfire and post-fire seeding (Amy Stillman personal observation, South Trail Fire 2010). Therefore it is likely that either effect could occur following disking, seeding, and/or prescribed burning. After seedings become established, soil deposition and/or erosion would be reduced. If native plants are seeded within EOs or occupied habitat then litter could increase in slickspots if the native plants become established within slickspots. If prostrate kochia plants become established within slickspots in slickspot peppergrass habitat soil deposition could increase if soil collects around plant stems. Plant litter accumulations within prostrate kochia seedings would decrease within slickspots as non-native invasive annual plant biomass decreases and the seed sources for these plants decreases. Gray and Muir (2013) found prostrate kochia to be "negatively associated with litter."	M	⟷

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
B. Habitat Characteristics within the Action Area Surrounding Occupied Slickspots	B-1. Level of ground disturbance within the action area	At each HIP transect, a five minute walk-around of the 5th slickspot is conducted to gather information regarding the General Occurrence Area (GOA). Data collected to reflect ground disturbance includes: penetrating livestock prints within slickspots that are outside of the HIP transect slickspots, livestock trails, OHV disturbance, fire related disturbance, restoration or post-fire rehabilitation disturbance (see Appendix B in Kinter et al. 2012). Transect 029 has had no ground disturbance in the GOA since 2004. Transects 015, 051A, and 051B have had negligible ground disturbance during this time frame. All other transects have had at least one ground disturbing event in the GOA. The most common source of disturbance was penetrating livestock prints in at least one slickspot ("M1" and "M1>10%" in table below) followed by livestock trails ("Trails"). Fire, OHV, and restoration ground disturbance was less common. Seven of the sixteen HIP transects in the project area had multiple disturbances in a given year and/or some type of disturbance every year; HIP 008B, 026, 030B, 031, 060, 061 and 063.	M	Disking would result in major permanent ground disturbance within the action area surrounding occupied slickspots (i.e. occupied habitat). Disking is unlikely to occur within occupied habitat although it had been suggested as a possible fuel break treatment alternative in this habitat type. Drill seeding native species into occupied habitat using moderate soil disturbing techniques as described in Methods could result in some minor ground disturbance. Mowing could cause negligible ground disturbance due to vehicles tracks. Drill seeding and mowing would not take place in occupied habitat when soils are saturated. On-going livestock activity could increase in the areas surrounding occupied slickspots where sagebrush is thinned or mowed and in areas that are seeded, though livestock would be fenced out of seeded areas until seedings become established.	D	↓
	B-2. Condition of native vegetation within the action area - Level of habitat fragmentation	Multiple fires have resulted in a decrease in Wyoming big sagebrush/native bunchgrass habitat within the action area. Since 1980 there have been over 600 fires documented within the action area, with many locations burning multiple times. These fires have resulted in roughly 20-30% of the action area being dominated by exotic invasive annuals, leaving the native habitat highly fragmented. During	L	Mowing, mechanical thinning, prescribed fire, and fuel break seeding could further reduce sagebrush cover around occupied slickspots within the action area thus increasing habitat fragmentation. All attempts would be made to maintain sagebrush cover in areas surrounding and within extant slickspot peppergrass EOs and occupied habitat. However, if the benefits of fuel breaks resulting from the removal of	D	↓

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑⟷↓
		BLM surveys of slickspot peppergrass habitat types, data collected at each slickspot or group of slickspots indicate roughly 37% of the area being dominated by shrubs. Native grass dominates roughly 7% of the area according to slickspot data. The majority of the understory within the shrub-dominated area consists of cheatgrass and/or bur buttercup. Native shrub cover from vegetation frame data at the 16 HIP transects within the project area averaged 16.16% in 2009, average native forb cover was 1.37%, and average native grass cover was 2.82% (Kinter et al. 2010). Line intercept data from 2009 at the 16 HIP transects show an average across all transects of 23.6% shrub cover. The majority of the shrub cover is from Wyoming big sagebrush with minor contributions from gray rabbitbrush and green rabbitbrush. Transect 008a had the highest shrub cover at 52.2% and 015 had the lowest at 0% (Kinter et al. 2010). Shrub cover has likely decreased since 2009 due to wildfires in HIP transects 010, 030B, 031, 051A, 051B, 058 and 062 though specific shrub cover data is not currently available.		sagebrush are deemed to outweigh the risks to slickspot peppergrass then some sagebrush cover could be lost. The potential loss of sagebrush habitat to wildfire would be much greater than the removal or mowing of sagebrush for fuel breaks to decrease fire size and frequency. Native grass cover could increase if seeded into fuel breaks in occupied habitat. Native grasses and forbs could also increase as a result of release and decreased competition from invasive annuals due to herbicides and prescribed fire. The areas along proposed fuel break routes are currently fragmented as these routes are along existing roads and/or rail lines. However, long term benefits of reduced fire could decrease habitat fragmentation especially after fire the time between fires increases allowing for restoration efforts to be conducted to establish perennial grass, forb, and shrub communities.		
	B-3. Condition of native vegetation within the action area - presence of nonnative annuals and/or nonnative perennial plants	Line intercept data from HIP transects indicate that over half of the GOAs within the action area are dominated by non-native annual grasses with little to no native bunchgrass cover (denoted by "F" and "G" in table below). Where native bunchgrasses are common or dominant, Sandberg bluegrass is the most common species present. During BLM surveys of slickspot peppergrass habitat types data	L	In the short-term, invasive non-native annuals and noxious weeds could increase as a result of failed seedings. However, seedings would be monitored and evaluated for success and re-seeded if necessary, and noxious weeds would be chemically treated. If seedings are deemed a failure then the seeding area would be seeded with a mix of native grasses, forbs, and shrubs. Targeted grazing outside of EOs	M	⟷

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
		recorded at individual slickspots or groups of slickspots indicate that 27% of the action area is dominated by non-native invasive species such as cheatgrass, clasping pepperweed, tall tumblemustard, rattail fescue, medusahead, and bur buttercup. According to these data approximately 4% of the action area is dominated by seeded non-native species such as crested wheatgrass and prostrate kochia. Data from HIP monitoring shows that non-native cover, including seeded species cover, averaged 21.5% at the 15 vegetation transects within the proposed project area (Kinter et al. 2010). Based on line intercept data over all years and over all 16 transects, at least 44% of the GOAs had greater than 10% cover of non-native forbs species (denoted by C in table below). In roughly one third of the GOAs, non-native forb cover has been greater than 25% (denoted by D in table below). Major non-native forb species present in these 16 transects included clasping pepperweed, tall tumblemustard and bur buttercup.		but within the occupied habitat buffer could lead to the spread and periodic, high intensity of invasive annuals and noxious weeds through both physical transport and soil disturbance. Prostrate kochia would not be seeded in areas surrounding occupied slickspots except as noted previously. Where prostrate kochia is seeded within the 1.5 mile buffer surrounding extant EOs, Monitoring and Control protocols would be implemented. The use of herbicides and/or prescribed fire to prepare areas for a seeded fuel break would decrease invasive non-native annual biomass and seed sources, and could result in the release and increase of native forb and other perennial species cover in the areas surrounding occupied slickspots over time. This would be a long term benefit the species by improving pollinator habitat.		
	B-4. Condition of native vegetation within the action area - percent cover of biological soil crusts	Biological crust cover in the general area surrounding slickspots, based on vegetation transect data averaged 25.5% across all years and all transects, ranging from 0.27% in 2009 at HIP transect 060 to 64.3% in 2006 at HIP transect 061. Yearly vegetation transect data was not recorded following 2009, instead, vegetation transect data will now be collected every five years.	M	Crusts within the action area surrounding occupied slickspots would likely be subjected to damage due to the proposed action. Disking, mowing, seeding, and targeted grazing could result in mechanical damage to crusts. Design features that limit soil disturbing activities to times when soils are wet or frozen would help alleviate most damage. Targeted grazing would likely occur when soils are dry and biological crusts are most susceptible to	D	↓

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
				damage and less able to repair themselves (Belnap and Eldridge 2001). The direct short and long-term effect of herbicide application to existing biological soil crusts is largely unknown (Belnap et al. 2001). Limited experiments have shown that crustal species are differentially affected depending on the compound used and the species tested. Herbicide exposure could decrease and/or alter species composition of crusts (Metting 1981). Prescribed fire could damage or kill biological soil crust, although prescribed burning would likely take place during winter and early spring months when biological soil crusts are dormant. If the ground is frozen during prescribed burning, crust could survive with minimal damage. If prostrate kochia is planted within 1.5 miles of an EO crust cover could increase as Gray and Muir (2013) found prostrate kochia "abundance to be positively associated with biological crust cover."		

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
	B-5. Condition of native vegetation within the action area - percent cover of native forbs	Native perennial diversity and abundance data were collected during BLM surveys of slickspot peppergrass habitat types within the action area. These data were collected for each legal section surveyed. Roughly 127,000 acres of habitat have been surveyed thus far within the project area. The number of native perennial forbs varied from 0 to 10 with an average of roughly 3 species per square mile section. Abundance of these native perennial forbs ranged from very low to moderate with 99% of the abundance ratings being low, very low, or none. It can be inferred from these data that very little native forb cover is present within the project area. In the slickspot survey data, common hareleaf, a native annual, was the only native forb observed as being among the dominant species in the area surrounding individual slickspots or groups of slickspots. Across all HIP transects in 2004, 2005 and 2009 mean canopy cover of all native forbs was 2.07%, ranging from 0 to 6.3%. The two notable transects that had "high" percent cover in 2009 were 015 and 054; the dominant forb species for both of these transects was the same annual observed during potential habitat surveys, common hareleaf. No perennial forbs were noted in 2006 or 2008 HIP monitoring photos.	L	The current condition of native forbs within the action area surrounding occupied slickspots is low. Native seeds within the seed bank that are currently under a dense sagebrush canopy or a heavy mat of non-native invasive annual grasses such as cheatgrass or medusahead may germinate due to the removal of biomass from fuels reduction activities. Seeds could also move into the area from offsite. Pollinator habitat would improve with the removal of non-native annual invasive plants and subsequent release of native forbs. Additionally, planting forbs species such as alfalfa would provide forbs for pollinators in treated areas.	M	⟷

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
C. Slickspot Peppergrass Subpopulation Characteristics within the Action Area	C-1. Subpopulation size and resiliency as described by EO rank	EO / Ranking / Viability / Rank Date 8 / B / Good / 2005 10 / D / Poor / 2005 15 / D / Poor / 2005 20 / C / Fair / 2005 26 / B / Good / 2005 29 / C / Fair / 1998 30 / B / Good / 1998 51 / BD / Good-Poor / 2005 54 / F / Failed to Find / 2005 60 / D / Poor / 2005 61 / C / Fair / 2005 62 / C / Fair / 2010 63 / D / Poor / 2006 The current condition of many of the EOs within the project area is not accurately reflected in the EO rankings as the majority of these rankings are not up-to-date; most having not been updated for between 9 to 16 years. All of the EOs listed here have burned at least once since 1957; some have burned multiple times.	M	The short-term potential effects of the action include localized slickspot, plant and seed degradation, increased soil deposition into slickspots, decreased pollinator habitat quality, and increased invasive annuals until seedings become established. The long-term potential positive effects include increased protection from wildfire (one of the two biggest threats to slickspot peppergrass and its habitat (USFWS 2009)), decreased annual invasive species in all LEPA habitat categories (the other biggest threat to slickspot peppergrass (USFWS 2009)), increased protection for existing big sagebrush habitat within the project area, increased protection of pollinator habitat, increased perennial forb cover through decrease in annual invasive species and decreased fire cycle. Long-term negative effects include increased habitat fragmentation, decreased shrub cover within the treatment footprint, prostrate kochia spread (though this would be mitigated through the Monitoring and Control protocols, and loss of uninhabited slickspots due to disking.	M	⟷

POTENTIAL EFFECTS PATHWAYS:	INDICATORS	BASELINE INDICATOR CONDITIONS		EFFECT OF THE ACTION ON INDICATOR CONDITION		
		Current Condition Description	Current Quality Ranking (H, M, L)[1]	Description of Potential Effects of the Action on the Baseline within the Action Area	Restore, Maintain or Degrade Habitat	Expected Modification of Baseline ↑ ⟷ ↓
SUMMARY		**Summary of Overall Status of Baseline within the Action Area**		**Summary of Potential Effects of the Action on the Baseline within the Action Area**		
		Shrub cover is patchy and is decreasing every year due to wildfire, invasive annual grass and forb cover is increasing in recently burned areas and in the understory of established sagebrush and other shrub communities, both annual and perennial forbs are greatly lacking with a diminutive annual being the most prevalent forb. Minor to extreme slickspot trampling within slickspots has occurred leaving the slickspots vulnerable to occupation by non-native annuals. Slickspots are being increasingly invaded by invasive annual grasses and forbs. As these invasive species increase within slickspots, organic matter will also increase within slickspots. Average crust cover is decreasing due to invasive annual grasses and forbs, wildfire and livestock grazing.	M - L	Over the short-term, this project may adversely affect slickspot peppergrass and its habitat by temporarily altering slickspots in some locations. However, over the long-term and by employing all Design Features, this project could improve slickspot peppergrass habitat by decreasing invasive annuals in the immediate and surrounding area, increase the quality of pollinator habitat and forage, and decrease the potential for habitat damage and species loss due to wildfires.	D	↓

[1] Described in Appendix B (L = low quality, M = moderate quality, H = high quality).

Effects Determination Matrix for Slickspot Peppergrass Proposed Critical Habitat

PCE[1]	Corresponding Pathway Indicators	Quality Ranking of PCE (H,M,L)	Description of potential effects of the action on the baseline within the action area	Restore, Maintain, or Degrade Habitat	Expected modification of baseline
1	A-1, A-2, and A3	M	Fuel break implementation within PCH has the potential to impact the function of slickspots primarily through; 1) mechanical damage to slickspots, 2) potential damage to long term seed availability, 3) damage to soil crusts, both in the slickspots and the surrounding area, 4) spread and continued persistence of invasive annuals and noxious weeds through both physical transport and soil disturbance. Design features would help to alleviate potential negative impacts as follows: • Within slickspot peppergrass Element Occurrences (EOs) and Occupied Habitat (and therefore in PCH), fuel break design and layout would be coordinated with FWS. • Within EOs (and therefore in PCH), slickspots would be flagged for avoidance. • Fuel break implementation within EOs or in Occupied Habitat (and therefore in CH) would be overseen by a Bureau botanist or qualified botany technician to ensure avoidance is maximized and impacts are minimized. • Seeding in PCH would occur via minimum disturbance seeding techniques and use species described in Methods. • Prostrate kochia would not be seeded in PCH or within 1.5 miles of extant EOs with some exceptions as discussed in Rationale for Proposed Kochia Fuel Breaks within 1.5 mile Buffer. • Prostrate kochia seedings would be monitored and control protocols implemented to discourage spread into PCH. • Ground disturbing treatments within PCH would not take place when soils are saturated. • Targeted grazing would not occur within PCH. • Herbicide application in preparation for seeding could decrease non-native invasive biomass and seed sources surrounding PCH. The implementation of the proposed fuel breaks would aid in the maintenance or improvement of slickspots within PCH in the long term as fire recurrence is reduced and existing slickspots are protected from design features.	M	
2	B-1, B-2, B-3, B-4, and B5	L	Mowing, mechanical thinning, and prescribed fire could further reduce sagebrush cover in PCH within the action area in the short and long term. Sagebrush in PCH would be mowed or thinned on a site-specific basis with direction from BLM and FWS botanists if it is determined that the loss of sagebrush cover would result in the long-term benefits of reducing wildfire starts, size and intensity, which may allow for long-term increase in the extent of sagebrush cover across the landscape. Fuel breaks would aid in the protection of PCH from wildfire over the long term but would also result in increasing fragmentation in existing	D	

Effects Determination Matrix for Slickspot Peppergrass Proposed Critical Habitat

PCE[1]	Corresponding Pathway Indicators	Quality Ranking of PCE (H,M,L)	Description of potential effects of the action on the baseline within the action area	Restore, Maintain, or Degrade Habitat	Expected modification of baseline
			sagebrush stands. Fuel breaks would be placed along existing routes thus increasing fragmentation that is already present. Thinning could be employed in PCH as a way of reducing fuels; this would likely have a beneficial effect on pollinator forage as native forbs are released or seeds move into the area from off-site.		
3	B-3, B-5	L	Loss of pollinator habitat could result from any of the proposed treatment methods in the short term. Herbicide could decrease the abundance of already lacking native forbs in the areas surrounding occupied habitats. However, dormant native forb seeds within the seed bank that are currently under a dense sagebrush canopy, or a heavy mat of non-native invasive annual grasses such as cheatgrass or medusahead could be released for germination following mowing or thinning of dense sagebrush stands as more light, water and nutrients become available in the understory. Opening up the canopy could also allow seeds from offsite a place to germinate and establish. While not a native, alfalfa planted in treated areas would provide a food source for pollinators thus reducing pollinator habitat fragmentation. Understories of many dense sagebrush stands in PCH are currently dominated by cheatgrass, annual *Vulpia* species and/or bur buttercup. Across the action area, implementation of the proposal is likely to maintain or improve pollinator habitat in the long term.	M	⟷
4	B-1, B2, B3, and B-5	L	Treatments that lead to a loss of native forbs and shrubs may lead to a loss of both diversity and numbers of insect pollinators. Herbicide would decrease the amount of non-native biomass and seed sources in PCH, increase native forbs and release native seed for germination thus improving habitat and forage for pollinators.	M	⟷

Appendix D. Primary Constituent Element (PCE) Crosswalk

PCE	PCE Description	Corresponding Pathway Indicator
1	Ecologically functional microsites or "slickspots" that are characterized by: (a) a high sodium and clay content and a three-layer soil horizonation and (b) sparse vegetation with low to moderate introduced plant species cover	A-1. Density of nonnative annual and/or nonnative perennial plants established within slickspots A-2. Level of ground disturbance within slickspots A-3. Level of organic debris (litter or feces) and/or soil deposition and accumulation within slickspots
2	Relatively intact native Wyoming big sagebrush vegetation assemblages within 820 feet (250 meters) of slickspots	B-1. Level of ground disturbance within the action area B-2. Condition of native vegetation within the action area - level of habitat fragmentation B-3. Condition of native vegetation within the action area - presence of nonnative annuals and/or nonnative perennial plants B-4. Condition of native vegetation within the action area - percent cover of biological soil crusts B-5. Condition of native vegetation within the action area - percent cover of native forbs
3	A diversity of native plants for insect pollinator habitat requirements	B-3 and B-5
4	Sufficient pollinators for successful fruit and seed production	B-1, B-2, B-3, and B-5

Appendix E. NRCS CPA 52 and Endangered and Threatened Species Evaluation Procedure Guide Sheet

U.S. Department of Agriculture — NRCS-CPA-52
Natural Resources Conservation Service — 4/2013

ENVIRONMENTAL EVALUATION WORKSHEET

A. Client Name:

B. Conservation Plan ID # (as applicable):
Program Authority (optional):

D. Client's Objective(s) (purpose):

C. Identification # (farm, tract, field #, etc. as required):

E. Need for Action:

H. Alternatives

No Action	√ if RMS ☐	Alternative 1	√ if RMS ☐	Alternative 2	√ if RMS ☐

Resource Concerns

In Section "F" below, analyze, record, and address concerns identified through the Resources Inventory process. (See FOTG Section III - Resource Planning Criteria for guidance).

F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	I. Effects of Alternatives — No Action: Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC	Alternative 1: Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC	Alternative 2: Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC
SOIL: *EROSION*						
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
SOIL: *SOIL QUALITY DEGRADATION*						
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
WATER: *EXCESS / INSUFFICIENT WATER*						
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
WATER: *WATER QUALITY DEGRADATION*						
Excessive sediment in surface waters		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC

F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	L. (continued)					
	No Action		Alternative 1		Alternative 2	
	Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC	Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC	Amount, Status, Description (Document both short and long term impacts)	√ if does NOT meet PC
AIR: *AIR QUALITY IMPACTS*						
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
PLANTS: *DEGRADED PLANT CONDITION*						
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
ANIMALS: *INADEQUATE HABITAT FOR FISH AND WILDLIFE*						
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
ANIMALS: *LIVESTOCK PRODUCTION LIMITATION*						
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
ENERGY: *INEFFICIENT ENERGY USE*						
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
		☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
HUMAN: *ECONOMIC AND SOCIAL CONSIDERATIONS*						

Special Environmental Concerns: Environmental Laws, Executive Orders, policies, etc.						
In Section "G" complete and attach Environmental Procedures Guide Sheets for documentation as applicable. Items with a "•" may require a federal permit or consultation/coordination between the lead agency and another government agency. In these cases, effects may need to be determined in consultation with another agency. Planning and practice implementation may proceed for practices not involved in consultation.						
G. Special Environmental Concerns (Document existing/ benchmark conditions)	J. Impacts to Special Environmental Concerns					
	No Action		Alternative 1		Alternative 2	
	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action
•Clean Air Act *Guide Sheet FS1 FS-2*		☐		☐		☐
•Clean Water Act / Waters of the U.S. *Guide Sheet Fact Sheet*		☐		☐		☐
•Coastal Zone Management *Guide Sheet Fact Sheet*		☐		☐		☐
Coral Reefs *Guide Sheet Fact Sheet*		☐		☐		☐
•Cultural Resources / Historic Properties *Guide Sheet Fact Sheet*		☐		☐		☐
•Endangered and Threatened Species *Guide Sheet Fact Sheet*		☐		☐		☐
Environmental Justice *Guide Sheet Fact Sheet*		☐		☐		☐
•Essential Fish Habitat *Guide Sheet Fact Sheet*		☐		☐		☐
Floodplain Management *Guide Sheet Fact Sheet*		☐		☐		☐
Invasive Species *Guide Sheet Fact Sheet*		☐		☐		☐
•Migratory Birds/Bald and Golden Eagle Protection Act *Guide Sheet Fact Sheet*		☐		☐		☐
Natural Areas *Guide Sheet Fact Sheet*		☐		☐		☐
Prime and Unique Farmlands *Guide Sheet Fact Sheet*		☐		☐		☐
Riparian Area *Guide Sheet Fact Sheet*		☐		☐		☐
Scenic Beauty *Guide Sheet Fact Sheet*		☐		☐		☐

•Wetlands *Guide Sheet* *Fact Sheet*	☐	☐	☐
•Wild and Scenic Rivers *Guide Sheet* *Fact Sheet*	☐	☐	☐

K. Other Agencies and Broad Public Concerns	No Action	Alternative 1	Alternative 2
Easements, Permissions, Public Review, or Permits Required and Agencies Consulted.			
Cumulative Effects Narrative (Describe the cumulative impacts considered, including past, present and known future actions regardless of who performed the actions)			
L. Mitigation (Record actions to avoid, minimize, and compensate)			
M. Preferred Alternative — Preferred alternative	☐	☐	☐
M. Preferred Alternative — Supporting reason			

N. Context (Record context of alternatives analysis)

The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.

O. Determination of Significance or Extraordinary Circumstances

Intensity: Refers to the severity of impact. Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

If you answer ANY of the below questions "yes" then contact the State Environmental Liaison as there may be extraordinary circumstances and significance issues to consider and a site specific NEPA analysis may be required.

Yes	No	
☐	☐	• Is the preferred alternative expected to cause significant effects on public health or safety?
☐	☐	• Is the preferred alternative expected to significantly affect unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?
☐	☐	• Are the effects of the preferred alternative on the quality of the human environment likely to be highly controversial?
☐	☐	• Does the preferred alternative have highly uncertain effects or involve unique or unknown risks on the human environment?
☐	☐	• Does the preferred alternative establish a precedent for future actions with significant impacts or represent a decision in principle about a future consideration?
☐	☐	• Is the preferred alternative known or reasonably expected to have potentially significant environment impacts to the quality of the human environment either individually or cumulatively over time?
☐	☐	• Will the preferred alternative likely have a significant adverse effect on ANY of the special environmental concerns? Use the Evaluation Procedure Guide Sheets to assist in this determination. This includes, but is not limited to, concerns such as cultural or historical resources, endangered and threatened species, environmental justice, wetlands, floodplains, coastal zones, coral reefs, essential fish habitat, wild and scenic rivers, clean air, riparian areas, natural areas, and invasive species.
☐	☐	• Will the preferred alternative threaten a violation of Federal, State, or local law or requirements for the protection of the environment?

P. To the best of my knowledge, the data shown on this form is accurate and complete:

In the case where a non-NRCS person (e.g. a TSP) assists with planning they are to sign the first signature block and then NRCS is to sign the second block to verify the information's accuracy.

Signature (TSP if applicable)	Title	Date
Signature (NRCS)	Title	Date

If preferred alternative is not a federal action where NRCS has control or responsibility and this NRCS-CPA-52 is shared with someone other than the client then indicate to whom this is being provided.

NRCS-CPA-52, April 2013

Federally listed endangered or threatened species/habitats (continued)

STEP 2.

Is NRCS providing financial assistance or otherwise controlling the action(s)?

☐ No	**If "No," and the effects are purely benign or beneficial, continue with planning but ensure the client is aware endangered and threatened species or their habitat exists and conservation practices must be applied in a manner that avoids adverse effects. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used and proceed with planning.**
☐ No	**If "No," and there is a possibility of short-term or long-term adverse effects then inform the client of NRCS's policy concerning endangered and threatened species and the need to use alternative conservation treatments to avoid adverse effects on these species or their habitat. Further, NRCS assistance will be provided only if one of the conservation alternatives is selected that avoids adverse effects or the client obtains a "take" permit from the FWS/NMFS. Refer the client to FWS/NMFS to address the client's responsibilities under Sections 9 & 10 of the ESA, for Federally listed species. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used. If assistance is continued, document how the alternative conservation treatments avoid adverse effects and proceed with planning.**
☐ Yes	**If "Yes," and the action will be implemented according to an existing informal consultation, biological opinion, or 4(d) special rule, document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used and proceed with planning.**
☑ Yes	**If "Yes," and the action cannot be modified to avoid the effect, inform client that in order to proceed with the action NRCS must consult with FWS/NMFS. Contact your area or State biologist for consultation procedures. The action can only be implemented according to the terms of the consultation. When consultation is complete, attach the consultation documents to NRCS-CPA-52 or reference them in the notes section below and proceed with planning.**

Notes for Federally listed endangered or threatened species/habitats:

SECTION 2: Federally proposed species/habitats

STEP 1.

What is the effect (i.e. beneficial/adverse, short-term/long-term, etc.) of the action(s) on proposed species or their habitat?

☐ No effect — If "No effect," additional evaluation is not needed concerning proposed species or proposed critical habitat. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used and proceed with planning.

☑ May effect — If "May affect," meaning that the action might affect endangered and threatened species or proposed critical habitat in any way, go to Step 2.

STEP 2.

Is NRCS providing financial assistance or otherwise controlling the action?

☐ No — If "No," and the effects are purely benign or beneficial, continue with planning but ensure the client is aware proposed species or their habitat exists and conservation practices must be applied in a manner as to avoid adverse effects. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used and proceed with planning.

☐ No — If "No," and there is a possibility of short-term or long-term adverse effects then inform the client of NRCS's policy concerning proposed species and the need to use alternative conservation treatments to avoid adverse effects on these species or their habitat. Further, NRCS assistance will be provided only if one of the conservation alternatives is selected that avoids adverse effects, and to the extent practicable, provide long-term benefits to species and habitat. Should the client or landowner refuse to apply the recommended alternative conservation treatment, NRCS will inform the client and landowner of the NRCS policy and shall not provide assistance for the action or portion of the action affecting the proposed species.

☑ Yes — If "Yes," and the action will be implemented according to an existing conference report or conference opinion. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used and proceed with planning.

☐ Yes — If "Yes," and the action cannot be modified to avoid the effect, inform client that the NRCS must conference with FWS/NMFS. Contact your area or State biologist for conference procedures. Further NRCS assistance can only be provided only if the client agrees to implement the conference recommendations to the extent practicable. When the conference is complete, attach the conference documents to NRCS-CPA-52, or reference them in the notes section below, and proceed with planning.

Notes for Federally proposed species/habitats:

Lepidium papilliferum (Slickspot Peppergrass) and proposed critical habitat

SECTION 3: Federal candidate species/habitats

STEP 1.

What is the effect (i.e. beneficial/adverse, short-term/long-term, etc.) of the action(s) on candidate species or their habitat?

☐ No adverse effect	**If "No adverse effect," additional evaluation is not needed concerning proposed species or proposed critical habitat. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used and proceed with planning.**
☑ May adversely effect	**If "May adversely affect," recommend alternative treatments that avoid or minimize the adverse effects and, to the extent practicable, provide long-term benefit to the species. Document the effects of the selected alternative on the NRCS-CPA-52 and proceed with planning.**

Notes for Federally proposed species/habitats:

Centrocerus urophansianus, Greater sage-grouse Conservation measures associated with planned practices as identified in the 2010 Conference Report will be implemented to mitigate any potential adverse effects.

SECTION 4: State/Tribal species/habitats

STEP 1.

What is the effect (i.e. beneficial/adverse, short-term/long-term, etc.) of the proposed action or alternative on State/Tribal species or their habitat?

☑ No adverse effect	**If "No adverse effect," additional evaluation is not needed concerning State or Tribal species of concern. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used and proceed with planning.**
☐ May adversely affect	**If "May adversely affect," go to Step 2.**

STEP 2.

Is NRCS providing financial assistance or otherwise controlling the action?

☐ No	**If "No," and there is a possibility of short-term or long-term adverse effects then inform the client of NRCS's policy concerning State and Tribal species and the need to use alternative conservation treatments to avoid or minimize adverse effects on these species or their habitat. Further, NRCS assistance will be provided only if one of the conservation alternatives is selected that avoids or minimizes adverse effects to the extent practicable. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used. If assistance is continued, document how the alternative conservation treatments avoid or minimize those adverse effects and proceed with planning.**
☐ Yes	**If "Yes," and the action cannot be modified to avoid the adverse effect, inform client that the NRCS must coordinate with State/Tribal government and receive concurrence on recommended alternatives. Contact your area or State biologist for coordination procedures. Further NRCS assistance will be provided only if the client agrees to implement a concurred upon alternative and obtains any required permits. Document on the NRCS-CPA-52, or notes section below, the finding, rationale, and information sources used and proceed with planning.**

Notes for State/Tribal species/habitats:

Appendix F. Definitions

Element Occurrence (EO) - An EO is a specific geographic location where "a species or natural community is, or was, present" (NatureServe 2002:10). Locations of a species located greater than 0.62 miles (1 kilometer) apart are identified as separate EOs.

Occupied Habitat – Refers to the location where slickspot peppergrass has been documented or identified as an element occurrence (EO), and the surrounding area within 0.5 mile radius of that occurrence. The 0.5 mile radius buffering area is important to maintain or improve habitat integrity, and pollinator populations and habitat necessary for species conservation. The area identified as occupied habitat may include additional slickspots or non-habitat such as roads, houses, etc. Further refinement of occupied habitat would be accomplished through field surveys considering existing resource conditions as well as specific habitat quality and integrity.

Slickspot Peppergrass Habitat – Areas that, through Stage 1 surveys, have documented slickspot microsites (natric and natric-like soil types) between 2,200 and 5,400ft elevation in southwest Idaho. This habitat type includes areas with slickspots of unknown occupancy. To maintain ecological continuity, if less than 0.5 mile distance exists between slickspot peppergrass habitats, the entire area is considered slickspot peppergrass habitat. After three years of surveys (Stage 2 and Stage 3) if no slickspot peppergrass plants are found, this habitat will be considered unoccupied. In order to classify slickspot peppergrass habitat as unoccupied the three years of surveys in which no slickspot peppergrass plants were observed must be conducted when spring precipitation (March-May) is at least 60 percent of average spring precipitation. For the Boise area this would be a total of at least 2.4 inches of precipitation from March 1 through the end of May, and 1.4 inches of precipitation from March 1 through the end of May for the Glenns Ferry area. NRCS has not surveyed any privately-managed lands for slickspot peppergrass habitat.

Potential Habitat – Areas within the known range of slickspot peppergrass with specific soil and elevation characteristics that are identified as having the potential to support slickspot peppergrass, even though the presence of slickspots or the plant is unknown.

These areas must meet the following criteria:

- Natric and natric-like soils forming "slickspots," and associated soil series, or phases thereof, characteristic of Loamy 7- to 10-inch and 10 to 13-inch ecological sites with Wyoming big sagebrush (Major Land Resource Areas 11—Snake River Plains, and 25—Owyhee High Plateau), and have an aridic, bordering on xeric, soil moisture regime and;
- 2,200 to 5,400 feet elevation;
- After field surveys are complete, potential habitat will be reclassified as either non-habitat or the appropriate habitat category for slickspot peppergrass.