Utah State University
DigitalCommons@USU

Aspen Bibliography | Aspen Research

9-2019

Pleasantview Hills Aspen Stand Diversity Project: Environmental Assessment

Pocatello Field Office

Follow this and additional works at: https://digitalcommons.usu.edu/aspen_bib

 Part of the Agriculture Commons, Ecology and Evolutionary Biology Commons, Forest Sciences Commons, Genetics and Genomics Commons, and the Plant Sciences Commons

Recommended Citation

Pocatello Field Office, "Pleasantview Hills Aspen Stand Diversity Project: Environmental Assessment" (2019). *Aspen Bibliography.* Paper 7830.
https://digitalcommons.usu.edu/aspen_bib/7830

This Report is brought to you for free and open access by the Aspen Research at DigitalCommons@USU. It has been accepted for inclusion in Aspen Bibliography by an authorized administrator of DigitalCommons@USU. For more information, please contact digitalcommons@usu.edu.

United States Department of the Interior
Bureau of Land Management

Pleasantview Hills Aspen Stand Diversity Project

Environmental Assessment
DOI-BLM-ID-I020-2019-0011-EA
September 2019

Pocatello Field Office
4350 Cliffs Drive
Pocatello, ID 83204
(208) 478-6340

INTRODUCTION

The Bureau of Land Management (BLM) Pocatello Field Office (PFO) has prepared this Environmental Assessment (EA) to analyze the environmental impacts of implementing treatments on aspen stands in the Pleasantview Hills area. This EA discloses the direct, indirect, and cumulative environmental effects that would result from implementation of this proposal as required by the National Environmental Policy Act (NEPA) of 1969. This EA will determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) based on environmental impact context and intensity, thereby informing agency decision making. Guidance for EA organization is determined by the BLM NEPA Handbook H-1790-1 (BLM 2008).

Project Area Description

The Pleasantview Hills Aspen Stand Diversity Project area (hereafter referred to as the "project area") is located approximately 12 miles west of Malad, Idaho and 10 miles north of the Utah/Idaho border. Topography of the area consists of mild/moderate terrain to steep hillsides. Elevation ranges from approximately 4,400 to 6,600 feet. The region is characterized by cold, wet winters; cool, wet springs; and hot, dry summers. Precipitation for the area varies with elevation. Lowest elevation areas average between 8 and 11 inches per year, while higher elevation areas average between 16 and 22 inches per year. The proposed actions would occur on BLM administered lands located in the following Township and Ranges:

Boise Meridian,
Oneida County, Idaho;
T13S R34E; T13S R33E;
T14S R34E; T14S R33E.

The BLM manages approximately 55,405 acres within the project area of which 10,871 acres are forested. The forest stands in the Pleasantview Hills are comprised of Montane Douglas fir (*Pseudotsuga menziesii*) stands (~10%), stable quaking aspen (*Populus tremuloides*) stands (~16%), and the remainder is seral aspen stands or mix Douglas fir/Aspen (~ 74%). Stable aspen is defined as stands that remain dominated by aspen cover through multiple ecological rotations, with little or no invasion by conifers (Rodger 2017). Seral aspen stands follow a successional pathway in which aspen dominate early on and are eventually replaced by conifers within a single ecological rotation (Rodger 2017). The relative abundance of aspen and conifers depends on the time since last disturbance; aspen dominates early stages and conifers dominate late stages of succession (Kitchen et al. 2019). Out of the forested stands, 3,986 acres are identified as priority areas for treatments and occur within the North Canyon, John Evans, West Elkhorn, Morgan Jones Sublet, Sheep Creek, and Wood Canyon drainages.

Purpose of and Need for Action

The purpose of the project is to treat aspen stands resulting in an increase age class diversity and stand resiliency. The intent is to promote early seral stand conditions, which would improve the quality of spring/summer habitat for Mule Deer and Rocky Mountain elk. The maintenance of healthy aspen communities; including understory shrubs, grasses, and forbs is of equal importance. Given that aspen stands provide critical ecosystem services and support disproportionately high numbers of vascular plant, insect, bird, and mammalian species, an

increase in aspen area may be expected to yield much greater increases in species diversity than would increases of other forest types (Chong et al. 2001).

The proposed actions would help ensure the longevity of seral and stable aspen stands by adding younger age classes into stands with mature structure. Objectives include:

- Increase quality and suitability of ungulate summer habitat by increasing the amount of early seral conditions in seral aspen stands (increase the amount and density of young aspen).
- Move seral aspen stands closer to 30% early seral, 40% mid seral, 30% late seral.
- Increase age class diversity in stable aspen stands.

The need for action is due to the lack of natural disturbance, resulting in mature (late seral) aspen stand conditions identified in the Pleasantview Assessment and Evaluation (PAE). The current high percentage of aspen stands in late seral stand condition has resulted in reduced quality of summer/fall habitat for big game species and is putting the longevity of aspen communities in the project area at risk.

Land Use Plan Conformance

Land use plan conformance can be found in Appendix C - "Land Use Plan Conformance."

Scoping and Issue Identification

Internal scoping was conducted by an interdisciplinary team (IDT) of BLM specialists to discuss the purpose and need of the project; various alternatives; resources of concern; potential environmental impacts; past, present, and reasonably foreseeable projects that may have cumulative effects; and possible mitigation measures.

Idaho Fish and Game (IDF&G), and Mule Deer Initiative representatives (MDI) have worked in Close Cooperation with the BLM in the development of the action alternative.

External scoping was initiated in the spring of 2019. A scoping notice for this proposal was made available to other agencies, organizations, the Shoshone Bannock Tribes and the interested public, initiating a 30-day comment period. More information regarding public comment can be found in Consultation and Coordination.

PROPOSED ACTION AND ALTERNATIVES

This chapter describes the alternatives developed by the IDT based on issues identified during scoping, understanding of the purpose and need for the project, and experience with similar fire, fuels and restoration projects in other locations within the PFO. Several vegetation treatments are proposed to address the differences in vegetation type and access within the project area. These treatments are tailored to the different aspen communities/stands present in the project area and are designed to change the seral status of aspen stands.

Alternative A: No Action

Under the No Action Alternative, treatment of aspen stands would not occur on public lands. Treatment of noxious weeds and other maintenance activities conducted on public lands would continue to occur.

Wildland fire suppression activities would continue in the Pleasantview Hills. Wildland fire rehabilitation efforts would continue to be implemented in accordance with the Normal Fire Rehabilitation Plan (2005) for the Idaho Falls District, Upper Snake and Pocatello Field Offices.

Alternative B: Proposed Action - Pleasantview Aspen Restoration

The BLM is considering treatments on approximately 3,986 acres within aspen stands over a fifteen-year span. This project distinguishes forty-two units for treatment within stable and seral aspen stand types (Figure 1). Table 1 provides more information regarding the aspen stand type, condition and type of treatment. Three treatment units are identified for thinning only (approximately 77 acres). Five are identified for harvest only (approximately 883 acres). Twenty are identified for harvest, followed by prescribed fire (approximately 2,057 acres). Fourteen treatment areas are identified to receive only prescribed fire (approximately 968 acres). Table 2 provides information on the size and treatment type for each identified unit. The units were identified for analysis purposes and annual implementation of treatments could occur on multiple units.

Table 1. Existing Aspen Types with Seral States and Proposed Treatments.

Ecological State	Stable Aspen Risk Ratings	# of Stands	Acerage	% of Aspen	# of Stands Treated	Acres Treated	Treatment Thin Acres	Treatment Harvest Acres	Treatment Harvest & Burn Acres	Treatment Burn Acres
Late	Highest	0	0	0%	0	0	0	0	0	0
	High	13	574	34%	2	275	0	0	0	275
Mid	Moderate	20	312	18%	0	0	0	0	0	0
Early	Low	58	826	48%	0	0	0	0	0	0
	Totals	**91**	**1712**			**275**	**0**	**0**	**0**	**275**

Ecological State	Seral Aspen Risk Ratings	# of Stands	Acerage	% of Seral Aspen	# of stands treated	Acres Treated	Treatment Thin Acres	Treatment Harvest Acres	Treatment Harvest & Burn Acres	Treatment Burn Acres
Late	Highest	14	1467	18%	11	1273	40	525	707	0
	High	44	3571	45%	16	1766	38	358	1024	347
Mid	Moderate	53	2354	30%	13	672	0	0	326	346
Early	Low	30	552	7%	0	0	0	0	0	0
	Totals	**141**	**7944**			**3711**	**78**	**883**	**2057**	**693**

Figure 1. Map of treatment units and temporary road locations

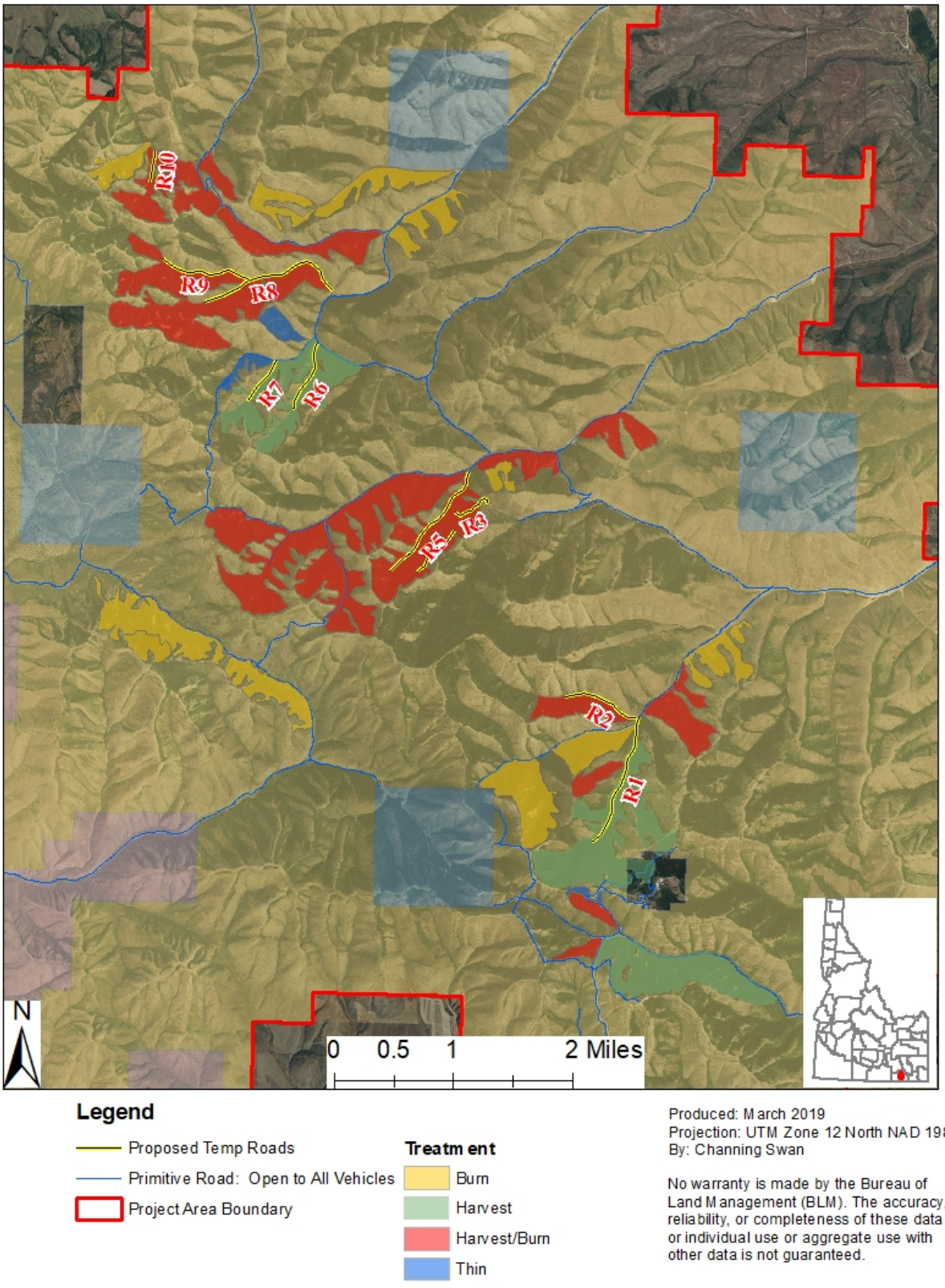


Table 2. Treatment Type and Treatment Unit with Acres

Stand ID	Treatments	Acres	Road Segment- If Yes how long
1	Harvest	270	No
7	Harvest	16	No
5	harvest	342	R1 (1.15 miles)
27	Harvest	179	R6 (.6 miles)
28	Harvest	76	R7 (.42 miles)
2	Harvest/Burn	23	No
3	Harvest/Burn	30	No
8	Harvest/Burn	38	R1 (1.15 miles)
10	Harvest/Burn	161	R2 (.66 miles)
11	Harvest/Burn	93	No
12	Harvest/Burn	23	No
19	Harvest/Burn	259	No
20	Harvest/Burn	94	No
21	Harvest/Burn	81	No
22	Harvest/Burn	228	R3 (.36 miles), R4 (.48 miles), R5 (1.09 miles)
23	Harvest/Burn	211	No
25	Harvest/Burn	61	No
26	Harvest/Burn	78	No
31	Harvest/Burn	233	
32	Harvest/Burn	57	R8 (1.3 miles)
33	Harvest/Burn	118	
34	Harvest/Burn	22	R9 (.78 Miles)
35	Harvest/Burn	134	No
40	Harvest/Burn	32	No
41	Harvest/Burn	163	R10 (.27 Miles)
6	Burn	161	No
9	Burn	88	No
13	Burn	16	No
14	Burn	62	No
15	Burn	11	No
16	Burn	100	No
17	Burn	174	No
18	Burn	42	No
24	Burn	26	No
36	Burn	22	No
37	Burn	59	No
38	Burn	88	No
39	Burn	62	No
42	Burn	56	No
4	Thinning	12	No
29	Thinning	28	No
30	Thinning	38	No

Thinning Only:
Three treatment units (within seral aspen communities) would be thinned using small mechanical devices (chainsaws and brush saws). In these treatment units all conifer up to 20 inches measured at diameter breast height (dbh) would be cut, lopped and scattered. Trees over 20 inches dbh may be girdled to create snags. Large trees (over 30-inch dbh) displaying old characteristics (Hamilton, 1993) would be left or turned into snags as long as the project goals and objectives are being met. Residual conifer densities would be between 0-20 square feet of basal area per acre at the end of the treatment.

Harvest Only:
In the five treatment units to be harvested; heavy mechanical equipment (e.g. feller-bunchers, skidders, and/or dozers) would be used to cut, skid, and process the timber. In seral aspen stands, conifers would be removed from within the aspen stand with a basal area target of 0 to 20 square feet per acre of conifer. Large trees (over 30-inch dbh) displaying old characteristics (Hamilton, 1993) would be left or turned into snags as long as the project goals and objectives are being met.

Harvest and Burn:
There are twenty treatment units that would be harvested with the same prescription as the harvest only treatments. These areas would then be burned with prescribed fire (See "*All Burn Units"* description below for further discussion on burn activities). All twenty treatment units have been identified as seral aspen stands, which have been rated as high or highest risk for the aspen stand disappearing or converting to Douglas fir stands. Within seral aspen stands, treatments are designed to increase the resilience of the aspen component, with the goal of increasing the aspen stems/acre, and age class diversity. This would be accomplished through the use of timber harvest, to remove the conifer component, and the use of fire to stimulate aspen cloning.

As part of the harvest, branches and tops would be left onsite to help facilitate/carry fire. Several acres are too steep for logging equipment to safely operate or are too far away to make mechanical harvesting economical. In areas where equipment is limited, hand crews would be used to thin out the understory to help carry fire. In areas where heavy equipment is not utilized, the objective of the burn would be to induce up to 50-90% mortality of the conifer over story.

Burn Only:
Fourteen treatment units have been selected to only be burned with prescribed fire. These are a mix of both stable aspen and seral aspen stands. In the seral aspen stands, treatments would be aimed at increasing the resilience of the aspen component. The objective of the prescribed fire would be to induce up to 50-90% mortality of the conifer over story, with the goal of increasing the aspen stems/acre, and age class diversity by creating early seral conditions. To achieve prescribed fire objectives, hand thinning and scattering of conifer species within the aspen stand would occur approximately one-year prior to prescribed fire; thereby assisting in promoting fire across stands. Within stable aspen treatment units, the objective would be to break up the continuity of the aspen stand and introduce younger age classes in a mosaic manner within each stand.

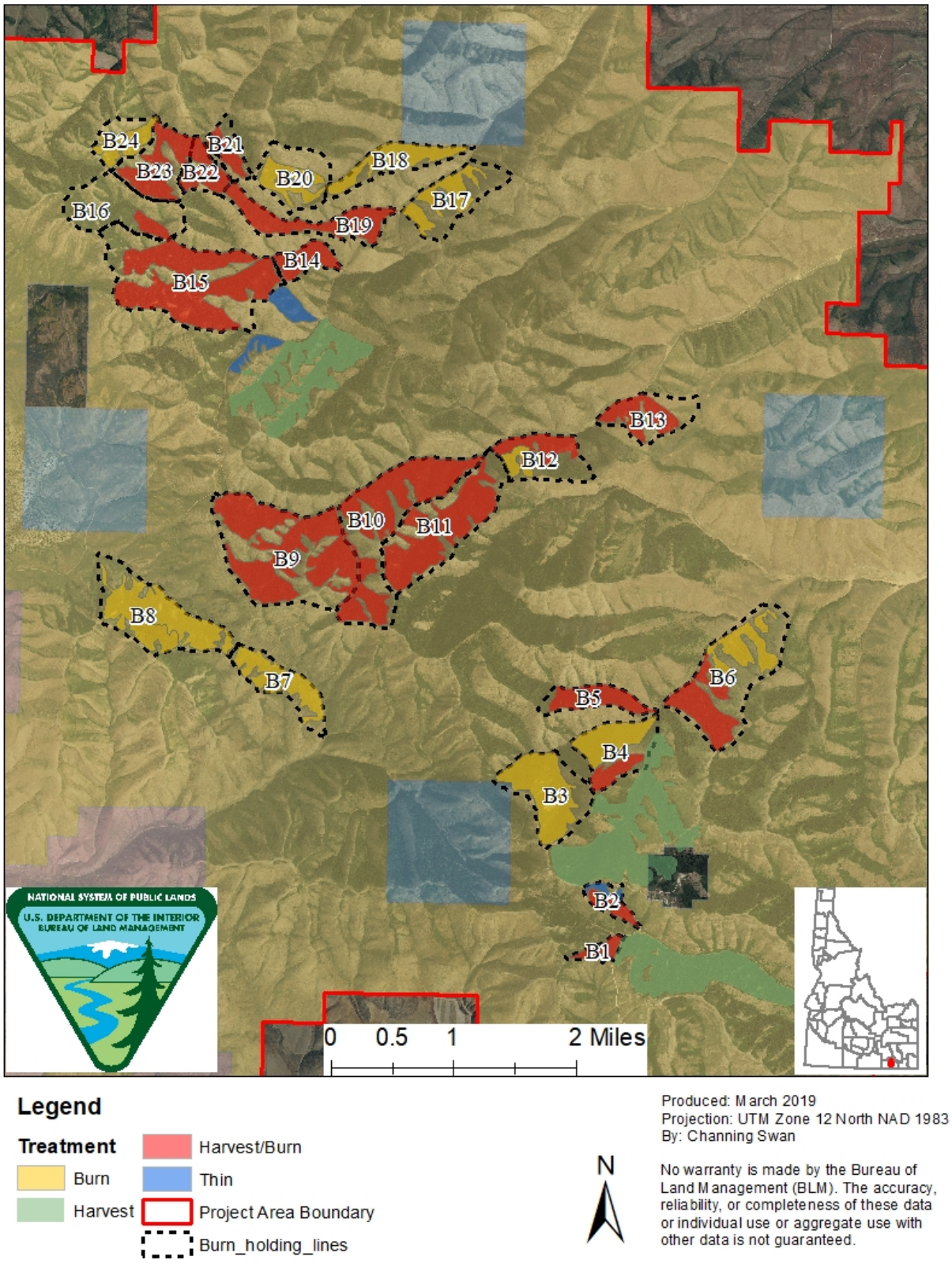
All Burn Units (Harvest and Burn & Burn Only Treatments):
In all units where burning is proposed, a holding line may be needed to safety burn the units. Approximately 7 miles of existing routes or trails may be used where available. Hand tools,

black lining, hose lays or heavy equipment may be used to construct holding lines. Holding lines may encompass more area than the target stands. Only the treated stands would be targeted for ignition, however the fire may creep onto adjacent slopes before it encounters a holding line. Pile or broadcast burning may occur during spring or fall as weather conditions permit. All holding lines are anticipated to be rehabbed following completion of the burn. Table 3 below shows which stands and how much acreage is within each burn unit.

Table 3. Burn Units and Treatment Unit with Acres

Burn Units	Treatment Unit ID	Total Treatment Acres
B1	2	23
B2	3	30
B3	6	161
B4	8,9	126
B5	10	78
B6	11,12,13,14,15	206
B7	16	100
B8	17,18	216
B9	19,20	353
B10	21,23	292
B11	22	228
B12	24,25	87
B13	26	78
B14	32	57
B15	31,33	351
B16	34	22
B17	36,37	41
B18	38	88
B19	35	134
B20	39	62
B21	40	32
B22	41	62
B23	41	101
B24	42	56

Figure 2. Map of burn units and associated treatment units.



Temporary Roads:

Access into several treatment units would require temporary roads to be built. Eleven identified treatment units (3 harvest only and 8 harvest and burn, totaling approximately 1,617 acres) would require temporary roads to facilitate access for timber removal. See Figure 1 for map detail of road locations. Over the life of the plan, approximately seven miles of temporary road would be built, consisting of ten road segments (see table 4 below). Temporary road widths would be approximately 12-foot to 14-foot wide. Construction of temporary roads would be through clearing vegetation and minimal construction (grading, ditching, and/or laying gravel) following guidelines set forth in BLM H-9113-1 Road Design Handbook and in the Road Standards Pocket Field Guide (Gold Book). Four miles of existing undesignated routes would need to be maintained (brushing and grading) to access new temporary road locations. Roads would be built only as needed, and would be completely removed/rehabbed following completion of treatments. Temporary road removal and rehab would be accomplished through the use of one or more of the following methods: ripping (e.g. subsoilers or rock rippers), recontouring, seeding native vegetation, scattered vegetation debris, barriers (e.g. fences, tank-traps, etc.), and/or signed. Ripping the road would decrease compaction and increase infiltration capacity of the road prior to closure (Luce 1997).

Table 4. Road Segments and Distance in Miles

Road Segment	Distance (miles)
R1	1.15
R2	0.66
R3	0.36
R4	0.48
R5	1.09
R6	0.6
R7	0.42
R8	1.3
R9	0.78
R10	0.27
Total	7.11

Design Criteria Incorporated into Alternative B

All vegetation treatments identified in the proposed action would follow accepted agency management plans, policies, and procedures. Management restrictions specified in the ARMP would be applied to all vegetation treatments with the intent of meeting current BLM, state, or federal policy and preventing significant impacts to human and natural resources (ARMP, Appendix A: Guidelines/Techniques/Practices; BLM 2012) including sage-grouse (ID/swMT ARMPA; BLM 2015a;). ARMP and ARMPA restrictions (Standard Operating Procedures, Management Decisions, and Required Design Features) would be applied to site-specific actions with the intent of protecting sensitive resources (Appendix D).

Incorporation of Management Restrictions, Best Management Practices (BMPs), and Standard Operating Procedures (Appendix D) would ensure that impacts to resources are avoided, minimized, or temporary.

Noxious/Invasive Species Management

Treatment of noxious weeds/invasive species would be conducted as part of Alternative B with the objective of containing and preventing further spread of known and newly invading populations of weeds. Equipment would be required to be thoroughly washed to remove noxious weed seeds and debris, helping in the prevention of noxious weeds. Weed treatment and monitoring may occur both before and after project implementation if necessary. All treatments would receive post-treatment monitoring/treatment for noxious weeds and invasive plants would ensue for up to three years and then on an as needed basis. Invasive species would be treated through methods and techniques dictated by the Upper Snake-Pocatello Integrated Weed Control Program Environmental Assessment (DOI-BLM-ID-I010-2016-0011-EA; BLM 2017).

Monitoring

Monitoring would be conducted to determine achievement of treatment objectives and or effectiveness of adaptive management actions implemented (Appendix F – Monitoring). Data would be compiled and analyzed to determine if treatment objectives were met or if additional treatments are required.

Adaptive management actions to limit excessive herbivory (based on browse monitoring)

Livestock and wild ungulate browse on aspen suckers would be monitored for excessive herbivory and appropriate adaptive management action would be taken until restoration objectives are met (Appendix F – Monitoring). Restoration objectives: harvest or thinning units, regeneration of 350 aspen stems per acre; burn units, regeneration of 800 aspen stems per acre. The following adaptive management actions could be used:

- Shut off water to troughs near project area.
- Installation of wildlife friendly exclusionary fencing/obstruction, such as: electric fencing, steel pipe rail fencing, slash/jackstraw of trees periphery of treatments.

Alternatives Considered But Eliminated from Detailed Analysis

Hand Thinning Only (No Timber Harvest or Fire)

The BLM considered this alternative, however, prohibiting the use of mechanical equipment in forested stands for treatments would not achieve the objectives of the purpose and need due to the lack of canopy removal/disturbance. It would not be possible to effectively reduce conifer crown densities, which result in shading of existing aspen clones.

Harvest Only (No Fire)

This alternative was considered, but not further analyzed. Under this alternative the BLM would only be able to harvest approximately 1,706 acres of timber. In the acreage that was identified to be harvested and burned the proposed action, it was assumed that only 40% of the stands would be harvestable due to slope and terrain limitations. The elimination of fire as a treatment option would reduce total acres of seral aspen treated by 1,927 acres. This alternative also would remove any treatment in the stable aspens stands (2 stands, 275 acres).

Our estimation is that harvesting will only move these high risk late seral stands to a mid-seral status. The lack of fire will not remove/kill any of the conifer recruitment or regeneration within these stands. The below table illustrates how only using timber harvest does not reset the ecological state in seral aspen stands enough to meet the 30% early seral, 40% mid seral, 30% late seral objective of the Purpose and Need of the EA.

Table 5. Harvest Only Effects

Ecological State	All Stands Risk Ratings	# of Stands	Acerage	% of All Stands	# of stands treated	Acres Treated	Treatment Thin Acres	Treatment Harvest Acres	Treatment Harvest & Burn Acres	Treatment Burn Acres	Acres after Treatment	Risk Rating % after Treatments
	Highest	14	1467	15%	11	848	40	808	0	0	619	6%
Late	High	57	4145	43%	16	806	38	768	0	0	3339	35%
Mid	Moderate	73	2666	28%	13	130	0	130	0	0	4190	43%
Early	Low	88	1378	14%	0	0	0	0	0	0	1508	16%
	Totals	**232**	**9656**		**40**	**1784**	**78**	**1706**	**0**	**0**	**9656**	
	Assumption is that harvest treatment moves stand back to moderate risk. Stands that were origainlly identifed as harvest and burn stands are only 40% harvestable due to slope limitations. Aspen thinned only stands will only move to the moderate risk level. Treatments in Moderate Risk Stand will result in the stands moving to a Low Risk Category.											

AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, and CUMULATIVE EFFECTS

Resources Considered in the Analysis

The Pleasantview Assessment and Evaluation (2016) assessed and evaluated land health on a portion of Public Lands administered by the Bureau of Land Management (BLM) Pocatello Field Office in the Pleasantview Hills. This document evaluated the existing uses and management actions within the evaluation area and assesses the current condition and/or function of public land resources. Resources that were evaluated included, cultural, soils, vegetation, forest health, water quality, riparian areas, and wildlife. The evaluation also factored in existing uses such as, lands and realty, recreation, travel management, mineral resources, fuels, fire history, forestry, noxious/invasive weed management, and grazing management. This evaluation created the frame work for this EA. Forest health issues that were identified as "at risk" have been targeted for treatment due to the conclusions drawn from the assessment and evaluations.

Affected resources considered as part of this analysis are discussed below. Not all of the resources considered are present or would be impacted by the alternatives. All resources evaluated may be found in Appendix A. Resources not present or not affected by implementation of the alternatives in the project area receive no further consideration in this analysis. Resources present in the project area, which may be impacted by an alternative, are identified, described, and analyzed in the following narratives.

The Pocatello Field Office interdisciplinary team involved in this project identified several preliminary resource issues and concerns to be considered. These include concerns over how Vegetation, Soils, and Wildlife may be affected by this proposal.

Vegetation (inclusive of Forest, upland shrub vegetation, and invasive/non-native species)

The overall project area (55,405 acres) contains a mosaic of vegetation types. Of the BLM acreage examined in the project area, approximately 52 percent is comprised of sagebrush steppe vegetation cover type (28,551 acres); 20 percent is mountain shrub (10,642 acres); 15 percent is seral aspen (7944 acres); 6 percent is Juniper (3522 acres); 3 percent stable aspen (1712 acres); 3

percent is maple (1617 acres); 2 percent Douglas fir (1122 acres); and less than 1 percent of dry valley bottoms (377 acres). The Pleasantview Assessment and Evaluation (2016) provides a detailed description of the various vegetation communities in Section C "Vegetation" pages 31 through 83.

Figure 3. Vegetation cover types and dominant species present in the project area.

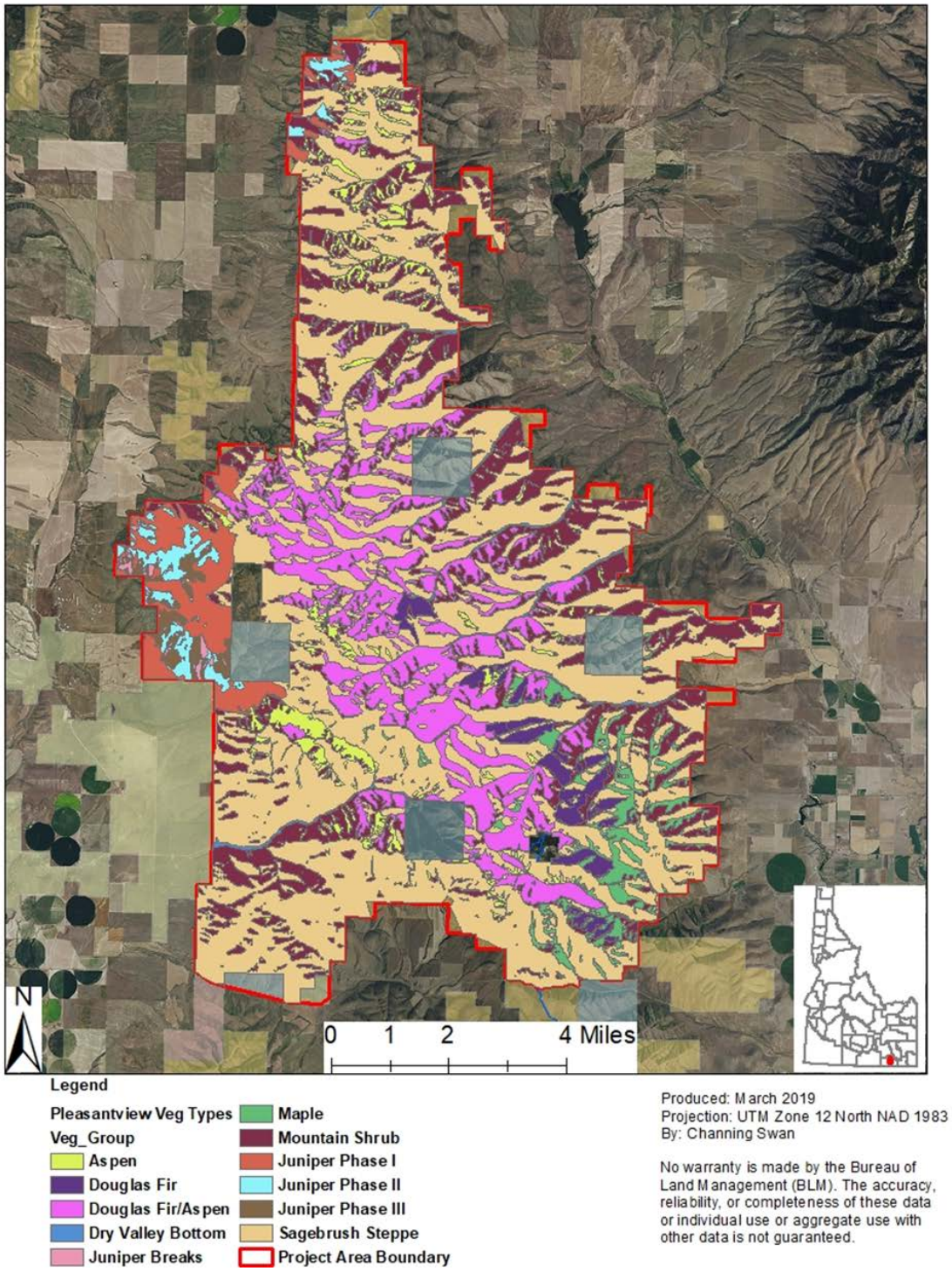


Table 6: Description of the current condition of vegetation within the project area broken out by vegetation type.

Vegetation Type	Description	PAE Reference Location
Sagebrush Steppe	The Sagebrush Steppe Vegetation Type Cover studies conducted throughout the project area indicate that within the Steep South 16-22 ARTRV/PSSPS ESD, which underlies the majority of the Sagebrush steppe vegetation type, native perennial grasses have an average canopy cover of 29%, annual grasses have an average canopy cover of 26%, sagebrush has an average canopy cover of 11% and all other shrubs have an average canopy cover of 15%. The greatest annual grass canopy cover occurs on south facing slopes with the majority of sampled locations having a cheatgrass infestation level between 2 and 3 as described by The Cheatgrass Management Handbook: Managing an invasive annual grass in the Rocky Mountain Region (2013). This indicates that the south facing slopes are susceptible to converting to a cheatgrass dominated site or have already crossed the dominance threshold. The distribution of areas with greater cheatgrass canopy cover and areas with healthy deep rooted perennial grasses on south slopes is highly heterogeneous but almost all areas have some component of annual grass composition.	Pgs. 38-41 & 170-175
Mountain Shrub	Within the Mountain Shrub Vegetation Type, Cover Studies conducted throughout the project area indicate that within the Steep Stony North 12-16 ARTRV/FEID ESD, which underlies the majority of the mountain brush vegetation type, native perennial grasses have an average canopy cover of 16%, annual grasses have and average canopy cover of 17%, sagebrush has an average canopy cover of 12% while all other shrubs added together have an average canopy cover of 38%. Perennial forbs also tend to have greater canopy cover and species richness compared to the Sagebrush Steppe Vegetation Type.	Pgs. 44 & 170-175
Juniper	Only about 155 acres of juniper currently occurring within the project area was found to be within its natural historical and ecological bounds. The majority of the juniper found within the project area occurs within the continuum from Phase I to Phase III juniper encroachment.	Pgs. 42-43 & 170-175.
Maple	Extensive maple stands occur within the south eastern portion of the project are. In mature stands dense leaf litter dominates the understory with limited herbaceous cover.	Pg. 45
Dry Valley Bottoms	The dry valley bottoms have been highly modified from the reference condition as described by the Loamy Bottom 12-16 ARTRT/LECI4-ELLAL ESD. Multiple cover studies indicate that the bottoms are predominately composed of Kentucky bluegrass, and Bulbous bluegrass, followed by other perennial grasses and weeds.	Pgs. 37-38 & 163-175.
Noxious/Invasive Species	Exotic invasive annuals such as bulbous bluegrass and cheatgrass occur throughout the project are, though cheatgrass tends to be more abundant on south facing slopes within the Sagebrush Steppe vegetation type. Other noxious or invasive species such as Houndstongue and thistle are found in small numbers/infestations throughout the project area with higher concentrations occurring along roadways, and near congregation sites such as watering areas.	Pgs. 10-12
Stable Aspen	Stable aspen stands in the project area are generally terrain isolated. Rogers et al. (2014) defines these as stable aspen communities isolated by terrain or substrate, often limited in extent. These are upland forests and woodlands dominated by aspen without a significant conifer component. These stands are outside of natural conifer sites, so they experience little encroachment. Disturbances, such as stand replacing and ground fires as well as blowdown, are important for the health and rejuvenation of the stand.	Pgs. 45-48 &180-182

Vegetation Type	Description	PAE Reference Location
	Ninety-two stable aspen stands were delineated within the project area and range in size from a tenth of an acre to 200 acres. Aspen Risk Ratings were assigned to all 92 stands (four categories; Highest, High, Moderate, and Low). The evaluation determined that 1% of stable aspen stands were within the highest risk category, 33% were within the High risk category, 18% were within the Moderate Risk Category and 48% were within the low risk category. A lack of disturbance within the stable aspen stands within the project area have led to more than 1/3 of the stands being rated within the High Risk Rating Category.	
Seral Aspen	Seral aspen stands follow a successional pathway from early seral aspen dominated to late seral conifer dominated. The tree canopy is composed of a mix of deciduous and coniferous species, co-dominated by aspen and conifers (Douglas fir and juniper). As the stands age, aspen is slowly reduced in abundance until the conifer species become dominant. Most of these stands were determined to be in the later seral stages due to a lack of disturbance allowing for high aspen mortality, lack of aspen regeneration, and an abundant presence of overstory conifers (BLM 2016). One hundred and thirty-nine seral aspen stands were delineated within the project area and range in size from 1 acre to 350 acres. The evaluation determined that 18% of seral aspen stands were within the Highest risk rating, 45% were within the High Risk rating, 29% were within the Moderate Risk Rating and 7% were within the Low risk rating.	Pgs. 45-50 & 180-182
Douglas fir	Generally Douglas fir stands within the project area are 150 years old or younger and behave as an even aged forest. As Stand Density Index (SDI) increased the probability of large scale mortality events and increased self-thinning. Twenty-three Douglas fir stands were delineated within the project area and range in size from 3 acres to 150 acres. The evaluation determined that 19% of the Douglas fir stands were within the highest risk rating category, 37% were within the High risk rating category, 4% were within the Moderate risk rating category, and 41% were within the Low risk rating category. Those stands with the lowest risk ratings have experienced some form of disturbance in the recent past.	Pgs. 45-52 & 183-186

Proposed Treatment Area Vegetative Communities

The proposed treatments encompass approximately 5,606 acres or 10% of the Project Area. Vegetation within the proposed treatments is comprised of approximately 70 percent seral aspen; 14 percent sagebrush steppe; 11 percent mountain shrub; 5 percent stable aspen and less than 1 percent Maple.

Within the proposed treatment area the sagebrush steppe, mountain shrub, juniper, maple and dry valley bottoms are generally the same as that described above. For seral and stable aspen stands within the proposed treatment area the overall risk ratings are higher than that described above for the entire project area. See Table 1 above for a description of the risk rating, total number of stands, number of stands proposed for treatment, and proposed treatment type.

Aspen studies were conducted in 2014-2015 utilizing the Aspen Stand Risk Assessment Protocol (2014-06-17 ver. 1.7) developed by the Eastern Idaho Aspen Working Group Science and Technology Committee and a Forest Vegetation Information System (FORVIS) inventory was conducted in 2009 within a subset of the stands proposed for treatment (PAE pgs. 181-186).

Aspen is a fire adapted species that relies on disturbance for rejuvenation (Appendix K Fire Ecology of Aspen). Fire has largely been excluded from the proposed project area and contributed to the current condition.

Approximately 275 acres of stable aspen are proposed for treatment. Stand studies indicate that mid-story recruitment (trees 5-15 ft. high) averaged 31 aspen stems/ac while understory regeneration (suckering/ trees <5 ft. high) averaged 287 aspen stems per acre. In addition, the stands had primarily an open upper canopy (canopy height over 15 ft.) indicating a reduction in mature aspen trees and an abundant shrub understory. Based on the Aspen Stand Risk Assessment Protocol the combination of a reduced mature over-story, a recruitment level of less than 500 stems/ac and regeneration level of less than 1,000 stems/ac put these stands at a high risk rating.

Approximately 3,716 acres of seral aspen are proposed for treatment of which approximately 34% was rated the Highest Risk Rating, 48% was rated the High Risk Rating and 18% was rated as the Moderate Risk Rating. The FORVIS data collected within proposed treatment areas, which was only collected within seral aspen stands, indicates that on average, stands have 106 trees per acre of which 45 are conifers and 61 are aspens. The average basal area of all species is 87 and the SDI is 147. Aspen studies indicate that mid-story recruitment (trees 5-15 ft. high) averaged 20 aspen stems/ac while understory regeneration (suckering/ trees <5 ft. high) averaged 1,081 aspen stems per acre. For conifer species within the same stands mid-story recruitment (trees 5-15 ft. high) averaged 5 stems/ac while understory regeneration (trees <5 ft. high) averaged 576 stems per acre. The reduced recruitment and regeneration of aspen within the proposed treatment area indicates that the stands are within the high to highest risk rating. In addition, the large quantity of conifer seedlings; which will continue to grow and reach a height capable of shading and outcompeting the aspen within the next 30-50 years, places the stands in a higher risk rating.

Direct and Indirect Effects:

Alternative A: No Action

Under Alternative A, No Action, the proposed vegetation treatments would not occur on public lands. There would be no change in vegetative composition within sagebrush steppe, mountain shrub, Maple, Juniper Breaks Ecological Sites or dry valley bottom vegetative communities. Areas where juniper encroachment is occurring will continue to progress through the Phases from Phase I to Phase III. Isolated and small populations of noxious/ invasive species will continue to occur throughout the project area while larger more established populations will continue to exist along travel corridors and in disturbed areas such as watering sites. Delineated Douglas fir stands would continue to progress towards later seral stands with increased stand density, age, and vulnerability to insect infestation and drought. Regeneration of Douglas fir seedlings would continue to decline as stand density continues to increase, as would mean annual increment, or growth, of mature trees.

Stable aspen stands would continue to age and decline in the project area. Aspen assessments show the stable aspen in the project area to have lower than desired regeneration and recruitment. As the over story declines it is highly probable that these stands will shrink with less recruitment, and shrub communities will expand their footprint. (Rogers 2017)

Seral aspen stands would continue to transition into conifer dominated stands, which without disturbance, may be completely converted to conifer stands as existing aspen dies out. The current late seral condition of the project area would further deteriorate which would continue to decrease the diversity of plant species. Decreased light would continue to greatly reduce mycorrhizal associations, decreasing aspen's ability to take up soil nutrients (Clark and St. Clair 2011). In the absence of any action to reduce density, conifers would continue to encroach into existing aspen stands, which are not currently threatened by encroachment.

Alternative B: Pleasantview Aspen Restoration

Alternative B would improve overall forest health by targeting treatments at stands identified in the PAE, with implementation targeting the health and vigor of aspen stands. Aspen stands would benefit from the removal of conifers and prescribed burning, stimulating regeneration, maintaining long-term stand viability. Post treatment conditions in treated stands would be more representative of early-mid seral stages, increasing landscape diversity.

Under Alternative B, approximately 5,606 acres of vegetation may be affected through the proposed treatments. Table 6 depicts the Vegetation Type and the number of acres associated with each for the Project Area and each proposed treatment type.

Table 7: Affected acres categorized by proposed treatment type and Vegetation Type.

Vegetation Type	Project Area (acres)	Proposed Treatment Area (acres)	Thinning Only (acres)	Harvest Only (acres)	Harvest and Burn (acres)	Burn Only (acres)	Non-targeted Areas within Burn Units (acres)	Burn Units Total (acres)	Temporary Roads* (acres)
Sagebrush Steppe	28,551	786	<1	0	0	0	786	786	3
Mountain Shrub	10,642	600	<1	0	0	0	600	600	2
Seral Aspen	7,472	3,805	77	882	2,057	692	205	2,631	21
Stable Aspen	1,986	274	0	0	0	274	15	289	0
Douglas fir	1,238	0	0	0	0	0	0	0	0
Maple	1,617	11	0	0	0	0	11	11	<1
Juniper	3,522	2	0	0	0	0	2	2	0
Dry Valley Bottoms	377	6	0	0	0	0	6	6	0
Total	**55,405**	**5,606**	**77**	**882**	**2,057**	**966**	**1,625**	**4,646**	**26**

*Temporary roads were calculated at the maximum disturbance footprint of 30feet. Actual active road width assumed to be 14 feet (approximately 12 acres).

The inclusion of maple and juniper vegetative communities within the proposed treatment area is a function of heads up digitizing within ArcGIS. It is not anticipated that treatments would occur either directly or indirectly within these vegetation communities.

Table 7 outlines the treatment for each aspen type and the potential resulting risk rating / seral status change.

Table 8: Change in Risk Rating for ALL Stands, STABLE Aspen Stands, and SERAL Aspen Stands following the proposed treatments.

Ecological State	All Stands Risk Ratings	# of Stands	Acerage	% of All Stands	# of stands treated	Acres Treated	Treatment Thin Acres	Treatment Harvest Acres	Treatment Harvest & Burn Acres	Treatment Burn Acres	Acres after Treatment	Risk Rating % after Treatments
	Highest	14	1467	15%	11	1273	40	525	707	0	195	2%
Late	High	57	4145	43%	18	2041	38	358	1024	622	2172	22%
Mid	Moderate	73	2666	28%	13	672	0	0	326	346	3473.5	36%
Early	Low	88	1378	14%	0	0	0	0	0	0	3815.5	40%
	Totals	**232**	**9656**		**42**	**3986**	**78**	**883**	**2057**	**968**	**9656**	
	Assumption is that harvest treatment moves stand back to moderate risk. Assumption is that treatments that include a burn will be 75% effective at resetting the systemto a low risk. Aspen thinned only stands will only move to the moderate risk level. Treatments in Moderate Risk Stand will result in the stands moving to a Low Risk Category.											
Ecological State	**Aspen Risk Ratings**	**# of Stands**	**Acerage**	**% of Aspen**	**# of stands treated**	**Acres Treated**	**Treatment Thin Acres**	**Treatment Harvest Acres**	**Treatment Harvest & Burn Acres**	**Treatment Burn Acres**	**Acres after Treatment**	**Risk Rating % after Treatments**
	Highest	0	0	0%	0	0	0	0	0	0	0	0%
Late	High	13	574	34%	2	275	0	0	0	275	368	21%
Mid	Moderate	20	312	18%	0	0	0	0	0	0	311	18%
Early	Low	58	826	48%	0	0	0	0	0	0	1033	60%
	Totals	**91**	**1712**			**275**	**0**	**0**	**0**	**275**	**1712**	
	Assumption is that treatments that include a burn will be 75% effective at resetting the system low risk. Aspen thinned only stands will only move to the moderate risk level.											
Ecological State	**Seral Aspen Risk Ratings**	**# of Stands**	**Acerage**	**% of Seral Aspen**	**# of stands treated**	**Acres Treated**	**Treatment Thin Acres**	**Treatment Harvest Acres**	**Treatment Harvest & Burn Acres**	**Treatment Burn Acres**	**Acres after Treatment**	**Risk Rating % after Treatments**
	Highest	14	1467	18%	11	1273	40	525	707	0	195	2%
Late	High	44	3571	45%	16	1766	38	358	1024	347	1804	23%
Mid	Moderate	53	2354	30%	13	672	0	0	326	346	3162.5	40%
Early	Low	30	552	7%	0	0	0	0	0	0	2782.5	35%
	Totals	**141**	**7944**			**3711**	**78**	**883**	**2057**	**693**	**7944**	
	Assumption is that treatments that include a burn will be 75% effective at resetting the system low risk. In harvest and burn stands the 25% that doesn't make it to a low risk will end up as a moderate risk. Aspen thinned only stands will only move to the moderate risk level. Harvest only stands will only move to the moderate risk level. Any treatments in Moderate risk stands will move theses stand to low risk.											

Effects expected for **Thinning** only treatment (77 acres):

The Thinning Treatment would not occur within mountain shrub, sagebrush steppe, maple, juniper, dry valley bottom, stable aspen or delineated Douglas fir vegetation types and therefore there would no direct or indirect impacts to these vegetation types.

Approximately 77 acres of seral aspen are proposed for thinning. Within these units all conifer (Douglas fir and juniper) up to 20 inches DBH would be cut, lopped and scattered. Conifer over 20 inches DBH may be girdled to create snags or left to provide future snags. Treatments would break up forest continuity, while leaving larger diameter trees and aspen. Treatment implementation may damage a small percentage of residual conifer and aspen. The removal of the conifer overstory would help transition the aspen stands to an earlier seral state, allow for greater light penetration to the forest floor stimulating aspen suckering. It is expected that suckering would attain over 400 stems/ac. based on similar treatments conducted in the Soda Hills in Southeast Idaho (Munzo 2013).

Effects expected for **Harvest** treatments (2,940 acres):

The Harvest Treatment would not occur within mountain shrub, sagebrush steppe, maple, juniper, dry valley bottom, stable aspen or delineated Douglas fir vegetation types and therefore there would be no direct or indirect impacts.

The direct and indirect effects on seral aspen within Harvest Only units would be similar to those expected within thinned units; conifer would be removed from identified stands, and some damage to surrounding trees may occur. Douglas fir harvest within seral aspen stands would have a slight effect on the amount of hormonal stimulation triggering suckering but would facilitate successful natural stand regeneration of aspen by exposing bare mineral soil. Thus, allowing more sunlight to penetrate the forest floor, promoting aspen suckering (Jones et al 2005). It is expected that suckering would achieve 1,000 stems per acres, similar to that currently occurring within past timber harvest units located within the project area (see Appendix J-Aspen Response Post Harvest).

Mechanical treatments affect plants differently depending upon their vegetative reproduction capabilities. Direct effects on target and non-target vegetation from mechanical treatments depend on how a particular method affects a species at its growing points. Indirect effects on non-target vegetation depend on the availability of resources (water, minerals, and light) previously used by the target species. Mechanical treatments that target aboveground vegetation would remove woody plants, causing a short-term increase of grass and forb cover.

Effects expected for **Temporary Roads and Holding Lines** (29 acres):

Construction of the temporary roads would remove all vegetation from the road base; approximately 26 acres if the maximum disturbance calculation of 30 feet is assumed (See Table 7 above). This disturbance will increase the potential for noxious and invasive weeds to become established, however treatment of noxious weeds would occur annually reducing the potential of seed production and spread. The temporary nature of these roads would limit the amount, extent and duration of vegetation disturbance in connection with this action as all temporary roads would be reclaimed following the completion of the proposed treatment they are associated with. Reclamation would follow the BMPs as outlined in Appendix D and would include seeding the

temporary road with a seed mix applicable for the Ecological Site. It is expected that herbaceous cover in the form of grasses and forbs would occur within the first two years, while the establishment of shrubs would require more time, 5-20 plus years depending on the distance to a seed sources and/or if supplemental plantings occur. It is expected that aspen suckers on the periphery of the road base may occur the year following disturbance depending on proximity to established aspen clones.

Effects expected for **Burn** treatments (3,025 acres):

The proposed prescribed fire treatments will target stable and seral aspen stands, however, logistics involved with planning, and completing the treatment require the establishment of logical holding lines, such as on ridges or valley bottoms. Due to these constraints there is a possibility that other vegetation communities may be affected by the prescribed fire. The following analysis assumes that all acres within the burn holding line will be affected though the extent to which non-targeted vegetation types are burned is expected to be less.

Within the burn units it is expected that the prescribed fire will burn in a mosaic pattern; with areas of low intensity and/or severity and areas of high intensity and/or severity depending on fuel availability and distribution. Within all vegetation types it is expected that the prescribed fire will remove aboveground biomass, and remove a portion of the aboveground seedbank. Prescribed fire would also increase the proportion of bear ground allowing for the establishment and/or expansion of noxious/invasive species.

Approximately 786 acres of sagebrush steppe vegetation is identified within the proposed burn holding lines (approximately 3% of the sagebrush steppe vegetation community within project area). It is expected that the area would revert to an early seral state, dominated by herbaceous vegetation and root sprouting shrubs. Sagebrush and other non-root sprouting shrubs would be killer by the prescribed fire. It is expected that non-root sprouting shrubs would recolonize the area between 5-20 plus years following disturbance based on burn severity and proximity to a seed source. Cheatgrass would increase within this vegetation type due to disturbance. This would be more abundant on south facing slopes than other aspects. Due to the current infestation levels occurring any addition would have minimal impacts on the ecological functioning of affected area (Mealor et al 2003).

Approximately 600acres of mountain shrub vegetation is identified within the proposed burn holding lines (approximately 6% of the mountain shrub vegetation community within the project area). These vegetative communities are generally more resistant to disturbance and resilient to invasion by annual grasses than the Sagebrush steppe vegetative community. Mountain shrub communities generally occur on North aspects which hold moisture longer and are composed of more fire resistant species such as snowberry, bitterbrush and rabbit brush. It is expected that burned areas would revert to an early seral state in which herbaceous vegetation and root sprouting shrubs would be the dominant vegetation. It is expected that non-root sprouting shrubs would recolonize the area between 5-20 plus years following disturbance based on burn severity and proximity to a seed source. As with other vegetation types there is an increased risk of establishment and/or expansion of noxious/invasive species immediately following disturbance. Even with this expansion it is not expected that these would become dominant.

Approximately 6 acres of dry valley bottoms is identified within the proposed burn holding lines (approximately 2% of the dry valley bottom vegetation community within the project area). These areas are already highly modified and dominated by non-native grasses such as Kentucky bluegrass and bulbosa bluegrass and invasive species. Burning of Kentucky bluegrass in early spring or fall tends to have little negative impacts and may even be beneficial to the species (US Forest Service 2002).

Approximately 275 acres of stable aspen are targeted for prescribed fire (14% of the stable vegetation community within the project area). Aspen studies conducted in 2014 indicate that mature aspen are scattered throughout the proposed treatment area. In areas where aspen stems are more prevalent and in those areas that experience higher fire severities more aspen suckering is expected (Keyser et al 2005 and Jones et al 2005).

Approximately 2,750 acres of seral aspen are targeted for prescribed fire (35% of the seral aspen vegetation community within the project area). Of this 2,057 acres would be harvested and subsequently burned and 693 acres are proposed for a prescribed fire treatment only (see table 8 above). As with the stable aspen stands it is assumed that the prescribed fire would burn in a mosaic pattern. A moderate-severity fire generally results in dense aspen sprouting. A new, even-aged aspen stand may develop within a decade (Howard 1996). Fire releases sprout primordia on roots from hormonally controlled growth inhibition, removes canopy shade, and blackens the soil surface thereby increasing the heat absorption. Increased soil temperatures aid sprout production (Howard 1996; Hungerford 1988). Root systems of top-killed stems send up a profusion of sprouts for several years post fire. On cooler sites, aspen may be unable to sprout until soil temperature rises after fire (Howard 1996; Hungerford 1988). It is expected that suckering would attain 4,450 suckers/ac. (Munoz 2013).

All levels of disturbance severity, particularly those that directly reduce conifer competitors and aspen, will activate hormonal responses in roots, which stimulate vegetative reproduction (Schier et al. 1985). Generally, more severe disturbance would result in higher densities of aspen regeneration, but this does not ensure that the majority of stems will survive to maturity.

Cumulative Impacts

For this analysis, past and present activities with the potential to affect resources in the project area are identified below. The Cumulative Impact Analysis Area (CIAA) for vegetation is the project boundary. Vegetation types and acres are defined above in the document. Implementation of the action alternatives is expected to last approximately 10-15 years; therefore, generally a 15-year time frame for analysis was selected. It is estimated that 100 – 500 acres would be treated annually. The geographical boundary for the cumulative impact analysis may vary by resource.

Past and Present Actions

Past and present actions with the potential to contribute to cumulative impacts to the resources considered in this analysis include continued wildland fire and associated restoration activities, livestock grazing, fuels removal and timber cutting, weed treatment, and recreational use. These activities are discussed briefly in the following paragraphs.

Fire suppression was successful within the project area. There are few fires reported above 10 acres within treatment areas. Going back to the mid 1980's, records demonstrate only 26 wildfires reported within or adjacent to the project area (wildfire records capture only fires greater than 10 acres in size). There were wildland fires in the area sometime in the 1970s, but they are not shown on the BLM's fire history layer. Some of these past fires received

rehabilitation efforts. The fire history and management section of the PAE provides additional information starting on page 5.

In the last 30 years, there were several small timber sales within the area. Most of this logging occurred on one large sale, John Evans Timber Salvage in 1992 on 305 acres. This sale was a bark beetle salvage thinning in a "donut hole effect" off of main roads and removed 2.6 million board feet. In 1994, a similar Bark beetle event occurred in North Canyon and a 90-acre salvage harvest was completed. This sale removed about 800 thousand board feet of timber. In 2005-2006, a tussock moth outbreak occurred in the Pleasantview Hills. The BLM initiated a salvage sale on 174 acres and removed 1.6 million board feet. The same footprint acreage was replanted following the harvest in 2012. The forestry section of the PAE provides additional information starting on page 12.

Noxious weed control has and will continue to occur within the CIAA boundary. Treatment generally consist of herbicide use within high use area along roads and livestock watering areas. Targeted treatment of weeds within timber harvest areas has occurred since 2017. The noxious and invasive weed management section of the PAE provides additional information starting on page 10.

Livestock grazing occurs on public land within the project area as authorized under the Pleasantview Grazing Association permit #1102803. Grazing use occurs on the majority of areas proposed for treatment, however grazing does not occur within two pastures. The grazing management section of the PAE provides additional information starting on page 14.

Recreational opportunities in the project area are dispersed and seasonal and include Off-Highway Vehicle (OHV) use, hiking, horseback riding, hunting, camping, sightseeing, and picnicking. Similar opportunities are available throughout the analysis area. The project area is under a travel management plan (Curlew/Deep Creek Travel Management Plan; EA# DOI-BLM-ID-I020-2012-0070-EA; Signed January 27th 2014), designating routes. The recreation/travel management section of the PAE provides additional information starting on page 5.

Reasonably Foreseeable Future Actions

Most of the past, present, and ongoing actions discussed above are expected to persist and remain steady throughout the time frame considered in this analysis with relatively little change in intensity expected. Due to the public ownership pattern within the project area, there are no specific areas identified for development at this time within the project area. There is no logging planned for state lands in this area in the 15 year horizon (Laurie Stone, IDL Forester, personal communication 2019).

Livestock grazing will continue as authorized under the Pleasantview Grazing Association permit #1102803. There is potential for an increase in use of 1,700 AUMs compared to actual use since 2012, however it is unlikely these will be used based on conversations with the permittee.

Alternative A: No Action

The past and present actions occurring within the CIAA have led to the current environment and will result in the direct/indirect impacts described above. If the grazing permittees increased grazing use by 1,700 AUMs, this would result in increased utilization of herbaceous vegetation primarily in sagebrush steppe, mountain shrub and valley bottoms. Increased use or affects by livestock within forested communities would occur with most affects occurring in existing loafing/shading areas. Continued suppression of all wildland fire starts would occur into the future. Continued fire suppression would only offset potential aspen regeneration events further,

which would favor conifer expansion in future decades. If wildland fires are successfully suppressed as they occur, shade intolerant species would eventually be replaced with shade tolerant species.

Alternative B: Pleasantview Aspen Restoration

Under Alternative B, it is expected that there would be few measurable increases in cumulative impacts beyond those discussed above under direct and indirect effects associated with the proposed treatments with the exception of the following:

Expectations are that four percent of timber removal and/or prescribed fire treated areas would not exhibit the same or as high of a vegetative response from treatment due to herbivory and trampling. These areas exist near troughs (500 feet radius of trough location) where livestock and wildlife congregate their uses (BLM 2016). A higher probability of noxious/invasive species would occur within these areas as well (BLM 2016). The potential increase in livestock utilization could reduce the vegetative response from treatment within a slightly larger area than previously described.

Soils

Affected Environment:

There are thirty-four different soil map units within the project area however approximately 95% of the project area is composed of only eight different soil map units. These soil map units are composed of nine distinct soil types (BLM 2016). These soils are derived mainly from sedimentary rock and are well drained. Soils within the project area are generally stable with low susceptibility to wind and water erosion (BLM 2016).

Eight different soil map units are represented within the proposed treatment areas (Table 9 below). All nine of the dominant soils types found within the project area are represented within the proposed treatment area with the addition of the Manila and Yago soils types (Table 9). Despite the fact that most of these soils are silt loams, they have a low K_w value (whole soil water erodibility) due to the coarse texture of the soils. This implies that runoff would be negligible on these soils.

More detailed information about individual soils can be located in the Pleasantview Assessment and Evaluation (Chapter III – Existing Resources, Section B – Soils; BLM 2016).

Table 9: Soil Map Unit Symbol/ Name and associated acres within the Project Area

MUSYM (Map Unit Symbol)	Map Unit Name	Acres
42	Hondoho-Hymas-Pavohroo association, 30 to 60 percent slopes	11,851
43	Hondoho-Ridgecrest-Hades association, 12 to 50 percent slopes	1,715
51	Ireland-Calpac association, 30 to 60 percent slopes	10,120
79	Manila-Yago complex, 12 to 30 percent slopes	1,750
82	Northwater-Povey-Pavohroo association, 30 to 60 percent slopes	5,182
88	Pavohroo-Povey association, 30 to 60 percent slopes	4,772
93	Povey-Pavohroo association, 30 to 60 percent slopes	3,971
106	Ridgecrest-Hondoho complex, 30 to 60 percent slopes	13,512

Table 10: Physical Properties of soils affected by proposed treatments. (USDA 2006 Soil Survey of Oneida County Area, Idaho.)

Soil Name	Erosion Factor: K_w	Wind Erodibility Group	Wind Erodibility Index
Hondoho	.20	6	48
Hymas	.15	8	0
Pavohroo	.24	5	56
Ridgecrest	.20	8	0
Hades	.32	5	56
Ireland	.15	8	0
Calpac	.24	7	38
Manila	.43	6	48
Yago	.17	8	0
Northwater	.28	6	48
Povey	.20	7	38

Water erosion susceptibility: Low 0.05 to 0.25, Moderate 0.25 to 0.45, and High 0.45 and above
Wind erosion: Soils assigned to groups with 1 being the most susceptible and group 8 being the least susceptible.

Soils occurring under seral aspen stands are a transition type between Mollisols and Alfisols (Bartos and Amacher 1998). Cryer and Murray (1992) found that the type of soil aspen stands occur on can affect their ability to persist on the landscape. Most aspen stands were found to occur within the soil order mollisols; which have a dark, organically enriched mineral soil. Buck and St. Clair (2012) found that leaf litter associated with broadleaf species such as aspen had higher N and lower C:N ratios than conifers. Alfisols have a significant O horizon composed of decomposing needles, a thin A horizon and a prominent argillic B horizon (Bartos and Amacher 1998). Within stable aspen stands and early seral stands, the leaf litter provided by the deciduous trees maintains and may even thicken the mollic horizon. Within later seral aspen communities and older, less productive stable aspen stands deciduous leaf litter is reduced thus decreasing the thickness and organic matter of the mollic horizon. Water percolation increases through the thinned mollic horizon leading to a leached horizon which is lower in nutrients, organic matter and increased acidity. Within seral aspen stands, as conifer cover increases, the rate of change also increases (Cryer and Murray 1992). Species composition within forested stands also affects soil moisture content, with greater winter snowpack accumulation occurring in aspen stands in comparison to conifer stands (Buck and St. Clair 2012). All soils within the proposed treatment area are mapped as Mollisols (NRCS 2014a; NRCS 2014b).

Direct and Indirect Effects:

Alternative A: No Action Alternative

Under the No Action alternative proposed timber harvest, thinning and prescribed burning treatments would not occur. Soils within the Pleasantview Hills are relatively stable due to a high rock content and ample vegetative cover. The Water Erosion Prediction Project (WEPP) model predicts zero to negligible erosion under the current vegetation condition within the proposed treatment areas. No increased soil erosion or compaction would occur outside of that currently occurring in association with other activities such as off road vehicular travel, recreational fire wood gathering, and livestock management. The Pleasantview Assessment and Evaluation Standard 1; Watersheds, indicate that soils within the project area are stable with no rills or gullies and the occurrence of few, short disrupted water flow patterns (BLM 2016). Under the No Action Alternative seral aspen stands would continue to progress towards conifer dominated stands and the needle duff and litter would continue to increase in depth. As Douglas fir stands within the Pleasantview Hills continue to mature, the amount of understory vegetation decreases. Decreased surface vegetation increases the likelihood of increased erosion for the first 2-5 years should a wildfire occur and remove the evergreen canopy cover.

In the long term it is expected that soils within seral aspen stands would continue to transition from mollic horizons to albic horizons. This conversion would continue to feed into a positive feedback loop favoring conifers over aspen. The continued decrease in soil nutrients and pH may eventually limit the ability of aspen suckers to sprout and/or establish on a site (Cryer and Murray 1992). Continued progression of early seral aspen stands to later climax coniferous forest would also continue the progression of decreased soil Nitrogen and increased C:N ratios (Buck and St. Clair 2012; Clark and St. Clair 2011). This decreased mollic horizon and increased acidity would limit the ability of aspen suckers to sprout and/or survive if disturbance should occur.

Alternative B: Pleasantview Aspen Restoration Alternative

Under Alternative B, approximately 5,606 acres of soils may be affected through the proposed treatments. Table 11 depicts the Soil Map Unit Symbol and the number of acres associated with the Soil Map Unit for the Project Area and each proposed treatment type.

Table 11: Affected acres categorized by proposed treatment type and Map Unit Symbol.

MUSYM	Project Area (acres)	Proposed Treatment Area (acres)	Thinning Only (acres)	Harvest Only (acres)	Harvest and Burn (acres)	Burn Only (acres)	Non-targeted Areas within Burn Units (acres)	Burn Units Total (acres)	Temporary Roads* (acres)
42	11,851	211	0	0	1	81	129	211	0
43	1,715	11	0	0	0	<1	11	11	0
51	10,120	877	8	12	154	28	677	859	9
79	1,750	23	0	0	0	<1	23	23	0
82	5,182	1,759	10	547	825	112	265	1,202	12
88	4,772	2,580	60	323	1,071	702	427	2,200	5
93	3,971	58	0	<1	6	<1	53	59	0
106	13,512	87	0	0	<1	44	43	87	0
Total	**52,873**	**5,606**	**78**	**882**	**2,057**	**967**	**1,628**	**4,652**	**26**

*Temporary roads were calculated at the maximum disturbance footprint of 30feet. Actual active road width assumed to be 14 feet (approximately 12 acres).

The Water Erosion Prediction Project (WEPP) model was utilized to determine the potential erosion within proposed treatment units. Eighteen of the 42 treatment units were modeled utilizing the WEPP model. Modeled treatment units were chosen to represent a diversity of treatment types, landscape setting and treatment area size with the largest treatment areas being favored over smaller units. Modeling of baseline erosion (No treatment) is essentially zero. The information produced from the model is summarized below and described in more detail in the Pleasantview Hills Wildlife Habitat Enhancement Project Soil Report (Appendix E), May 2019.

Effects expected for **Thinning** only treatment (77 acres):

Thinning with small mechanical devices such as chainsaws is not expected to increase erosion potential nor soil compaction above background levels. This is supported by the WEPP model which predicts that there would be no increased erosion in areas that are thinned.

Effects expected for **Temporary Roads and Holding Lines** (29 acres):

There are currently 71 miles (~121 acres) of designated roads and trails within the project area if the maximum width of 14 feet is assumed and approximately 11 miles of non-designated trails (~16 acres). A total of 7.11 miles (~12 acres) of temporary roads, and 32 miles (~17 acres) of holding lines are proposed under Alternative B. This constitutes an increase of 21% above that already occurring.

It is expected that the creation of temporary roads would remove native vegetation and lead to increased soil compaction. Increased bare soil, soil compaction, and vehicular traffic would increase potential erosion within the footprint of the proposed temporary roads. It is also expected that any temporary road would be built following the guidelines outlined in the Pocatello ARMP (2012) which would reduce potential erosion. The temporary nature of these roads would limit the amount, extent and duration of soil movement in connection with this action as all temporary roads would be reclaimed following the completion of the proposed treatment they are associated with. The construction of temporary haul roads to facilitate both timber harvest and prescribed fire may also invite additional recreational vehicular use, which would increase the potential for the development of rills/ruts and increased erosion. To minimize this impact, temporary roads could be signed as “haul roads only” and “not for public use.” Erosion rates associated with vehicular travel and holding lines is expected to return to pretreatment levels following reclamation of all temporary roads and holding lines.

Effects expected for **Harvest** treatments (2,940 acres):

Soil erosion and compaction would occur within harvest units due to equipment and skid trails. Modeling with WEPP indicates this should not exceed 0.27 tons/acre for any one treatment area and would average 0.09 tons/acre.

Areas that are associated with Timber Harvests have an increased potential for erosion due to the presence of skid trails. The same area modeled as a Timber Harvest was also modeled as a skid trail because the amount and location of skid trailing within each timber harvest unit is unknown. It was assumed that no more than 10% of any timber harvest area would be utilized as a skid trail; therefore only 10% of the erosion calculated from this model run was used when predicting the total potential erosion for the site. According to the model erosion due to skid trails would be negligible (minimum 0.017 tons/acre, maximum 0.034 tons/acre) as shown in Table 10 in Appendix E; Soils Report.

Effects expected for **Burn** treatments (3,025 acres):

Soil erosion would occur within prescribed fire treatment areas. Vegetative and litter cover would be reduced throughout the burn units. Unprotected soils have an increased chance for dislodgement by raindrop impact, however, the soils within the proposed burn treatments have a low to moderate K value (water erosion susceptibility measurement) due to the course texture of the soils.

Prescribed fires were also modeled based on the proposed Burn Units. Some of these units were initially harvested indicating that they were in a later seral aspen category, while others were not, indicating that they were either considered true aspen stands or were in an earlier seral aspen category. In stands considered to be in a later aspen seral category the stands were modeled as progressing from a tall grass stage to a shrub stage to a young forest. Early or true aspen stands were modeled as progressing immediately to a shrub stage to a young forest. According to the model erosion due to prescribed fire would be negligible (minimum 0.07 tons/acre, maximum 0.24 tons/acre) as shown in Table 12 in Appendix E; Soils Report.

The Pocatello Approved Resource Management Plan (ARMP; 2012) sets the acceptable limit for soil erosion at 5 tons/acre/year. (Action SW-1.1.1) According to the WEPP model, none of the proposed treatments individually (i.e. Timber Harvest only, or Burn only) would come close to this limit, nor would the combination of these treatments per Burn Unit over a 6-7 year time period. (See Table 8, Appendix E; Soil Report) The maximum predicted erosion for any of the Burn Units for a single treatment type was 2.91 tons/acre/year, while the minimum was 0.15 tons/acre/year and the average was 1.15 tons/acre/year.

General Effects expected for **Thin, Harvest and Burn** treatments (3,984 acres):

It is expected that there would be a temporary, short term increase in soil erosion following both harvest treatments and prescribed fire treatments. Impacts associated with any one treatment type would be distributed both temporally and spatially throughout the project area. Treatments were modeled for a five year duration as described in Appendix E, Soils Report. Modeling indicates that erosion at the end of a five year time frame should not exceed a maximum of 3.4 tons/acre for any one treatment area and would average 1.32 tons/acre.

It is expected that all treatments would increase aspen suckering and seedling establishment. The expected aspen suckering and eventual establishment within treatment areas would positively influence the development and maintenance of the mollic horizons as deciduous leaf litter accumulates and decomposes (Cryer and Murray 1992). This increase in deciduous litter would increase and/or maintain the mollic layer causing a shift towards supporting and/or maintaining aspen stands. All treatments are also expected to increase herbaceous vegetative cover. Increased vegetative cover would add additional protection to the soil surface to rain drop splash impacts (Buckman and Brady 1966) and slow the transport of sediment by overland flow (Thurow, Blackburn and Taylor 1986). Increased herbaceous and broadleaf litter would also increase soil organic matter allowing for greater water holding capacity compared to later seral coniferous forests where duff exhibits water repellency (Buck and St. Clair, 2012). Timber harvests conducted on soils which have a sufficient mollic horizon release aspen suckers and allow for the reversal of the natural progression from mollic horizons to albic horizons by increasing organic matter and nutrients and lowering the pH of the soils (Bartos and Amacher 1998; Cryer and Murray 1992). It has been found that burning of later seral aspen stands better allows aspen to compete with other vegetation (Cryer and Murray 1992). Within those stands for which both timber harvest and prescribed fire are proposed (generally those stands in a later seral state), burning would increase the pH of the soils, release organic carbon and other available

nutrients, allowing aspen to better compete with other vegetation. This too would reverse the natural progression of the sites from mollic horizons to albic horizons (Cryer and Murray 1992).

It is expected that following treatment, wildfires would burn with lower severity within treatment units compared to untreated areas (Fechner and Barrows 1976). Reductions in burn severities would provide for increased residual soil cover and therefore decreased erosion rates compared to untreated areas.

Cumulative Impacts

For this analysis, past and present activities with the potential to affect resources in the project area are identified below. The cumulative impact boundary for soils is the project area boundary. Soil types and acres are defined above in the document. Implementation of the action alternatives is expected to last approximately 10-15 years; therefore, generally a 15-year time frame for analysis was selected. It is estimated that 100 – 500 acres would be treated annually.

Past and Present Actions

Past and present actions with the potential to contribute to cumulative impacts to the resources considered in this analysis would be the same as those discussed above under Vegetation.

Reasonably Foreseeable Future Actions

Past and present actions with the potential to contribute to cumulative impacts to the resources considered in this analysis would be the same as those discussed above under Vegetation.

Alternative A: No Action

Under Alternative A, it is expected that there would be no additional impacts to soils above those already occurring and/or those expected to occur. Travel management will continue to be enforced, watering sites associated with livestock management will continue to be utilized, wildfires and associated suppression measures will continue to be employed. Restoration of areas affected by wildfires will continue to be addressed utilizing the Normal Fire Rehabilitation Plan Upper Snake and Pocatello Field Offices ID-320-2005-003 or applicable document.

Alternative B: Pleasantview Aspen Restoration

Under Alternative B, it is expected that there would be no increases in cumulative impacts beyond those discussed above under direct and indirect effects associated with the proposed treatments.

Wildlife Resources

Affected Environment

The Pleasantview Hills (PH) are comprised of a variety of habitat types. These habitat types, although spatially complex due to variation in soil composition/distribution and moisture, can be generally described by the following six vegetative communities: shrublands (sagebrush steppe and mountain shrub (includes big-toothed maple stands); grasslands (seeding treatments and recently burned areas (early succession); juniper; aspen, conifer/mix; and riparian. The diversity of habitat within the evaluation area is correlated with diversity in wildlife species. The PH are in various ecological status depending on numerous historic and/or on-going influences which have modified vegetative [wildlife habitat] composition and structure. Influences include, but are not limited to the following: timber harvest, noxious/invasive vegetation establishment, insect outbreaks, livestock use, fire or lack thereof, and precipitation received. Additional information about wildlife habitat status can be found in the Pleasantview Assessment and Evaluation (Chapter III – Existing Resources, Section G – Wildlife; BLM 2016).

Many mammalian species occur or potentially occur within the PH and are not mentioned below. Mammal species that have been directly observed or detected within the PH's include: the American badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), black-tailed jackrabbit (*Lepus californicus*) coyote (*Canis latrans*), mountain lion (*Puma concolor*), snowshoe hare (*Lepus americanus*), mountain cottontail (*Sylvilagus nuttalli*), longtail weasel (*Mustela frenata*), and a variety of squirrels and chipmunks (IDFG 2019; BLM observations 2016).

Three species of big game herbivore exist within the PH: Rocky Mountain elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), and moose (*Alces alces*). In accordance with direction set forth in the Pocatello Field Office ARMP (2012), the PH are designated for management as big game summer range (Pleasantview Hills/Samaria Mountains Big Game Wildlife Area). Parturition and rearing habitat for both mule deer and elk is extensive therein the PH. This includes moist areas with dense understory for cover and forage, such as willows, aspen stands, chokecherry (*Prunus virginiana*)/serviceberry (*Amelanchier alnifolia*)/snowberry (*Symphoricarpos oreophilus*) thickets. Sixteen-thousand acres of forested ecotypes exist within the PH (quaking aspen, seral aspen, and Douglas fir stands). There are approximately 2,050 acres of stable quaking aspen stands; approximately 8,000 acres of seral aspen stands (dense competing stands likely invaded by conifers); and approximately 1,250 acres of Douglas fir stands. Although late seral stands provide ungulates with adequate escape and thermal cover, forage value is reduced, especially when compared to the potential that a spatial and temporal mosaic of mixed seral stages could provide. There is often an inverse relationship between plant age and forage value for ungulates. As such, younger and more diverse plant communities are often most beneficial for mule deer/elk (WAFWA Guidance 2009). The PH are located entirely within the Idaho Fish and Game (IDF&G) game management unit (GMU) 73. The most recent big game inventory was conducted winter of 2015; predominately flying the lowlands. The total population estimate (statistically corrected for sight-ability and land area coverage) for mule deer in all of GMU 73 was 8,553. Specifically, within the PH portion of the GMU, 1165 deer and 80 elk were directly observed. The moose population is unaccounted-for the 2015 inventory, as moose – due to their long legs and foraging preference – can, and typically do, over-winter at high elevations that were not flown. Currently, there are no IDF&G established mule deer management goals outside of male to female ratios in the 73 GMU. For elk, the Bannock zone, which incorporates portions/entirety of GMU's 70, 71, 72, 73, 73a, and 74, has an estimated population of 1400-1800 animals (IDFG 2014). Flights for moose and elk are not specifically conducted in the Bannock Zone.

Species of upland game birds known to occur in the PH include the ruffed grouse (*Bonasa umbellus*), greater sage-grouse (*Centrocercus urophasianus*), dusky grouse (*Dendragapus obscrurus*), and Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*). Forested habitat obligates include the dusky and ruffed grouse. In the shrub-land/grassland habitats present in the PH, Columbian sharp-tailed and greater sage grouse are sympatric, although, the two species typically use the habitat differently. Sharp-tails use sagebrush/mountain-shrub stands but do not require brush species for nesting and brood rearing habitat. Sage grouse in the PH utilize both sagebrush and mountain shrub associated habitat types. The entirety of the PH is identified as General Habitat Management Area, as defined in the 2015/19 GRSG ARMPA. However, the forested treatment areas are not identified as seasonal habitat for the grouse (Figure 4), nor are the treatment areas identified as Key Habitat (Figure 5).

Figure 4 Greater Sage-grouse seasonal use areas.

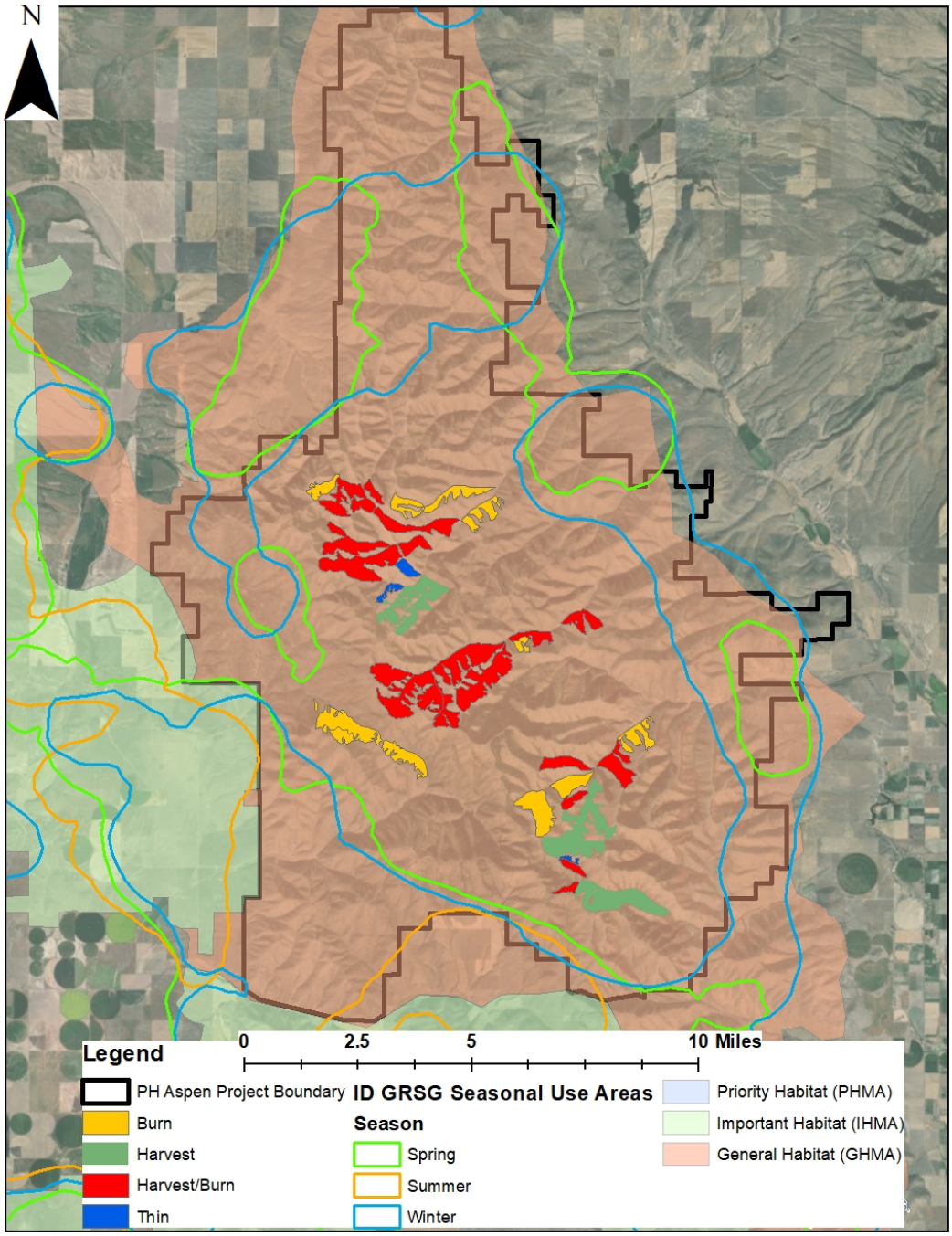
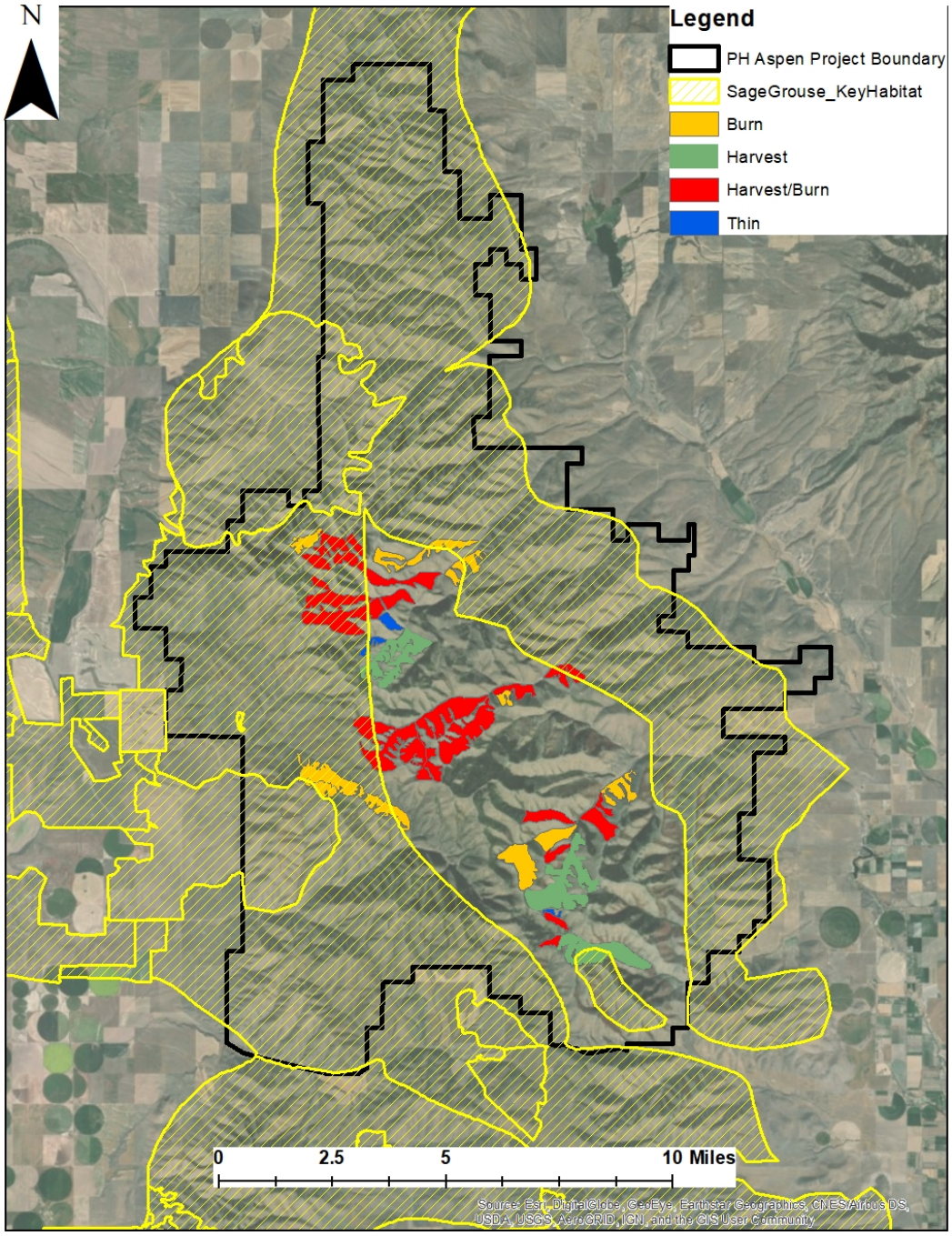


Figure 5. Greater Sage-grouse identified key habitat in relation to treatment area.



Migratory Birds

Migratory birds include species that spend the winter in the southern latitudes, and then fly north to nest, and fledge their young in the summer. An executive order was issued in 2001 (EO 13186) outlining the responsibilities of federal agencies with respect to migratory birds. In 2010, pursuant to this Order, the BLM signed a Memorandum of Understanding (MOU), with the U.S. Fish and Wildlife Service (USFWS) to promote the conservation of migratory birds. In the MOU, the BLM and USFWS agree to work collaboratively to identify and address issues that affect Birds of Conservation Concern (BCC) (USFWS 2008). Birds of Conservation Concern are listed by Bird Conservation Regions (BCRs), which are broad, ecologically distinct geographic

regions in North America that have similar bird communities, habitats, and resource management issues. The PH are located within BCR 9 (Great Basin).

Table 12: BBC's within BCR 9 with the potential to occur within the PH's

Common Name	Scientific Name
Bald eagle	*Haliaeetus leucocephalus*
Brewer's sparrow	*Spizella breweri*
Burrowing Owl	*Athene cunicularia*
Calliope Hummingbird	*Stellula calliope*
Cassin's Finch	*Carpodacus cassinii*
Ferruginous Hawk	*Buteo regalis*
Flammulated Owl	*Otus flammeolus*
Fox Sparrow	*Passerella iliaca*
Golden eagle	*Aquila chrysaetos*
Greater sage-grouse	*Centrocercus urophasianus*
Green-tailed towhee	*Pipilo chlorurus*
Lewis's woodpecker	*Melanerpes lewis*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Peregrine falcon	*Falco peregrinus anatum*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Sage sparrow	*Amphispiza belli*
Sage thrasher	*Oreoscoptes montanus*
Swainson's Hawk	*Buteo swainsoni*
Virginia's warbler	*Oreothlypis virginiae*
Willow flycatcher	*Empidonax extimus*

Special Status Animals

Special Status Species (SSS) are identified as those for which population viability in the region is a concern as indicated by current or predicted downward trends in population numbers, density, or habitat capability. Special Status Species receive special management emphasis to ensure their viability and to prevent the need for listing of the species as Threatened, Endangered, and Proposed Candidate Species, under the Endangered Species Act (ESA) of 1973, as amended. The BLM also recognizes SSS as those that are range-wide or globally imperiled, regionally or state imperiled or peripheral species (species that are generally rare in Idaho, with the majority of their breeding range outside the state).

There are no known federally listed species (Type 1) with potential to occur in the evaluation area. Type 2 SSS include: Idaho BLM sensitive species, including USFWS proposed and candidate species, ESA species delisted during the past five years, and ESA experimental non-essential populations (BLM 2014).

Table 13 Type 2 SSS and their habitat associations

Special Status Species	Sagebrush/grassland	Riparian	Juniper	Aspen	Mountain Shrub	Conifer
Greater Sage Grouse	X				X	
Columbian Sharp-tailed Grouse	X				X	
Ferruginous Hawk	X		X			
Loggerhead Shrike	X		X		X	

Special Status Species	Sagebrush/grassland	Riparian	Juniper	Aspen	Mountain Shrub	Conifer
Sage Sparrow	X					
Sage Thrasher	X					
Brewer's Sparrow	X					
Burrowing Owl	X					
Lewis' Woodpecker			X	X		X
Long-billed Curlew	X					
Short-eared Owl	X	X				
Golden Eagle	X	X	X	X	X	X
Green-tailed Towhee	X				X	
Olive-sided Flycatcher	X	X	X	X	X	X
Virginia's Warbler	X		X		X	
Pinyon Jay			X	X		X
Northern Goshawk				X		X
Flammulated Owl				X		X
Silver-haired Bat	X	X	X		X	
Big Brown Bat	X	X	X		X	
Little Brown Bat	X	X	X		X	
Western Small-footed Myotis	X	X	X		X	
Long-eared Myotis	X	X	X		X	

Direct and Indirect Effects:

Alternative A: No Action

The current conditions of aspen within the project area would progress toward late seral stages, leading to decrease plant species diversity and reduction in diversity of aspen habitat. Long term lack of disturbance would likely convert several seral aspen stands to conifer stands further reducing the habitat aspen stands provide.

Some wildlife species, which favor dense forest conditions, such as woodpeckers, owls and moose, may benefit from the No Action Alternative because these conditions would continue to exist and expand within the project area. There would be no short-term effects to various wildlife species, however in the long-term, the increased fuel load increases the possibility of catastrophic stand-removing fire. Should this type of fire occur, thermal and security cover for elk, deer, and moose would be dramatically reduced. Additionally, a large wildland fire could remove forest habitat and the adjacent sagebrush resulting in a critical loss to various sagebrush obligate species.

Effects expected for **Thinning** only treatment (77 acres):

Short-term displacement due to noise disturbance during chainsaw operations would be expected. Increased dry fuel loads would be present in treatment areas, especially over the short term, and insect density would be expected to increase as a result additional downed woody material. Initially, access into thinned stands by large ungulates may be difficult due to tripping hazard.

Effects expected for **Harvest** treatments (2,940 acres):

There may be limited mortality to small mammals and reptiles through crushing during heavy equipment use during pioneering of harvest landings/access roads, and cross-country travel by heavy equipment. Furthermore, disturbance areas associated with heavy equipment use, would be expected vectors for non-native species establishment, however, BMPs would require years of post-disturbance monitoring/treatment to reduce weedy species abundance/occurrence. Design feature avoiding treatments during the breeding season(s) would effectively minimize additional direct effects.

Over time, treatments would increase understory production of grass and forbs through opening up of the over-story and ground disturbance. Removal of encroaching conifers from natural montane meadows and aspen stands would maintain and increase plant species diversity. These treatments would also create a forest structure resistant to stand replacement fires. Fires that do occur would burn more "naturally" due to reduction of fuel build up caused by a century of fire suppression. These actions are expected to stimulate aspen and deciduous shrub growth. Expansion of vegetation diversity, specifically deciduous shrubs/trees, would increase and diversify foraging opportunities for many species and their predators. As shrubs and aspen cover increase, early successional vegetative cover would replace cover loss from conifer removal. Forage value and habitat suitability would increase for a variety of species including big game, game birds, and a variety of special status species.

Generally, a reduction of forest over-story/canopy is expected to result in an increase in vegetative production near soil level. By increasing sun exposure and access to water/precipitation [primary factors], an increase in vegetation production at heights accessible to grazing animals is expected. Post-treatment, a portion of the newly available forage produced would be aspen, however, a variety of other browse species would be expected to sprout/bolt as well. Browse species include, but are not limited to, chokecherry, ninebark, snowberry, Rocky Mountain maple, and antelope bitterbrush. Figure 2 and Figure 3 of Appendix J exhibit post forest harvest treatments (completed in 2009; Pleasantview Hills, John Evans Pasture) conditions at varying distances from active livestock [cattle] watering troughs. Considering the abundance and diversity of browse/herbaceous species present within the treatments areas, combined with the adaptive management design features, it is expected that the deleterious impacts from ungulate grazing (both domestic and wild) post-treatment, would be negligible.

Effects expected for **Burn** treatments (3,025 acres):

Impacts would be similar to Harvest treatments, except Burn treatments would be especially invigorating to post-fire sprouting herbaceous species desirable forbs, grasses, aspen and some mountain shrub/browse species. Aspen release would be expected at stems-per-acre twice to three times that of Harvest only treatment areas. Periphery of Burn treatment units, hose lays and hand-lines would modify habitat (soil/vegetation condition) on the periphery of treatments, albeit on a limited acreage. These areas may be prone to invasive species establishment. Best

Management Practices (e.g. seeding and weed treatment) would require that fire control measures/acreages be monitored/treated for three years post treatment/reclamation.

Treatments described in the proposed action would diversify age structure of forested habitats throughout the PH, resulting in marked progress toward meeting habitat objectives identified in the vegetation, forestry and wildlife subsections of the PFO ARMP; additionally objectives from the IDF&G Elk Management, and Mule Deer Initiative Action Plan(s) would be fulfilled in these habitats. Aspen communities are vital summer and fall habitat for mule deer, which support a diversity of plants that provide high quality forage, thermal cover and concealment (Debyle and Winokur 1985). When compared to conifer-dominated forests, aspen stands have greater forb production and diversity (Thiel 2012). Shallow et al. (2015) documented that mule deer females utilizing aspen communities had higher maternal condition and averaged larger litter sizes than females from conifer forests. Those fawns had higher birth weights, growth rates and survival than fawns from conifer forests. Additionally, the high quality forage provided by aspen and its associated understory increases fat reserves for elk, ultimately enhancing overwinter survival (Green and Bear 1990). Moreover, aspen communities support a greater diversity and abundance of birds, and provide more cavity, canopy and ground nesting habitat compared to conifer dominated forests (Swift et al. 2017; Heath 2004; Griffis-Kyle and Beier 2003).

Cumulative Impacts

The past, present, and reasonably foreseeable future actions within the cumulative effects analysis area especially relevant to wildlife resources are presented in Table 14. The spatial extent of these actions were calculated using the best available BLM GIS data. The total area within the Cumulative Impacts Assessment Area (CIAA) is 453,258 acres (Figure 6). Major lands areas are comprised by privately owned (270,720 acres), BLM managed (121,920 acres), USFS managed (52,355 acres), and State managed lands (8,135 acres).

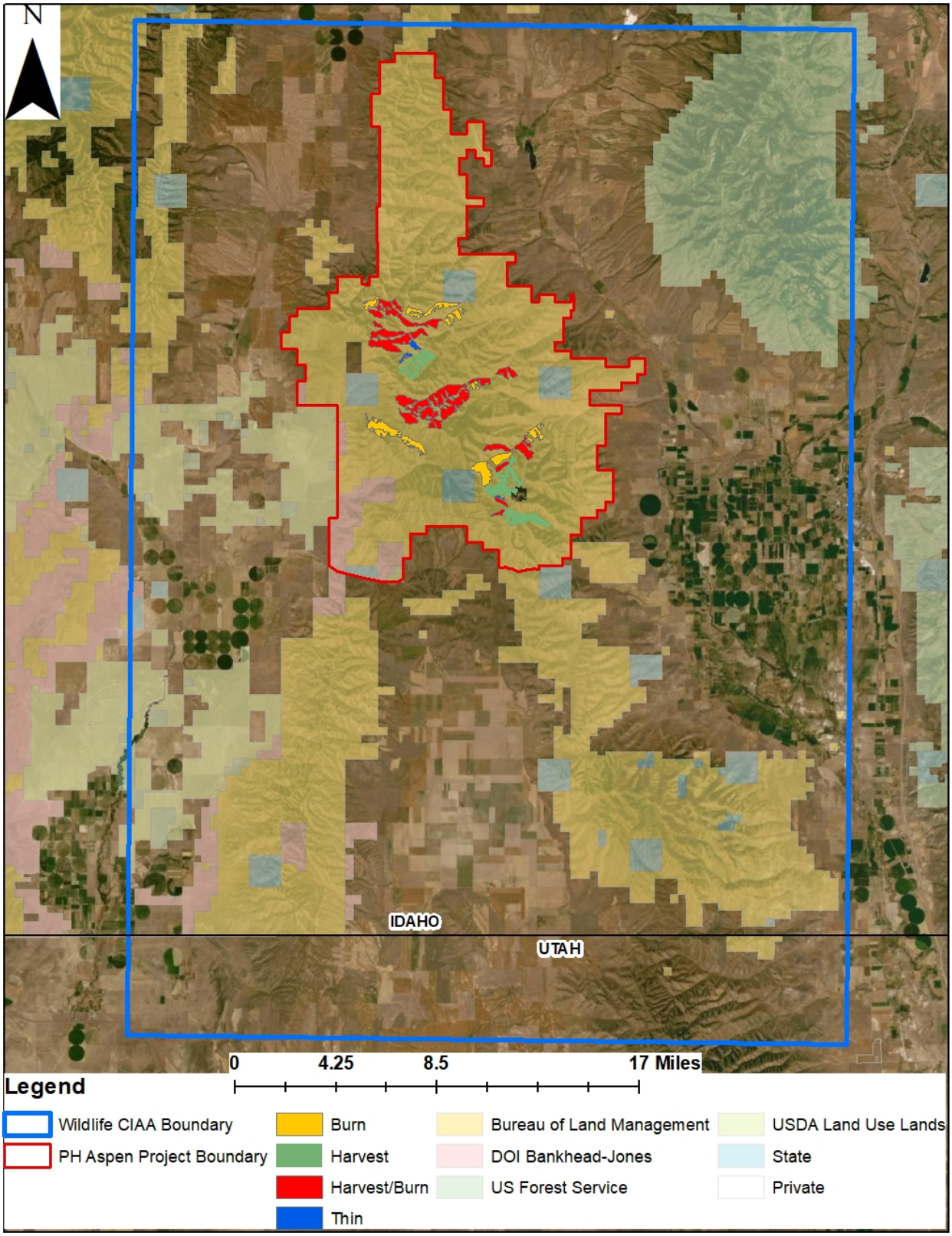
Table 14: Past, present, and foreseeable future actions within the cumulative effects analysis area for wildlife.

Type of Activity	Past and Present	Reasonably foreseeable additions
Grazing	The majority of all public lands within the CIAA are available for livestock grazing. All or a portion of 16 BLM allotments, and 7 USFS allotments, occur with the CIAA.	Grazing would continue on the federal allotments. Changes could be made to grazing use through the permit renewal process to address resource issues if needed. Pleasantview Allotment could see an increase in use of up to 1,700 AUMs.
Wildfire	61,472 acres burned (1985-2016). Full suppression actions taken.	Full suppression of any wildfires would occur.
Vegetation Treatments (Prescribed Fire, Mechanical and Chemical)	At least 26,048 acres (1971-2018)	Herbicide treatments to control noxious weeds occur within high traffic areas (along roads) and around livestock watering areas.
Agriculture	Roughly 90,000 acres	None
Communication* and Mineral Material sites	15 acres	New sites would be authorized as demand requires. Development potential unknown, albeit increased need is expected as citizen population growth occurs
Roads** and Transmission Lines	630 miles	Development potential unknown, albeit increased need is expected as citizen population growth occurs. 7.1 miles of new (temporary) haul roads would be utilized over the course of the project.

**Communication sites assumed at 0.5 acres of disturbance.*

***Roads with maintenance regime level 3 or greater, as defined in the 2015/19 GRSG ARMPA (Appendix H, pg. 41).*

Figure 6. Wildlife Cumulative Impact Analysis Area



Alternative A: No Action

Previous actions, such as past seedings and water developments, have increased forage production, water availability and distribution for wildlife. Activities such as livestock grazing;

road construction and maintenance; recreation activities including off-highway travel, camping and hunting; fence construction and wildfire have altered wildlife habitat, and/or affected wildlife behavior and distribution. These activities are expected to continue to some degree in the future and would continue to impact wildlife. However, as additional vegetative treatments occur (weed treatments, other habitat restoration projects), habitat improvements would be expected, thereby reducing competition for resources and habitat, providing long-term cumulative benefits to wildlife. BLM policy and guidance on sage grouse/sharp-tailed grouse; various migratory birds and special status species would help to reduce deleterious impacts to said wildlife species.

Alternative B: Pleasantview Aspen Restoration

There could be an increase in grazing use within the project area that would result in additional herbivory within the grazing allotment, and thereby the treatment areas. The various design/adaptive management features of the proposed action are expected to effectively minimize excessive herbivory of aspen and other browse within treatment areas. These design features (Appendix D), in combination with the diversity/resiliency of the habitat present in the Pleasantview Hills, is expected to result in the attainment of recruitment objectives for aspen saplings.

Roughly, 17,515 acres of forest habitat (largely excluding Rocky Mountain maple/Utah juniper stands, and the limited aspen in the Hansel mountains) exists within the Wildlife CIAA boundary (2016 PVEA), 9,150 acres of which is aspen or aspen associated (mixed stands). The 4,500 acres of treatments proposed herein this EA, constitutes roughly 25% of the forested stands present within the Wildlife CIAA, and roughly, 40% of the aspen associated forested stands present therein. The State Fire (2013) burned roughly 2,356 acres of forested stands on the Samaria Mountain, within the CIAA, southeast of the project area. This acreage – roughly 13% of forested stands within the CIAA - burned under varying severity, some stand replacing, while other areas had numerous unburnt islands/mosaics. The proposed aspen treatment acreage in combination with the State fire disturbance equates to roughly 38% of the aspen associated habitats within the CIAA. Treatments proposed herein, considered cumulatively with previous disturbance/forest treatments, would be expected to; substantially benefit wildlife resources, especially the numerous species in preference of various/earlier forest conditions and/or aspen associated habitats, and result in attainment of ARMP objectives/goals.

Roughly, 7 miles of temporary haul roads would be developed and reclaimed over the project's life. Roads would be closed/re-contoured and signed immediately following harvest operations, limiting their use by recreationists. Considering 7.1 miles is just over 1% of the existing linear disturbance features present within the CIAA, and the temporary nature of the haul roads, new haul road construction would be expected to have a negligible cumulative effect on wildlife resources.

Improved diversity of forested habitat on a regional (CIAA) scale, is expected to improve recreational hunting opportunity for a variety of game species (e.g. mule deer, moose, elk, sharp-tailed grouse, and forest grouse). In 2017, over 2100 hunters participated in deer hunting in GMU 73, spending an estimated 8,400 days actively hunting. Big game hunting is a significant cultural and important social activity for Idaho's residents. Maintaining and improving aspen stands would positively benefit mule deer populations in the PH and overall ecosystem health. Consistent with Secretarial Order 3362 (2018), restoring aspen communities in the PH would effectively "expand opportunities for big game hunting by improving priority habitats…" and "improve the quality of big-game migration corridor habitat on federal lands."

CONSULTATION AND COORDINATION

This chapter lists individual BLM resource specialists who participated in the preparation of this EA, as well as others who contributed or were contacted during its development. The alternatives and issues analyzed in detail were produced through input from those identified below.

Tribes, Agencies, and Organizations Contacted

The following were contacted during the preparation of this EA.

Agencies	
Idaho Department of Agriculture	SE Idaho Environmental Network
Idaho Department of Environmental Quality	US Fish and Wildlife Service
Idaho Department of Fish and Game; Southeast Region	US Forest Service; Caribou-Targhee National Forest
Idaho Department of Lands	United States Congress, Mike Simpson
Oneida County Commissioners	United States Senate, James Risch
Oneida County Fire District	United States Senate, Michael Crapo
Pleasantview Livestock and Grazing Association	
Organizations	
Idaho Conservation League	Western Watersheds Project
Idaho Wildlife Federation	WildLands Defense
Tribes	
Shoshone Bannock Tribes	

List of Preparers

The following were involved with the development of this EA:

Bureau of Land Management, Pocatello Field Office

Karen Kraus	Natural Resource Specialist (soils)
Mike Kuyper	Supervisor / Assistant Field Manager / Range
Amy Lapp	Archaeologist
Shelli Mavor	Fire Ecologist
Blaine Newman	Assistant Field Manager / Travel / Recreation
David Price	Wildlife Biologist
Channing Swan	Forester, BLM Project Lead
Ben Swaner	Planning and Environmental Coordinator

Idaho Department of Fish and Game

Anna Owsiak	Regional Habitat Manager
Matt Pieron	Staff Biologist, Mule Deer Initiative Coordinator

APPENDIX A – Resources Considered Table

Resource	Not Present	Present Not Analyzed	Present Analyzed	Rationale
Access		X		The proposed actions would not impact Access.
Air Quality		X		Short term impacts due to burning. Following state regulations as well as the MT/ID air shed group. See BMPs
Areas of Critical Environmental Concern (ACEC's)	X			Not present/ Not affected
Cultural Resource		X		A cultural resources report (BLM report #2019-PFO-7) was completed for this project. See Appendix D for cultural resource stipulations. A No Historic Properties Affected determination has been made for this project.
Economic and Social Values	X			Not Present or affected
Environmental Justice	X			Not present/ not affected
Existing and Potential Land Uses	X			Not present/ Not affected
Fisheries	X			Not present/ Not affected
Floodplains	X			Not present/ not affected
Forest Resources			X	Impacts are disclosed under Environmental Consequences.
Invasive, Non-Native Species			X	Impacts are disclosed under Environmental Consequences.

Resource	Not Present	Present Not Analyzed	Present Analyzed	Rationale
Mineral Resources		X		Not impacted
Native American Religious Concerns		X		None known.
Paleontological Resources	X			Not present/ Not affected
Prime and Unique Farmlands	X			Not present/ Not affected
Range Resources		X		The proposed action would not impact the management of permitted grazing.
Recreational Use		X		Temporary both spatially and temporally. Restricted access.
Soils Resources			X	Impacts are disclosed under Environmental Consequences.
Threatened, Endangered, and Sensitive Animals	X			There are no T&E species within the project area. Sensitive animals are discussed in the wildlife section.
Threatened, Endangered, and Sensitive Fish	X			Not present/ Not affected
Threatened, Endangered, and Sensitive Plants		X		BMPs/SOPs will alleviate any possible effects of the proposed treatments.
Tribal Treaty Rights and Interests		X		The 1868 Fort Bridger Treaty, between the United States and the Shoshone and Bannock Tribes, reserves the Tribes' right to hunt, fish, gather, and exercise other traditional uses and practices on unoccupied federal lands. The proposed project would not change the Tribes ability to access and

Resource	Not Present	Present Not Analyzed	Present Analyzed	Rationale
				exercise treaty rights within the project area.
Vegetation			X	Impacts are disclosed under Environmental Consequences.
Visual Resources		X		Affected but not analyzed. In a class 3 and 4 can be modified from moderate to high.
Wastes, Hazardous and Solid	X			Not present/ Not affected
Water Quality (Surface and Ground)		X		Possible depending on BMPs and SOPs
Wetland and Riparian Zones		X		Not Impacted. See appendix D
Wild & Scenic Rivers	X			Not present/ Not affected
Wild Horse and Burro Designated Herd Management Areas	X			Not present/ Not affected
Wilderness	X			Not present/ Not affected
Wild Lands	X			Not present/ Not affected
Wildlife Resources			X	Impacts are disclosed under Environmental Consequences.

APPENDIX B – GLOSSARY

Animal Unit Month (AUM): The amount of forage required by one animal unit for one month. Animal Unit (AU) is generally one mature cow of approximately 1,000 pounds and a calf as old as six months, or their equivalent.

Fire Regime Groups (FRG): General temporal and spatial patterns of fire behavior and effects within a particular vegetation type or ecosystem over multiple fire cycles (decades to centuries) determine the fire regime over a specific period for any given ecosystem. Vegetation display a range of fire behavior and fire characteristics that depend on factors such as the vegetation composition and fuel structure, stage of succession after previous fires or other disturbances, types of past management, climate and weather patterns, terrain, and landscape patterns. Fire regimes provide an integrated way of classifying the impacts of these diverse spatial and temporal patterns of fire and impacts of fire at an ecosystem or landscape level. The national, coarse-scale classification of fire regime groups commonly used includes five groups: I - frequent (0-35 years), low severity; II - frequent (0-35 years), stand replacement severity; III - 35-100+ years, mixed severity; IV - 35-100+ years, stand replacement severity; and V - 200+ years, stand replacement severity (Sommers et al 2011).

Ground Fire: A fire that burns in surface organic materials such as peat or deep duff layers. Ground fires typically undergo a large amount of smoldering combustion and less active flaming than other types of fires. They may kill roots of overstory species because of prolonged high temperatures in the rooting zone (Sommers et al 2011).

Surface Fire: Fires that burn only the lowest vegetation layer, which may be composed of grasses, herbs, low shrubs, mosses, or lichens. In forests, woodlands, or savannas surface fires are generally low to moderate severity and do not cause extensive mortality in the overstory vegetation (Sommers et al 2011).

Understory or sub-canopy fire: A fire that burns trees or tall shrubs under the main canopy. Depending on structure, this may also be called a surface fire (Sommers et al 2011).

Crown Fire: A fire that burns through the upper tree or shrub canopy. In most cases the understory vegetation is also burned. Depending on species, a crown fire may or may not be lethal to all dominant vegetation. An example of this would be many shrub and broadleaf tree species that sprout from roots, root crowns or stem bases after their tops are killed. A crown fire may be continuous or may occur in patches within a lower severity burn (Sommers et al 2011).

Stand Replacement Fire: A fire that is lethal to most of the dominant above ground vegetation and substantially changes the vegetation structure. Stand replacement fires may occur in forests, woodlands and savannas, annual grasslands, and shrublands. They may be crown fires, high-severity surface fires, or ground fires (Sommers et al 2011).

Mixed-Severity Fire: The severity of fires varies between nonlethal understory and lethal stand replacement fire with the variation occurring in space or time. In some vegetation types, the stage of succession, the understory vegetation structure, the fuel condition and/or the weather may determine whether a low or high-severity (or surface or crown) fire occurs. In this case individual fires vary over time between low-intensity surface fires and longer-interval stand replacement fires. In others, the severity may vary spatially as a function of landscape complexity or vegetation pattern. The result may be a mosaic of young, older, and multiple-aged vegetation patches (Sommers et al 2011).

Fire Frequency: The number of times that fires occur within a defined area and time period (Sommers et al 2011).

Fire Return Interval (or fire interval; FRI): The time between fires in a defined area, usually at the scale of a point, stand or relatively small landscape area. This is called Mean Fire Interval (MFI) in the LANDFIRE system, where it refers to the average number of years between fires in representative stands (Sommers et al 2011; Barrett et al 2010).

Biophysical Settings (BPS): Represent the vegetation that may have been dominant on the landscape prior to Euro-American settlement and is based on both the current biophysical environment and an approximation of the historical disturbance regime.

LANDFIRE: Web based Landscape Fire and Resource Management Planning Tools, it is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. LANDFIRE data products provide data for landscape assessment, analysis, and management. Data and information serve as important data sets in decision support with efforts such as identification of areas with similar characteristics, prioritization exercises, modeling capacity and potential, and improving collaboration between landowners with common data sets and analytics (https://www.landfire.gov/index.php).

Off-Highway Vehicle (OHV): A type of vehicle designed specifically for off-road use. Some can be driven on the road, but the vast majority of drivers reserve their OHVs for recreating in places that regular vehicles cannot go.

APPENDIX C – LAND USE PLAN CONFORMANCE AND RELATIONSHIP TO STATUTES, REGULATIONS OR OTHER PLANS

Land Use Plan Conformance

The alternatives are in conformance with the objectives, goals, and intent of the Idaho and Southwestern Montana Greater Sage-Grouse (GRSG) Approved Resource Management Plan Amendment (ID/swMT ARMPA; BLM 2015) and the Approved Pocatello Resource Management Plan (PFO ARMP; BLM 2012).

The Record of Decision for the Idaho and Southwestern Montana Approved Resource Management Plan Amendment (ID/swMT ARMPA) was signed on September 21, 2015. The ARMPA amended all of the Land Use Plans within Idaho that have sage-grouse habitat. The ARMPA identifies and incorporates measures to conserve, enhance, and restore GRSG habitat by avoiding, minimizing, and compensating for unavoidable impacts of threats to GRSG habitat. The ARMPA addresses threats to GRSG and its habitat identified by the GRSG National Technical Team (NTT), by the USFWS in the March 2010 listing decision, as well as those threats described in the USFWS's 2013 COT report. The ARMPA establishes Objectives, Management Decisions, Buffers, and Required Design Features to protect and restore sage-grouse habitat. Idaho uses a conformance review form to document how each project proposal conforms to the ARMPA.

Specific management decisions and required design features identified in the ID/swMT ARMPA that are applicable to this project for the *Southern Conservation Area* (located south of the Snake River and east of the Bruneau River, including East Idaho uplands) are addressed in the Idaho Greater Sage-grouse Implementation Plan Conformance Request and Review Worksheet located in Appendix H.

Specific goals, objectives, and management actions identified in the PFO Approved Pocatello Resource Management Plan (BLM 2012) that are applicable to this project include:

- ***Goal FO-1. Use a variety of silvicultural techniques and harvest systems to provide for an ecologically healthy system while offering products and services.***
    - **Objective FO-1.1** *Maintain a sustainable forest management program.*
        - **Action FO-1.1.3** Forest management projects will be designed to simulate natural patch sizes, shapes, connectivity, and species composition and age-class diversity in accordance with silvicultural prescription.
        - **Action FO-1.1.4** Silvicultural prescriptions will provide for stand health through the management of insects and disease, animal damage, and vegetation competition to promote regeneration of tree growth.

- ***Goal FO-2. Provide the Tribes and public opportunities for the use of forest/vegetal products to promote an ecologically healthy system.***
    - **Objective FO-2.1** *Maintain approximately 45,700 acres of commercial forest land in order to offer on a yearly basis 600-900 thousand board feet (MBF) as a "not to exceed" probable sale quantity.*
        - **Action FO-2.1.1** A full complement of harvest systems and other treatment methods and techniques will be used unless specifically prohibited or limited by individual prescription direction.
        - **Action FO-2.1.3** The following mitigation measures will be applied for all harvest activities to reduce adverse impacts on wildlife habitat, streams, and riparian areas:

- In Douglas fir stands, leave no fewer than 5 snags per acre and recruit an additional 15 trees per acre of live trees. The size of snags and snag recruitment should be the equivalent of the largest size class on site. Recruitment snags will not have to be structurally superior. Live trees with forked and broken tops may be preferred.
- Prescribe and maintain site specific levels of down/dead woody materials to balance the needs for nutrient recycling, wildlife habitat, and wildfire protection.
- No harvest activities in known ungulate fawning or calving areas until after July 1st in any given year.
- No harvest activities in known ungulate winter range areas from November 15th to April 30th in and given year.
- No harvest or yarding activities within 50 feet of intermittent and ephemeral channels.
- Fuels will be reduced to pre-harvest or within natural loading range.

- ***Goal FW-1. Manage wildlife habitats so vegetation composition and structure assures the continued presence of fish and wildlife as part of an ecologically healthy system.***
    - **Objective FW-1.1** *Maintain and improve wildlife habitats to support IDFG management objectives.*
        - **Action FW-1.1.1** As appropriate and practical, elk and deer habitat on public lands will be managed as identified below in order to generally support IDFG management objectives as described in the White-tailed deer, mule deer, and Elk Management Plan – Status and Objectives of Idaho's White-Tailed deer, Mule Deer, and Elk Resources (IDFG 1999) for southeast Idaho management units:
            - Aspen will be treated by applying appropriate management techniques that may include but are not limited to:
            - Removing encroaching conifer in Aspen clones.
            - Slashing old age aspen clones while leaving snags and some live trees.
            - Pursuing the use of prescribed fire.
        - **Action FW-1.1.2** The Integrity of the elk calving areas would be protected by: Design fire and non-fire vegetation treatments to protect the integrity of individual elk calving areas by providing for a desired mix of successional stages (e.g., 33% early, 33% mid, and 33% late),…
        - **Action FW-1.1.10** For the following big game summer/winter range areas, management guidance would be as follows to enhance and/or prevent loss of habitat: Pleasantview Hills/Samaria Mountains (big game summer range):
            - Native vegetation conditions to be maintained or improved
            - Aspen regeneration (e.g. cutting/harvesting, prescribed fire) would be enhanced as appropriate.

- ***Goal FW-2. Provide for the diversity of native and desired non-native species as part of an ecologically healthy system.***

- **Objective FW-2.1** *Maintain or improve native and desired non-native species and connectivity among habitats.*
  - **Action FW-2.1.2** The following snag retention guidelines will be implemented during forestry project implementation (forest management) to maintain adequate availability and distribution of snags:
    - Snags with existing cavities or nests will be priority for retention.
    - If site potential allows, will retain 5-7 snags per acre, preferably in a clumped configuration.
    - If possible, will retain at least 15 live trees per acre for future snag recruitment. Recruitment snags will not have to be structurally superior, live trees with forked and broken tops may be preferred.

- ***Goal SS-1. Manage special status species and their habitats to provide for their continued presence and conservation as part of an ecologically healthy system.***
  - **Objective SS-1.3** *Maintain or improve the quality of sensitive species habitat by managing public land activities to support species recovery and benefit those species.*
    - **Action SS-1.3.12** During restoration and rehabilitation of migratory species habitat, emphasis will be placed on riparian, non-riverine wetlands, sagebrush and Douglas fir habitat and the following management guidelines will be implemented as appropriate based upon site specific characteristics:
      - Improve aspen stands by reducing conifer invasion and overall reduction of average stand age to <40 years.
      - Improve dry conifer with reductions of stand density

- ***Goal VE-2. Prevent the establishment of invasive species/noxious weed species.***
  - **Objective VE-2.1** *Treat invasive species/noxious weed species to decrease or control the total number of acres occupied.*

- ***Goal VE-4. Manage vegetation types to provide for their continued presence as part of an ecologically healthy system.***
  - **Objective VE-4.2** *In the Aspen/Aspen Conifer Mix and Dry Conifer types, commensurate with site potential, maintain or increase LHC-A and B acres as described below so the landscape is composed of 40% mixed Aspen/Dry Conifer and 60% Aspen dominate areas consisting of 500-1,000 stems/acre w/5-15 ft. height resulting in the distribution of age classes of <30 years (40%), 31-80 years (40%), and >80 years (20%).*
    - **Action VE-4.2.1** Aspen/Conifer sites will be treated using appropriate treatment methods and harvest rotation cycles to achieve desired age classes. Appropriate methods may include but are not limited to regeneration and partial cuts.
    - **Action VE-4.2.2** Within the Aspen/Aspen Conifer Mix and Dry Conifer vegetation types, treatment and restoration priority areas will be:
      - Areas with greater than 50% mature conifer composition.
      - Areas adjacent to deer/elk summer range.
      - Areas significant to special status species.
      - Areas impacted by insects or disease.

- ***Goal WF-2. Protect life, property, and resources.***

- **Objective WF-2.2** *Manage public lands to protect, improve or enhance resources/values at risk.*
  - **Action WF-2.2.1** Appropriate treatment methods (e.g. mechanical, chemical, seeding, WFO, and prescribed fire) will be used to maintain or improve FRCC/LHC or to reduce fire hazard.

- ***Goal WF-3. Return fire to a more natural role in the ecosystem to improve FRCC and achieve desired LHC.***
  - **Objective WF-3.2** *Manage the mid-elevation shrub, juniper, dry conifer, Aspen/conifer and mountain shrub vegetation types in order to move towards FRCC 1 (LHC-A) so wildland fire mimics historical conditions.*
    - **Action WF-3.2.3** Vegetation treatments will be designed to simulate the effects of historic fire on vegetation structure and composition.
  - **Objective WF-3.6** *Implement priorities for wildland fire suppression and vegetation treatments.*
    - **Action WF-3.6.2** Priority areas for establishing vegetation treatments will be:
      - Aspen/Conifer, Mountain Shrub, Dry Conifer Restoration
  - **Objective WF-3.9** *Manage the Aspen/Aspen Dry Conifer Mix, Dry Conifer, Wet/Cold Conifer, Riparian, and Other/Vegetated Lava vegetation types in order to maintain vegetation conditions and wildland fire regimes similar to historical conditions..*

Relationship to Statutes, Regulations or other Plans

The following regulatory provisions are relevant to this EA: HR 1904 Healthy Forest Restoration Act of 2003 (16 USC 6512, 6513).

Broad objectives for management of vegetation on public lands are identified in BLM's *Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan* (2006) and *Partners Against Weeds: An Action Plan for the Bureau of Land Management* (1996). The following laws, acts, plans, manuals, and policies provide a foundation for vegetation management by the BLM.

- The *Federal Land Policy and Management Act of 1976*, as *amended*, (Public Law 94-579; 43 U.S.C. 1701 et seq.) directs BLM to "...take any action necessary to prevent unnecessary and or undue degradation of the public lands."
- *Executive Order 13855, Promote Healthy and Resilient Forests* (2018), directs federal agencies to protect people, communities, and watersheds, and to promote healthy and resilient forests, rangelands, and other Federal lands by actively managing them through partnerships with States, tribes, communities, non-profit organizations, and the private sector.
  - Reducing vegetation giving rise to wildfire conditions through forest health treatments by increasing health treatments as part of DOI's offering for sale 600 million board feet of timber from DOI-administered lands;
  - Performing maintenance on public roads needed to provide access for emergency services and restoration work;
- *DOI Secretarial Order 3372, Reducing Wildfire Risks Through Active Management* (2019), directs to protect watersheds by actively manage lands to reduce the risk of catastrophic wildfire.

- *H-9214-1 Fuels Management and Community Assistance Handbook* (2016), this handbook provides overall directions, objectives, authorities, responsibilities, and policies for fuels management, community assistance activities, and treatments within the BLM.
- *H-1740-2 Integrated Vegetation Management Handbook* (2008), this handbook guides implementation of vegetation management planning and treatment activities to achieve the objectives set forth.
- *DOI Secretarial Order 3362, Improving Big Game Habitat Quality* (2018) [BLM Information Bulletin 2019-005], directions to conserve or restore habitat necessary to sustain local and regional big-game populations.
- *Section 7 of the Endangered Species Act (1973),* as *amended,* outlines the procedures for Federal interagency cooperation to conserve federally listed species and designated critical habitat. Section 7(a) (1) imposes on federal agencies a "duty to consult" with USFWS whenever a listed species can be found within the area affected by the agency action. Section 7(a) (2) states that each federal agency shall, in consultation with the Secretary, insure that any action it authorizes, funds, carries out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of a listed species critical habitat.
- *Executive Order 13112, Invasive Species* (1999), directs federal agencies to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.
- The Environmental Assessment and Biological Assessment for the Normal Fire Rehabilitation Plan, 2005, (NFRP; ID-320-2005-003) identifies emergency stabilization and rehabilitation actions needed after fire.

40 CFR 1502.20: Outlines the tiering process being implemented within this EA.

APPENDIX D – MANAGEMENT RESTRICTIONS, BEST MANAGEMENT PRACTICES, AND STANDARD OPERATING PROCEDURES

Air Quality

- Fugitive dust control methods for unpaved roads include (ARMP Action AQ-1.1.1 & Appendix A; BLM 2012):
    - Limit vehicle traffic and vehicle speed on unpaved roads.
    - Apply water to the unpaved road surface.
    - Apply gravel to the unpaved road surface.
    - Apply an environmentally safe chemical soil stabilizer or chemical dust suppressant to the unpaved road surface
- All fire activities on BLM-administered lands are coordinated through the Montana/Idaho (MT/ID) Air shed Group Smoke Management Program and/or the Idaho Department of Environmental Quality (IDEQ) Air Quality Division (ARMP Action AQ-1.1.2, Action AQ-1.1.3, & Appendix A; BLM 2012).
    - Approval must be received from the MT/ID Air shed Group Smoke Management Program and IDEQ notified prior to prescribed fire ignitions. During December through February 15th, consultation and approval would be provided by IDEQ.
        - MT/ID Air shed Group website (https://mi.airshedgroup.org/) posts daily burning restrictions by air shed. Daily prescribed burning decisions are issued based upon conditions conducive to good smoke dispersion. Restrictions may be recommended by air shed, elevation or by special impact zones around populated areas.
    - Prescribed fire should be conducted within a prescription that minimizes adverse affects on air quality.
    - Smoke dispersion/transport would be monitored on-site to ensure ventilation needs are met and disturbances to local residences are minimized.

Noxious Weeds

- All herbicide applications would follow manufacturer label instructions, specifications, and precautions; all federal, state and local laws, rules and regulations; and BLM policy. In instances where herbicide labels, federal, or state stipulations overlap, the more restrictive criteria would apply.
- Applications would be made by a certified applicator consistent with the manufacturer's label and an approved BLM Pesticide Use Proposal.
- During implementation and maintenance located within the project area, equipment would be cleaned of all plant and soil material to remove seeds or other plant parts that may contribute to noxious weed and invasive plant spread.
- Precautions would be taken to minimize drift by not applying herbicides when winds exceed >10 mph or a serious rainfall event is imminent.
- To reduce potential resource impacts from chemical treatments, herbicide use would conform to application criteria described in the SOP's found within Appendix C of the Upper Snake-Pocatello Integrated Weed Control Program Environmental Assessment (BLM 2017a) or in subsequent revisions and/or replacements of this document. Use

would conform to instructions from BLM Manual 9011 Chemical Pest Control, as well as label restrictions and current policies and state statutes. In addition, the prescription for herbicide application (desired, optimum environmental conditions) would evaluate off-site migration and non-target species by assessing wind speed and direction, temperature, precipitation forecast, soil infiltration potential, constraints on overland water transport due to precipitation or flooding, establishment of riparian buffer strips, and risk to special status species. Fishery and/or wildlife biologists would assist project planners in selecting appropriate herbicides for use among or near terrestrial and aquatic flora/fauna sensitive to herbicides.

- Staging areas should avoid sites with noxious weed infestations.

Cultural Resources

- Class III Cultural Resource inventories will be completed prior to project implementation.

- Prior to implementation, the BLM archaeologist (working with the project lead) will ensure that National Register of Historic Places (NRHP) eligible properties will be avoided by the project. This could include modifying treatment unit boundaries, adjusting the location of temporary roads, or other actions to avoid impacts to NRHP eligible properties.

- The project will comply with the following standard stipulation:

  "Pursuant to 43 CFR 10.4(b), If any unidentified cultural resources are discovered during proposed activities, operations in the immediate area of the discovery would be halted. The discovery would be reported to the BLM, and the BLM or its authorized representatives would be allowed to document and evaluate the discovery, and if appropriate, would be allowed time for the determination and implementation of actions necessary to prevent or mitigate the loss of important cultural values in consultation with the Idaho State Historic Preservation Office (SHPO)."

Special Status Plant Resources

- Inventory of known populations and surveys of potential habitat will be completed prior to project implementation.
- Prior to implementation, the BLM special status plant program lead (working with the project lead) will ensure that populations of special status plant species will be avoided by the project. This could include modifying treatment boundaries, adjusting the location of temporary roads, hand lines, dozer lines, or other actions to avoid impacts.

Soils Resources

- **Soil Protection -** Select for each harvesting operation the logging method and type of equipment adapted to the given slope, landscape and soil properties in order to minimize soil erosion.
  - Ground based skidding shall not be conducted if it will cause rutting, deep soil disturbance, or accelerated erosion. On slopes exceeding forty-five percent (45%) gradient and which are immediately adjacent to a Class I or II stream, ground based skidding shall not be conducted except with an approved variance.

- Limit the grade of constructed skid trails on geologically unstable, saturated, or highly erodible or easily compacted soils to a maximum of thirty percent (30%).
- In accordance with appropriate silvicultural prescriptions, skid trails shall be kept to the minimum feasible width and number. Tractors used for skidding shall be limited to the size appropriate for the job.

- Roads shall be constructed in compliance with the planning guidelines of Subsection 040.02. of the Idaho Forest Practices Act and BLM Road Design Guidelines.

Wildlife

Design features of the proposed action intended to reduce negative impacts:

- Preferred treatment size of 450 acres per treatment year (variety of methods can be used [thinning, mechanical and/or fire]); which is intended to distribute ungulate herbivory/reduce excessive herbivory on aspen suckers.
- Slash/jackstraw of trees periphery of treatments may be instituted regularly to reduce herbivory on aspen saplings, and reduce other grazing related effects in areas recovering from treatment (e.g. invasive species establishment, soil destabilization, reestablishment of herbaceous/shrub species).
- A minimum of five to seven snags per acre would remain within Douglas fir stands. Snags with existing cavities or nests would receive retention priority. Retention of all snags and dead topped trees within 50-foot perimeter of wet meadows would occur.
- Seeding of disturbance areas – e.g. harvest landings, reclaimed/re-contoured roads/hand-lines. Said areas would be seeded with seed mix appropriate for the ecological site present.
- Treatment timing to avoid breeding/nesting seasons for avian and mammals (March 1 – July 31), or require negative clearance surveys by qualified biologist during said season.

Pleasantview Hills Wildlife Habitat Enhancement Project
Soil Report
May 2019

Soils within the Project area were determined utilizing the Web Soil Survey developed and supported by the NRCS (Natural Resources Conservation Service) and the Oneida County Area 1998 Published Soil Survey downloaded from the NRCS website: https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=ID.
This information was utilized to determine the % rock fragments within each soil map unit and individual soil components. If a range of soil rock fragments was given, the lowest percent was utilized when modeling potential erosion rates. Table 1 below shows the Soil Map Unit Number, associated soil component, vegetation type and % rock fragments utilized during modeling efforts.

Table 1: Soil Map Unit Number, associated soil component, vegetation type and % rock fragments

MUSYM	Component	Associated Veg Type	% rock fragments
42	Hondoho	Shrub/grass	35%
	Hymas	Shrub/grass	40%
	Pavohroo	Aspen	15%
43	Hondoho	Shrub/grass	35%
	Ridgecrest	Shrub/grass	35%
	Hades	Shrub/grass	5%
51	Ireland	Shrub/grass	25%
	Calpac	Shrub/grass	35%
79	Manila	Shrub/grass	5%
	Yago	Shrub/grass	40%
82	Northwater	Douglas Fir	25%
	Povey	Shrub/grass	25%
	Pavohroo	Aspen	15%
88	Pavohroo	Aspen	15%
	Povey	Shrub/grass	25%
93	Povey	Shrub/grass	25%
	Pavohroo	Aspen	15%
106	Ridgecrest	Shrub/grass	35%
	Hondoho	Shrub/grass	35%

The WEPPcloud online interface was utilized to model the potential erosion within the proposed treatment areas. "The Water Erosion Prediction Project (WEPP) Model is a process-based model that predicts runoff and sediment yields from a planar hillslopes and small, unchannelised watersheds. The surface hydrology component of the WEPP model uses climate, soils, topography, and vegetation input files to predict infiltration, runoff volume and peak discharge for each simulated storm or snowmelt runoff event. WEPP then uses the same inputs and runoff predictions to calculate rill and interrill erosion, as well as sediment yield from the hillslope. For the WEPP forest vegetation database, Elliot (2004) categorized forest vegetation as Mature Forest, Young Forest, Low-severity Fire, and High Severity Fire in an online interface to the WEPP model.

Elliot (2004) database consisted of soils with properties that were dependent on the forest vegetation or burn severity category and the soil texture (sandy loam, silt loam, clay loam, or loam)." Elliot et all, 2016.

The outputs from WEPPcloud were imported into ArcGIS and an ERMiT batch disturbed WEPP model. Burn Units 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 15, 16, 17, 19, 21, 22, 23, 24 were fully modeled. These burn units represent all drainages within the proposed treatment areas and a combination of all Timber Harvest and Prescribed fire possibilities. The definition of the different Vegetation Treatment Types provided in the reference section of the ERMiT Batch model were used to determine the appropriate vegetation treatment types to use throughout the modeling process. For example, an area defined as an Evergreen Forest by the model is in reality a serial aspen stand within the Pleasantview Hills Project Area. For the baseline data the area would be modeled as a 20 year old forest. Following the proposed timber harvest the same area would be modeled as a 5 year old forest. The same area would be modeled as a skid trail because the amount and location of skid trailing within each timber harvest unit is unknown. It was assumed that no more than 10% of any timber harvest area would be utilized as a skid trail; therefore only 10% of the erosion calculated from this model run was used when predicting the total potential erosion for the site. Following the Timber Harvest the same area would be modeled as a tall grass prairie, then as a shrub state until 5 years post fire, when the same area would again be modeled as a 5 year old forest. (See Table 2 for example modeling effort for a serial aspen stand.)

Table 2: Example modeling effort for a **Serial Aspen Stand**

Project Area Number	Proposed Treatment Type	Vegetation Treatment Type
Example 1	No Treatment	20 Year Old Forest
	Timber Harvest	5 Year Old Forest
	Prescribed Fire	Low Severity Fire
	1 Year Post Fire	Tall Grass Prairie
	2 Years Post Fire	Shrub Dominated Rangeland
	3 Years Post Fire	Shrub Dominated Rangeland
	4 Years Post Fire	Shrub Dominated Rangeland
	5 Years Post Fire	5 year Old Forest

Table 3: Example modeling effort for a **Shrub Dominated Rangeland**

Project Area Number	Proposed Treatment Type	Vegetation Treatment Type
Example 2	No Treatment	Shrub Dominated Rangeland
	Timber Harvest	Shrub Dominated Rangeland
	Prescribed Fire	Low Severity Fire
	1 Year Post Fire	Short Grass Prairie
	2 Years Post Fire	Tall Grass Prairie
	3 Years Post Fire	Shrub Dominated Rangeland
	4 Years Post Fire	Shrub Dominated Rangeland
	5 Years Post Fire	Shrub Dominated Rangeland

Table 4: Example modeling effort for an **Aspen Stand**

Project Area Number	Proposed Treatment Type	Vegetation Treatment Type
Example 3	No Treatment	20 Year Old Forest
	Prescribed Fire	Low Severity Fire
	1 Year Post Fire	Shrub Dominated Rangeland
	2 Years Post Fire	Shrub Dominated Rangeland
	3 Years Post Fire	Shrub Dominated Rangeland
	4 Years Post Fire	Shrub Dominated Rangeland
	5 Years Post Fire	5 year Old Forest

For true Aspen Stands found within the Pleasantview Hills it is assumed that the year following the prescribed fire the site would be best represented as a Shrub Dominated Rangeland due to the amount and distribution of suckering.

Table 5: Vegetation Treatment Options in the Disturbed WEPP Interface

Vegetation Treatment	Description
Twenty-year old forest	Any well-established forest with trees spaced about 2 m (6 ft) apart, about 5 m (20 ft) tall or taller. Ground is generally covered with a substantial layer of forest duff.
Five-year old forest	A growing forest describing conditions several years after a wilfire with surface cover approaching 100 percent in most climates. May also describe a forest in the first year or two following a significant harvest for timber of biomass. Be sure to not the correct ground cover following such an operation.
Shrub-dominated rangeland	Areas of shrubs with soil covered with residue beneath shrubs, and gaps between shrubs with minimal ground cover. Plants are about 1.2 m (4 ft) tall, with a 0.5 m (20 inch) spacing. The percent cover entered is an indication of the percent of the canopy or ground cover by the vegetation. Examples of this vegetation may be sage-dominated rangeland, or sparsely vegetated pinyon-juniper communities. This treatment may also be a reasonable estimate of a harvested forest 3 years after harvest and prescribed burn, or a forest 4 years after a severe wildfire.
Tall-grass prairie	Areas covered by tall bunch grasses, with gaps between bunches. Plants are about 0.6 m (24 inch) tall and 0.3 m (12 inch) average spacing. The percent cover entered is an indication of the percent of the canopy or ground covered by the vegetation. This vegetation treatment would best describe blue-stem or similar range communities in the west, or ryegrass, brome, or orchard grass pastures in the east. It may also describe post-fire conditions where wheat or oats have germinated to provide post-fire erosion mitigation. This treatment may also be a reasonable estimate of a harvested forest 2 years after a prescribed burn, or 3 years after a wildfire.
Short-grass prairie	Areas covered by short sod-forming grasses. Plants are about 0.4 m (16 inch) tall and with an average spacing of 0.2 m (8 inch). The percent cover entered is an indication of the percent canopy or ground covered by the vegetation. This vegetation treatment would best describe buffalo grass or similar sodding grasses in the west, or Kentucky bluegrass in the east. It may also best describe sparsely-covered reclaimed mine lands. This treatment may best describe forest conditions 1 year after a prescribed fire or two years after a wildfire.
Low-severity fire	This condition describes areas that have either had a low-severity fire, or a successful prescribed fire. Vegetation is assumed to reach a maximum height of 0.2 m (8 inch) and at a spacing of 0.2 m (8 inch). This is probably the most appropriate treatment to describe a sparsely vegetated, newly exposed surface following excavation where material has not been highly compacted, such as a road cut. The user enters an estimate of the vegetated cover, which may be zero. This treatment may best describe forest conditions the year of a prescribed fire, or conditions 1 year after a wildfire. If there has been a high severity fire, and the soils are NOT water repellent, this is probably the best selection, but with a cover reduced to about **60** percent, or that observed on the site.

Vegetation Treatment	Description
High-severity fire	This condition describes areas that have experienced a high-severity fire and soils may be water repellent. Vegetation is assumed to reach a maximum height of 0.15 m (6 inch) with a spacing of 0.15 m (6 inch).
Skid trail	This condition describes a skid trail with vegetation reaching a maximum height of 0.15 m (6 inch) at a 0.1 m (4 inch) spacing. The soil is assumed to be compacted. This treatment would also describe any site mechanically disturbed and compacted --as long as the user estimates the amount of cover--such as landings, forwarder tracks, skyline paths, etc. If the soils remain compacted during the regeneration period, then the user is advised to use the skid trail for the first five years of regeneration, using increasing amounts of cover to describe local conditions. The time required to achieve 100 percent cover may be as short as 2 years in Eastern forests.

The weather Climate parameter used was the ARBON 2NW ID; 42.50°N, 112.57°W; 5170 Feet elevation; 31 years of record.

Table 6: Compiled weather data by month.

Month	Mean Maximum Temperature (ºF)	Mean Minimum Temperature (ºF)	Mean Precipitation (in)	Number of wet days
January	30.3	14.4	1.53	8.1
February	36.4	18.8	1.31	6.9
March	45.3	24.1	1.43	7.6
April	56.3	30.1	1.33	7
May	66.9	36.6	1.68	7.6
June	76.5	43.6	1.44	6.6
July	86.3	49.4	0.99	5
August	85.1	48.2	0.9	5
September	75	39.8	0.94	4.3
October	62.2	31.2	1.05	5
November	43.3	23.5	1.59	8
December	32.2	15.3	1.61	7.6
Annual			15.82	78.6

Table 7: Interpolated weather data

INTERPOLATED DATA			
Station	**Weighting**	**Station**	**Weighting**
Wind Stations		**Solar Radiation and Max .5 P Stations**	
MALAD CITY ID	40.5 %	POCATELLO, IDAHO	72.4 %
POCATELLO ID	36.9 %	SALT LAKE CITY, UT	17 %
STREVILL ID	22.6 %	BOISE, IDAHO	10.6 %
Dewpoint Stations		**Time-to-Peak Stations**	
POCATELLO ID	72.6 %	PLYMOUTH UT	44.5 %
SALT LAKE CITY UT	16.9 %	HENRY ID	36.1 %
BOISE ID	10.5 %	GOODING 1 S ID	19.4 %

Each Burn Unit was composed of one or several subcatchments which were created through the WEPPcloud program. The soils, vegetation and proposed treatment type were verified for each subcatchment prior to any modeling efforts. Table 8 below is a compilation of all subcatchment data for the appropriate Burn Unit and Vegetation Treatment Type.

Table 8: Compiled predicted erosion data by burn unit and treatment type. Skid trails are reported as 10% of the whole reflecting the assumed extent of skid trails within harvest units.

Burn Units	**Proposed Treatment Type**	**Vegetation Treatment Type**	**Area (acres)**	**Average**		
				Precipitation (in)	**Runoff (in)**	**Erosion (tons/acre)**
B1	No Treatment	20 Year Old Forest	68.05	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.017	0.026
	Prescribed Fire	Low Severity Fire		15.73	0.09	0.26
	1 Year Post Fire	Tall Grass Prairie		15.73	0.01	0
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.117**	**0.286**
B2	No Treatment	20 Year Old Forest	17.82	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.016	0.006
	Prescribed Fire	Low Severity Fire		15.73	0.14	0.15
	1 Year Post Fire	Tall Grass Prairie		15.73	0.05	0.03
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.01	0.01
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.216**	**0.196**
B3	No Treatment	20 Year Old Forest	225.95	15.73	0	0
	Prescribed Fire	Low Severity Fire		15.73	0.24	1.44
	1 Year Post Fire	Tall Grass Prairie		15.73	0.03	0.09
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.01	0.01
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0

Burn Units	Proposed Treatment Type	Vegetation Treatment Type	Area (acres)	Average		
				Precipitation (in)	Runoff (in)	Erosion (tons/acre)
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.28**	**1.54**
B4	No Treatment	20 Year Old Forest	173.47	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.019	0.046
	Prescribed Fire	Low Severity Fire		15.73	0.33	1.15
	1 Year Post Fire	Tall Grass Prairie		15.73	0.07	0.12
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.03	0.04
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.449**	**1.356**
B6	No Treatment	20 Year Old Forest	365.4	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.043	0.125
	Prescribed Fire	Low Severity Fire		15.73	0.45	2.35
	1 Year Post Fire	Tall Grass Prairie		15.73	0.1	0.25
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.02	0.04
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.613**	**2.765**
B7	No Treatment	20 Year Old Forest	151.67	15.73	0	0
	Prescribed Fire	Low Severity Fire		15.73	0.15	1.08
	1 Year Post Fire	Tall Grass Prairie		15.73	0.03	0.12
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.01	0.02
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.19**	**1.22**
B8	No Treatment	20 Year Old Forest	280.88	15.73	0	0
	Prescribed Fire	Low Severity Fire		15.73	0.51	1.63
	1 Year Post Fire	Tall Grass Prairie		15.73	0.08	0.05
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.03	0
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.62**	**1.68**

Burn Units	Proposed Treatment Type	Vegetation Treatment Type	Area (acres)	Average		
				Precipitation (in)	Runoff (in)	Erosion (tons/acre)
B9	No Treatment	20 Year Old Forest	485.04	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.114	0.256
	Prescribed Fire	Low Severity Fire		15.73	0.62	2.91
	1 Year Post Fire	Tall Grass Prairie		15.73	0.12	0.17
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.03	0.03
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.884**	**3.366**
B10	No Treatment	20 Year Old Forest	387.19	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.18	0.268
	Prescribed Fire	Low Severity Fire		15.73	0.81	2.53
	1 Year Post Fire	Tall Grass Prairie		15.73	0.17	0.14
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.01	0.02
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**1.17**	**2.958**
B11	No Treatment	20 Year Old Forest	324.7	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.024	0.071
	Prescribed Fire	Low Severity Fire		15.73	0.14	0.88
	1 Year Post Fire	Tall Grass Prairie		15.73	0.01	0.06
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0.01
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.174**	**1.021**
B15	No Treatment	20 Year Old Forest	547.09	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.056	0.126
	Prescribed Fire	Low Severity Fire		15.73	0.49	2.08
	1 Year Post Fire	Tall Grass Prairie		15.73	0.1	0.22
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.03	0.04
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.676**	**2.466**

Burn Units	Proposed Treatment Type	Vegetation Treatment Type	Area (acres)	Average		
				Precipitation (in)	Runoff (in)	Erosion (tons/acre)
B16	No Treatment	20 Year Old Forest	199.27	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.009	0.017
	Prescribed Fire	Low Severity Fire		15.73	0.08	0.53
	1 Year Post Fire	Tall Grass Prairie		15.73	0.01	0.04
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.099**	**0.587**
B17	No Treatment	20 Year Old Forest	184.59	15.73	0	0
	Prescribed Fire	Low Severity Fire		15.73	0.26	0.92
	1 Year Post Fire	Tall Grass Prairie		15.73	0.05	0.1
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.01	0.03
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.32**	**1.05**
B19	No Treatment	20 Year Old Forest	121.21	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.009	0.022
	Prescribed Fire	Low Severity Fire		15.73	0.03	0.21
	1 Year Post Fire	Tall Grass Prairie		15.73	0	0.01
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.039**	**0.242**
B21	No Treatment	20 Year Old Forest	92.07	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.023	0.031
	Prescribed Fire	Low Severity Fire		15.73	0.2	0.5
	1 Year Post Fire	Tall Grass Prairie		15.73	0.04	0.05
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.01	0.01
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.273**	**0.591**
B22	No Treatment	20 Year Old Forest	98.52	15.73	0	0

Burn Units	Proposed Treatment Type	Vegetation Treatment Type	Area (acres)	Average		
				Precipitation (in)	Runoff (in)	Erosion (tons/acre)
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.021	0.057
	Prescribed Fire	Low Severity Fire		15.73	0.09	0.48
	1 Year Post Fire	Tall Grass Prairie		15.73	0	0
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.111**	**0.537**
B23	No Treatment	20 Year Old Forest	159.46	15.73	0	0
	Timber Harvest	5 Year Old Forest		15.73	0	0
	Skid Trail	Skid Trail		15.73	0.056	0.114
	Prescribed Fire	Low Severity Fire		15.73	0.27	0.99
	1 Year Post Fire	Tall Grass Prairie		15.73	0.04	0.05
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.366**	**1.154**
B24	No Treatment	20 Year Old Forest	76.28	15.73	0	0
	Prescribed Fire	Low Severity Fire		15.73	0.14	0.59
	1 Year Post Fire	Tall Grass Prairie		15.73	0.03	0.06
	2 Years Post Fire	Shrub Dominated Rangeland		15.73	0.01	0.02
	3 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	4 Years Post Fire	Shrub Dominated Rangeland		15.73	0	0
	5 Years Post Fire	5 year Old Forest		15.73	0	0
	Total Erosion 5 Years Post Treatment				**0.18**	**0.67**

From the data it appears that there are two main treatment types that contribute to soil erosion; skid trails and prescribed fire. Table 9 summarizes the predicted soil loss on 10% of each proposed burn unit while Table 10 summarizes the predicted soil loss of each proposed burn unit associated with a prescribed fire treatment type.

Table 9: Predicted soil loss on 10% of each proposed harvest by burn unit.

Burn Units	Proposed Treatment Type	Vegetation Treatment Type	Average		
			Precipitation (in)	Runoff (in)	Erosion (tons/acre)
B1	Skid Trail	Skid Trail	15.73	0.02	0.03
B2	Skid Trail	Skid Trail	15.73	0.03	0.02
B4	Skid Trail	Skid Trail	15.73	0.02	0.05
B6	Skid Trail	Skid Trail	15.73	0.04	0.13
B9	Skid Trail	Skid Trail	15.73	0.11	0.26
B10	Skid Trail	Skid Trail	15.73	0.18	0.27

Burn Units	Proposed Treatment Type	Vegetation Treatment Type	Average		
			Precipitation (in)	Runoff (in)	Erosion (tons/acre)
B11	Skid Trail	Skid Trail	15.73	0.02	0.07
B15	Skid Trail	Skid Trail	15.73	0.06	0.13
B16	Skid Trail	Skid Trail	15.73	0.01	0.02
B19	Skid Trail	Skid Trail	15.73	0.01	0.02
B21	Skid Trail	Skid Trail	15.73	0.02	0.03
B22	Skid Trail	Skid Trail	15.73	0.02	0.06
B23	Skid Trail	Skid Trail	15.73	0.06	0.11
			Average	**0.05**	**0.09**
			Max	**0.18**	**0.27**
			Min	**0.01**	**0.02**

Table 10: Predicted soil loss on 10% of each soil .map unit number and Vegetation Type

Soil Map Unit Number	Number of Samples	Proposed Treatment Type	Vegetation Type	Average		
				Precipitation (in)	Runoff (in)	Erosion (tons/acre)
51	2	Skid Trail	Evergreen Forest	15.73	0.07	0.027
51	1	Skid Trail	Shrub	15.73	0.06	0.018
82	23	Skid Trail	Evergreen Shrub	15.73	0.11	0.017
82	1	Skid Trail	Shrub	15.73	0.04	0.034
88	37	Skid Trail	Evergreen Forest	15.73	0.08	0.018

Table 11: Predicted soil loss of each proposed burn unit associated with a prescribed fire treatment type

Burn Units	Proposed Treatment Type	Vegetation Treatment Type	Average		
			Precipitation (in)	Runoff (in)	Erosion (tons/acre)
B1	Prescribed Fire	Low Severity Fire	15.73	0.09	0.26
B2	Prescribed Fire	Low Severity Fire	15.73	0.14	0.15
B3	Prescribed Fire	Low Severity Fire	15.73	0.24	1.44
B4	Prescribed Fire	Low Severity Fire	15.73	0.33	1.15
B6	Prescribed Fire	Low Severity Fire	15.73	0.45	2.35
B7	Prescribed Fire	Low Severity Fire	15.73	0.15	1.08
B8	Prescribed Fire	Low Severity Fire	15.73	0.51	1.63
B9	Prescribed Fire	Low Severity Fire	15.73	0.62	2.91
B10	Prescribed Fire	Low Severity Fire	15.73	0.81	2.53
B11	Prescribed Fire	Low Severity Fire	15.73	0.14	0.88
B15	Prescribed Fire	Low Severity Fire	15.73	0.49	2.08
B16	Prescribed Fire	Low Severity Fire	15.73	0.08	0.53
B17	Prescribed Fire	Low Severity Fire	15.73	0.26	0.92
B19	Prescribed Fire	Low Severity Fire	15.73	0.03	0.21
B21	Prescribed Fire	Low Severity Fire	15.73	0.20	0.50
B22	Prescribed Fire	Low Severity Fire	15.73	0.09	0.48
B23	Prescribed Fire	Low Severity Fire	15.73	0.27	0.99
B24	Prescribed Fire	Low Severity Fire	15.73	0.14	0.59
			Average	**0.28**	**1.15**
			Max	**0.81**	**2.91**
			Min	**0.03**	**0.15**

Table 12: Predicted soil loss of each soil map unit number and vegetation type associated with a prescribed fire treatment

Soil Map Unit Number	Number of Samples	Proposed Treatment Type	Vegetation Type	Average		
				Precipitation (in)	Runoff (in)	Erosion (tons/acre)
42	3	Prescribed Fire	Deciduous Forest	15.73	0.05	0.17
42	2	Prescribed Fire	Shrub	15.73	0.06	0.21
51	2	Prescribed Fire	Evergreen Forest	15.73	0.04	0.24
51	12	Prescribed Fire	Shrub	15.73	0.05	0.18
79	3	Prescribed Fire	Shrub	15.73	0.06	0.07
82	24	Prescribed Fire	Evergreen Forest	15.73	0.05	0.16
82	8	Prescribed Fire	Shrub	15.73	0.04	0.18
88	15	Prescribed Fire	Deciduous Forest	15.73	0.04	0.19
88	41	Prescribed Fire	Evergreen Forest	15.73	0.04	0.17
88	7	Prescribed Fire	Shrub	15.73	0.05	0.16
106	2	Prescribed Fire	Shrub	15.73	0.04	0.24

APPENDIX F – MONITORING PLAN

Monitoring would be conducted in accordance with treatment objectives, ecological site potential, and other woody shrub/small tree cover/diversity considered.

One or more of the following monitoring protocols may be used:

1. Line Intercepts: Shrub canopy cover is measured along a line intercept transect by noting the point along the tape where the canopy begins and the point at which it ends, in addition, collecting shrub height. When these intercepts are added, then divided by the total line length, the result is a percent cover for a particular species along the transect (Coulloudon et al. 1999; Elzinga et al. 1998).
2. Point Intercepts: Cover is measured by point intercept based on the number of "hits" on the target species out of the total number of points measured (Coulloudon et al. 1999; Elzinga et al. 1998).
3. Aspen Stand Risk Assessment: Qualitatively assesses regeneration, recruitment, and overstory of aspen/conifer species within a stand to determine risk factors and overall risk rating (EIAWG 2014).
4. Browsed Aspen Method: Assess the level of herbivory occurring on young and sprouting aspen (USDA FS 2004). Thirty to fifty percent browse across treatment would trigger management actions such as fencing, water manipulation, etc.
5. Photo-Points: Qualitative change in species composition and health.
6. Sampling Vegetation Attributes (Coulloudon et al 1999): Additionally available protocols for determining if treatment objectives were met or if additional treatments are required.
7. Pre/Post Prescribed Fire Monitoring (DOI NPS 2003): Monitoring protocols for fuel loading, fire/smoke conditions, and post-burn vegetation characteristics.

Treatments may receive the following monitoring (based on funding availability). Additional monitoring will occur based on need for management change.

- Year 1, Post-treatment: regeneration/utilization/species composition monitoring (spring)
    - One random Browse Aspen Method (hereafter browse) plot for every 30-acres treated
    - One random regeneration plot for every 70 acres.
- Year 1, Post treatment: browse monitoring (fall)
- Year 2, Post treatment: browse, regeneration, and species composition monitoring (fall)
- Year 5, Post-Treatment: recruitment/utilization/species composition monitoring (spring)

Monitoring and treatment of noxious/invasive species would ensue for up to three years following treatment completion.

References

Coulloudon, Bill; Eshelman, K.; Gianola, J.; Habich, N.; Hughes, L.; Johnson, C.; Pellant, M.; Podborny, P.; Rasmussen, A.; Robles, B.; Shaver, P.; Spehar, J.; Willoughby, J. 1999. Sampling Vegetation Attributes, Interagency Technical Reference. Tech. Ref. 1734-4. Bureau of Land Management, National Business Center, Denver, CO.

Eastern Idaho Aspen Working Group (EIAWG). 2014. Aspen Stand Risk Assessment (version 1.7). Eastern Idaho Aspen Working Group – Science and Technology Committee, Idaho.

Elzinga, Caryl L.; Salzar, Daniel W.; Willoughby, John W. 1998. Measuring and Monitoring Plant Populations, BLM Technical Reference 1730-1. Bureau of Land Management, National

Business Center, Denver, CO. Accessed on 03/14/2018: https://www.blm.gov/nstc/library/pdf/MeasAndMon.pdf

USDA Forest Service (USDA FS). 2004. Browsed Plant Method for Young Quaking Aspen: An annual monitoring method for determining the incidence of use on sprouts and young plants during the growing season (Supplemental guide for BLM Technical Reference 1734-3 Utilization Studies and Residuals Measurements). Pacific Southwest Region. December 2004.

USDOI National Park Service (DOI NPS). 2003. Fire Monitoring Handbook. Boise (ID): Fire Management Program Center, National Interagency Fire Center.

APPENDIX G – BLM ROAD DESIGN GUIDELINES

H-9113-1.12 Design Guidelines. Bureau roads are designed and constructed primarily to support the protection, development, use, and administration of public lands and resources with minimum impact on the environment. Bureau roads must ensure the safety of the user, but should respect the natural setting of the area. Designers of Bureau roads must be sensitive to national policy emphasizing safety, esthetics, protection and preservation of historic and cultural values, visual resource management objectives, and accessibility for the physically challenged. Designers of Bureau roads must incorporate these considerations in their designs.

A. Design Speed. Design speed determines the maximum degree of road curvature and minimum safe stopping, meeting, passing, or intersection sight distances. The design speed selected should be consistent with the anticipated speed users will drive on the constructed road. For example, in flat, open terrain where relatively straight alignment may induce drivers to travel relatively fast, low design speeds are unsafe.

1. Maximum Degree of Curvature. The maximum degree of curvature is determined by design speed, surface type, and the maximum superelevation rate. Using the maximum superelevation rate chosen by the designer see .12D – Superelevation of Curves, and the surface type of the proposed road, the maximum allowable curvature for various design speeds is determined using the rates shown in Illustration 3– Maximum Curvature and Recommended Superelevation Rates.
2. Sight Distances. Sight distances are those lengths of road the driver must be able to see to execute safely various vehicle operations. Sight distance requirements affect vertical curvature and may affect horizontal alignment by requiring easier curves to avoid sight obstructions due to terrain, vegetation, or manmade features. The designer may be required to adjust the horizontal or vertical curvature, the typical cross section, or to remove vegetation or manmade features to attain the required sight distances. Sight distance calculations are based on an eye height of 3.75 feet, and object height of 0.5 feet, and an opposing vehicle height of 4.50 feet. Driver perception and reaction time of 2.5 seconds is used. Since braking distance is related to surface type and weather conditions, it would be difficult to cover all foreseeable combinations of situations. Refer to Illustrations 4 through 8 for design guidance.

B. Horizontal Alignment. Alignment for higher standard roads should be as direct as possible with few curves and more than minimum sight distances. Coordinate horizontal alignment with vertical alignment to ensure user safety and comfort. Lower standard road designs should maintain a high quality alignment, but cost consideration may require that values normally required for higher standard road designs be lessened for construction economy. Accepted practices for good alignment design include the following:

1. Terrain. Fit the terrain.
2. Curve Length. Avoid short curves that provide the illusion of an angle. In open areas with long sight distances, the minimum curve length should be 500 feet for a 5 degree central angle. Where sight distance is limited, choose curves that appear to flow rather than curves that appear abrupt.
3. Reverse Curves. Avoid reverse curves separated by a short tangent. Where terrain
4. Dictates reverse curves, a tangent between curves of sufficient length to provide superelevation runoff without overlap is required.
5. Broken Back Curves. Broken back curves (two curves in same direction separated by a short tangent) should not be used. Substitute a longer curve or a compound curve.

6. Compound Curves. Compound curves may be used to fit the alignment closer to the natural contour, or to avoid the use of broken back curves. Compound curves should be limited to three separate curves, with the center curve being the sharpest, but not over 50% sharper than adjacent curves.
7. Alignment. Consistent alignment is safer and is more esthetically pleasing. Sharp curves at the end of long tangents, or a sharp curve among easy curves is hazardous. Where a sharp curve must be used, it should be approached by transitional, successively sharper curves from both directions to eliminate a sudden, unexpected, change for the driver.

C. Vertical Alignment. Controls on vertical alignment include maximum grade requirements for the applicable road standard see Manual Section 9113 - .23 Geometric Standards and the vertical curve length requirements for minimum sight distances.

1. Vertical Curves. Vertical curves must be long enough to provide minimum stopping sight distance throughout the road length and to provide a road that is safe, comfortable, pleasing in appearance, and adequately drained. Vertical curves longer than required for minimum sight distance should be used to reduce earthwork volume or to provide a better visual appearance.
    a. Stopping Sight Distance (SSD). Minimum stopping sight distance must be met for the entire length of all roads. Refer to Illustrations 5 – 7 for design guidance.
    b. Passing Sight Distance (PSD). Minimum passing sight distance should be met at regular intervals on two-lane roads. Higher-volume roads require more frequent passing opportunities than lower-volume roads. Construction costs are a major factor in determining passing sight distance needs.
    c. Meeting Sight Distance (MSD). Minimum meeting sight distance must be met over the entire length of all single-lane road sections. Meeting sight distance is calculated as the sum of the opposing stopping sight distances. Distance adjustment for grades may be ignored since such adjustments tend to cancel one another. Vertical curves provide safe stopping sight distances. See Illustration 8 – Crest Vertical Curves Based on Minimum Meeting Sight Distance (Single Lane Roads Only) for determining crest vertical curve lengths. However, safe meeting sight distance may require that lateral clearance on the inside of horizontal curves be lengthened, or that a double-lane section be used and the lateral clearance provide minimum stopping sight distance.
2. Recommended Practices. Recommended practices for providing a desirable vertical alignment are as follows:
    a. Coordinate vertical alignment and horizontal alignment to ensure a smooth flowing, safe, comfortable, and esthetically pleasing road.
    b. Provide a grade requiring minimum earthwork. This limits costs, reduces erosion, and is more environmentally acceptable.
    c. Provide a smooth vertical alignment with gradual changes consistent with class of road and character of terrain. Avoid an alignment with abrupt transitions.
    d. Avoid grades less than 0.5 percent due to difficulty in providing drainage of side ditches.
    e. Reduce grades around sharp curves, at intersections, at turnouts, and at turnarounds.
    f. Avoid roller coaster and hidden-dip grades, even though they may reduce earthwork quantities (not applicable for very low cost roads). They will cause uncomfortable and possibly dangerous conditions for drivers.
    g. When possible, avoid locating a vertical curve within a horizontal curve.

D. Superelevation of Curves. The selection of a maximum superelevation rate should depend on several factors: frequency and amount of ice and snow; amount and type of roadside development; and number of slow-moving vehicles. Illustration 9 – Minimum Superelevation Runoff Lengths provides recommended maximum superelevation rates for various design speeds. The minimum superelevation rate for any curve is not less than the normal crown rate for adjacent tangent sections. Superelevation is required on all roads with a design speed of 20 mph or greater. See Illustration 9 – Minimum Superelevation Runoff Lengths for runoff lengths for various superelevation rates and design speeds. One-third of this runoff occurs on the curve and two-thirds on the tangent. Increase runoff lengths where necessary to provide for better drainage or esthetics.

E. Cross Section Elements. The designer must determine the typical cross section(s). Changes in terrain, materials, visual resources, and vegetation may justify changing the typical cross section. Elements of the cross section include subgrade width, roadway crown or cross slope, side ditches, cut and fill slopes, widenings, and turnouts.

1. Subgrade Width. The subgrade width normally is equal to the traveled way width plus twice the taper width of surfacing materials. For an earthen road, the traveled way width is equal to the subgrade width. Extra widening for shoulder area may be provided where estimated ADT is over 400, or where special considerations justify a shoulder area. The taper of the surfacing material on surfaced roads provides a "usable" shoulder area if the tapered slope is 4:1 or flatter. The taper slope ratio should be approximately the same as the slope ratio selected for the flattest fills or side ditch inslope, but should never be steeper than 3:1. A taper slope ratio flatter than 4:1 may be provided if justified, but it should not be common practice. Select the total subgrade width to the nearest even 2 feet. Considerations for designing the subgrade width include the following:
    a. Changes in subgrade soil support values may require a change of the surfacing thickness, resulting in a change in taper and subgrade width.
    b. Using curbs may affect subgrade width.
    c. In areas with steep side slopes, the typical section may be narrowed by reducing the side ditch or by forming the side ditch in the surfacing course. This may be done only if the surfacing material can be protected from saturation and if the ditch shape and dimensions are such that user safety is not compromised.
2. Road Crown. The road should be crowned to ensure proper drainage. All double-lane roads except insloped or outsloped roads must have a centerline or shoulderline crown. See .12E3 – Insloped or Outsloped Roads. Place shoulderline crowns with the downstream shoulder highest in order to prevent erosion of fills. Recommended slopes are as follows:
    a. Earth Surface .03-.05 ft./ft.
    b. Aggregate Surface .02-.04 ft./ft.
    c. Paved Surface .02-.03 ft./ft.
3. Insloped or Outsloped Roads. A local road with a design speed of 20 mph or less may be insloped or outsloped for sections where the grade does not exceed 6%. (An insloped or outsloped road is a road without side ditches and superelevated curves.) Insloping or outsloping roads are not recommended unless the subgrade materials are resistant to erosion and traffic volume is extremely low. The slope across the roadway is the same as for normal crowns See .12E2 – Road Crown.
4. Cut and Fill Slopes. Cut and fill slopes provide: a structurally stable road, a safe recovery area for errant vehicles, minimum erosion susceptibility, and maximum revegetation possibility. Slopes steeper than 2:1 in level and rolling terrain or 1 1/2:1 in mountainous

terrain must not be used, except as stated below. If the steepest allowable slopes do not intersect with the natural terrain within a reasonable distance, make adjustments in the alignment and/or grade, or provide retaining walls. Fills with heights less than the depth of the side ditch are designed and staked as a cut section to ensure continuity of the side ditch.

a. The following slopes are suggested for use on Bureau roads. Where rock excavation is encountered, cut slopes may be steeper since weathered slopes should remain stable. Cut slopes may be steeper than recommended to reduce resource, environmental, or visual impacts; however, the angle of repose of the exposed material must not be exceeded.
b. Fill widening must be a minimum of 2 feet where the slope is 2:1 or steeper. Fill widening must be integrated with the normal embankment. Widening for curves and/or guardrails is determined independently of fill widening, and does not supersede fill widening requirements. See .12E9 – Curve and Guardrail Widening. Fill widening does not require widening of surfacing courses.
c. Slopes can be sculptured to provide a more natural appearance. Sculpturing is recommended for major roads through areas of high visual quality. Consult with visual management specialist on the advisability of slope sculpturing. Sculpturing methods include:
    (1) Flattening slope at cut-to-fill transitions;
    (2) Laying back cutslopes where a cut intersects a natural drainage to provide a more natural appearance;
    (3) Accenting natural ridges intersected by cuts with a steeper cut slope and wider rounding of intersection;
    (4) Creating diversity in long cuts by flattening slopes to create false draws;
    (5) Providing benches in rock cuts to accent natural strata;
    (6) Leaving planting pockets in rock slopes;
    (7) Leaving non-hazardous rock outcroppings to add variety; and
    (8) Varying slopes to save specimen trees, rock outcrops, or other items of visual interest, provided they do not constitute a roadside hazard.
d. The intersection of cut and fill slopes with natural ground should be rounded to improve integration with the natural topography. Slopes are normally rounded for approximately 5 feet on each side of the intersection between the construction slope and natural ground.
e. Slope treatments include revegetation and other landscaping techniques used to stabilize slopes and retard erosion. Use serrated slopes, topsoil, mulch, and jute matting if local conditions justify them. Revegetation with native grass and wildflower species is preferred. Other landscape treatments such as tree and shrub plantings or selected thinning of adjacent vegetation can mitigate the impact of the construction in areas of high visual quality. The degree of treatment is scaled to the location and purpose of the road. Landscape treatments should be coordinated with a landscape architect.

5. Daylight Sections. Daylighting of cuts is recommended if the disturbed slope area is not excessive. To daylight a slope, use a ratio of approximately 100:1 beginning at the bottom of the side ditch.
6. Side Ditches. Side Ditches (borrow ditches) are adjacent to and parallel with the roadway shoulder. They also collect the runoff from the roadway from adjacent upstream areas if no intercept ditch is provided above the cut slope. The shape and dimensions of the ditch are selected to carry adequately the anticipated runoff from a major storm without

saturation of subgrade or surfacing material. As it must be safe for errant vehicles, the ditch is wider for higher design speeds and has an inslope (the slope between the subgrade shoulder and the ditch bottom) of the same ratio as the flattest fill slope. Flat bottom ditches are recommended for higher speed roads, and slope slightly away from the traveled way. A minimum longitudinal gradient of 0.5 percent ensures good drainage. Vary ditch sections as required to satisfy differing conditions.

7. Turnouts. Turnouts are provided on single-lane roads for passing opposing traffic. Turnouts normally are spaced at a maximum distance of 1,000 feet. For higher volume or higher speed roads, a maximum distance of 700 feet is recommended. Locate turnouts where needed and where most economical. On haul roads, try to locate turnouts on the right side of the "empty" direction. The most economical locations for turnouts are usually on the low side in cuts, high side in fills, or at the transition between cuts and fills. Recommended turnout dimensions are 100 feet long with 50 foot transitions, but these may be changed to fit terrain. Width should be 10 feet. Eight-foot width may be sufficient for longer turnouts. As vehicles generally come to a stop or are traveling at low speed at turnouts, the slope of the turnout may be less than the superelevation of the adjacent traveled way on curve sections.
    a. Turnouts can provide a second lane to satisfy safe meeting sight distance requirements around blind curves; however, the design must still provide for safe stopping sight distance. The minimum width of turnouts should be at least 10 feet, with additional width recommended for roads serving oversized vehicles. The cross slope of the turnout is the same as the adjacent traveled way cross slope. Satisfying meeting sight distance requirements by providing lateral clearance or by flattening curves is preferable to using blind-curve turnouts. Widening of the traveled way with long turnouts encourages higher speeds and increases hazard.
    b. Long turnouts are acceptable for double-lane roads with high traffic volumes and a mix of fast and slow-moving vehicles. They allow passing on uphill grades. Safe passing sight distance is not required if lane markings or signing prevent opposing traffic from entering the passing lane.
    c. Turnarounds are provided as needed on single lane roads. Turnaround dimensions must be adequate to allow the average vehicle using the road to turn around with minimum maneuvering.
8. Vertical and Horizontal Clearance. A minimum vertical clearance of 16 feet must be provided. This applies to all obstructions within the 16 feet. Clearances on already existing roads of less than 14 feet must be properly signed. See Manual Section 9130 – Sign Manual. A minimum horizontal clearance of 4 feet from the edge of traveled way is recommended. A runoff distance that is safe, negotiable by errant vehicles, and free of hazards located adjacent to the edge of the traveled way is recommended. If safe runoff distances for roads with design speeds of 30 mph and above cannot be provided, seriously consider installing guardrails or other protective devices, particularly when the road is used by the general public.
9. Curve and Guardrail Widening. Curve, guardrail, and fill widening requirements are independent of one another, but widening for any cause is integrated with normal pavement structure construction operations. See .12E1 – Subgrade Width.
    a. Guidelines for determining curve widening are given in AASHTO “A Policy on Geometric Design of Highways and Streets” and Attachment 1. Curve widening is generally placed on the inside of a curve, with the transition generally occurring at the same location as the superelevation transition.

b. A 2-foot widening of the pavement structure, in addition to any necessary fill or curve widening, is required wherever a guardrail is to be placed. Length of transition for guardrail widening is governed by visual acceptability and State requirements.

F. Earthwork Design. BLM encourages balanced earthwork design. Waste or borrow is discouraged unless material characteristics require it. Adjust alignment, gradient, or slopes to eliminate need for waste or borrow, or utilize retaining walls, cribs, typical section adjustments, etc., to provide a balanced design. Side-cast waste is environmentally unacceptable. Any waste and borrow areas must be located out of view of the constructed roadway and in environmentally acceptable locations. Embankments should be constructed with the addition of suitable moisture to obtain density. Compact the top foot of material beneath the pavement surface to a minimum of 95 percent maximum density as determined by AASHTO T-99 – "Moisture-Density Relations of Soils Using a 5.5-lb Rammer and a 12-in. Drop."

G. Drainage Elements. Proper drainage is critical in road design. Protection of the road, adjacent upstream land, and downstream lands depend upon proper drainage design. This requires knowledge of both hydrology and hydraulics.

1. Bridges and Major Culverts. Design must conform to Manual Section 9112 – Bridges and Major Culverts.
2. Drainage Culverts. Culverts are used for all minor drainage crossings, unless debris problems or unusually low volume justify the use of a ford. The ford must be safe and environmentally compatible. Very low volume resource roads that are outsloped or insloped are usually the only type that may utilize fords.
    a. Culverts are to be designed using the appropriate hydraulic design procedures. Refer to AASHTO "Highway Drainage Guidelines" and State highway agencies for guidance. In addition, other publications are available from FHWA. Use any of the standard hydrologic and hydraulic design methods, but use a second method as a check to ensure that the solution is adequate but not extravagant. Special consideration may be necessary for debris passage.
    b. The type of culvert is specified in the design. If possible, specify alternate acceptable culvert materials.
    c. An 18-inch diameter or equivalent size is the smallest culvert normally used. Smaller sizes are difficult to clean and maintain.
    d. Minimum recommended cover over a culvert is 12 inches or one-half the diameter, whichever is greater. Compliance with manufacturer's recommendations for cover over various culvert materials is necessary.
    e. Culverts carrying runoff from one side of the road to the other between natural drainages are spaced as shown in Illustration 10 – Spacing for Drainage Laterals, unless local experience dictates otherwise.
    f. The inlet and outlet treatments of culverts include drop inlets, downspouts, energy dissipaters, flared ends, headwalls, riprap, paving, and beveled ends. Choose an end treatment that ensures that the culvert is properly protected, erosion is retarded, and the protrusion of the culvert is not a hazard to errant vehicles.
    g. Culverts in small drainages should generally be aligned with the natural channel and with a gradient that maintains the natural drainage velocity so sedimentation or erosion is not increased. Culverts used as laterals are skewed to form an entrance angle of 45 to 60 degrees with the side ditch, and have a gradient equal to or slightly greater than the approach ditch gradient.

h. Culverts may be protected from debris by deflectors, racks, cribs, raisers, basins, spillways, or other controls. Incorporate debris protection as necessary.
i. Culverts must be designed for minimum impact on aquatic life. Open bottom shapes should be used if it is necessary to maintain the character of the streambed. If a closed bottom shape is used, install the culvert so the gradient does not exceed one-half percent, placing the invert at least 6 inches below the natural streambed, and fill the bottom with rock and gravel to simulate natural streambed characteristics. Any construction in fish-bearing streams must be accomplished during the time of year when the least aquatic environmental impact will occur.

3. Ditches and Channels.
    a. Intercept ditches are used to intercept and carry sheet runoff to natural drainages before it can reach the roadway. A gradient of about 0.5 percent is recommended. Design intercept ditches to intercept and concentrate sheet runoff so the ditch does not erode.
    b. Natural channels must be avoided when possible. If channel changes must be made, maintain the natural stream depth, width, general flow conditions, and characteristics as closely as possible. Use appropriate protective devices, such as gabions, deflectors, and plantings. Vegetation near banks can provide natural sediment filters, shade, and shadows. Vegetation on slopes adjacent to channels reduces erosion and provides a natural sediment filter.
4. Fords and Dips. Fords and dips may be used if they are not a hazard to traffic. Design fords and dips to provide safe stopping sight distance. The roadway must be stable and self-cleaning. Place signs and flow depth markers to protect users.
5. Cattleguards. Cattleguards are placed normal to the roadway centerline on the finished roadway grade. If the road will be surfaced in the future, place the cattleguard at the final design elevation, with a 50-foot temporary ramp on each side to provide a smooth crossing. Use Bureau standard designs for all cattleguards. Cattleguard widths and design loads must meet requirements of Manual Section 9113-.25 – Structure Widths.
6. J. Signs and Markers. Each road design must include provisions for traffic control signing. Signs and markers must be in place prior to opening the road to traffic. These must meet the requirements of Manual Section 9130 – Sign Manual and the Federal Highway Administration's (FHWA) “Manual on Uniform Traffic Control Devices.” Roads open to traffic during construction must be signed in accordance with the FHWA's “Manual on Uniform Traffic Control Devices.”

----------Field Office Section----------	
Project Point of Contact: Channing Swan; David Price	**Date:** September 9th, 2019
Project Name: Pleasantview Hills Aspen Stand Diversity Project	
Project Type: Aspen/forestlands restoration	
Location: Located approximately 12 miles west of Malad, Idaho and 10 miles north of the Utah/Idaho border. The proposed action would occur on BLM administered lands located in the following Township and Ranges: Boise Meridian, Oneida County, Idaho; T13S R34E; T13S R33E; T14S R34E; T14S R33E.	
Which Alternative is Being Evaluated: Proposed Action- Alternative B	
Area of Impact: Forested stands within the Pleasantview Hills are identified as GHMA. Various forest restoration treatments (e.g. thinning, harvest, and burning) would be conducted over 10+ year timeframe in forested stands throughout the Hills. Prescribed fire line (hand lines/hose lays) and temporary roads would be constructed within and on the periphery of forested stands identified for controlled burning (see Map); shrublands adjacent to forested stands are functional/occupied sage-grouse habitat. Proposed forested stand treatments are not expected to negatively impact (except for periodic displacement due to noise/vibration) adjacent intact/occupied greater sage grouse and Columbian sharp-tailed grouse shrubland habitat. Moreover, forested stand periphery habitat is likely to be improved (increased habitat suitability for GRSG) due to conifer removal, and the subsequent release of herbaceous/early seral vegetation at soil level, where the aforementioned gallinaceous birds hide/forage.	
Conservation Area: Idaho Southern Conservation Area	
Habitat Designation: GHMA	Within GHMA, outside of Key habitat and not within any identified Sage-grouse Seasonal Use Area (SUA).
Have any Adaptive Management Triggers been engaged: No	
Is Project Within SFA: No	
Is Project Within a BSU: No	
Does the Proposed Project contribute towards the Disturbance Cap: No	
Please describe type of disturbance and the expected acres:	
Percent Disturbance within BSU: N/A, Habitat improvement project and GHMA only	**Percent Disturbance within Project Area:** N/A
Allocation Open	

Please identify the Management Decisions that authorize the proposed project or otherwise appear applicable:

Management Decision Number	Apply?	Management Decision Text	Conformance Statement.
MD SSS 7	Yes	GRSG habitat within the project area will be assessed during project-level NEPA analysis within the management area designations (PHMA, IHMA, GHMA). Project proposals and their effects will be evaluated based on the habitat and values affected.	Forested stands proposed for treatment are within GHMA, however, historical occurrence data and recent telemetry data suggest what is obvious – these largely contiguous forested habitats are avoided by Greater sage-grouse (GRSG), and therefore should NOT be considered habitat for said species. However, applicable Management Decisions and Required Design features will be utilized as they reduce resource conflicts (e.g. avoiding project implementation during sensitives timeframes, improve likelihood of restoration success, etc.).
MD SSS 8	Yes	Idaho BLM will annually update the Key Habitat map, in order to reflect habitat changes resulting from wildfire, succession, and vegetation treatments that occurred or were observed since the last update. Key habitat includes areas of generally intact sagebrush that provide sage-grouse habitat during some portion of the year. This map also identifies potential restoration areas (perennial grassland annual grasslands, conifer encroachment and recent burns). This map a broad scale current vegetation map that changes as habitat is lost or restored. The Key Habitat Map is not an allocation decision such as PHMA, IHMA, and GHMA. Updates to the map will also occur if it is determined that	Proposed forested stand treatments are largely outside of Key Habitat, and not identified inside of a particular Seasonal Use Area/period polygon. See the figures 4 and 5 above.

Management Decision Number	Apply?	Management Decision Text	Conformance Statement.
		mapping errors or omissions have occurred, or that radio-telemetry studies indicate that GRSG are consistently utilizing an area. Updates are also intended to capture recommendations by the field offices, GRSG Local Working Groups, or agency partners in GRSG conservation. Project-level evaluations of GRSG habitat during the NEPA process can also be used to inform the annual update.	
MD SSS 15	Yes	In PHMA and IHMA, incorporate RDFs, as described in Appendix C. In GHMA, the RDFs are considered BMPs that should be considered and applied, unless the proponent can show that applying the BMP is technically or economically impracticable.	The entirety of the project area is identified as GHMA. Applicable RDF's will be incorporated as BMP's, to the extent practicable.
MD SSS 33	Yes	Conduct implementation and project activities, including construction and short-term anthropogenic disturbances consistent with seasonal habitat restrictions described in Appendix C.	Seasonal habitat restrictions will be instituted to the maximum extent practicable, whilst considering MD SSS 15, and MD SSS 35.
MD SSS 35	No	In undertaking BLM management actions in PHMA, IHMA and GHMA, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances in accordance with Appendix B. The buffers do not apply to vegetation treatments specifically designed to improve or protect Greater	The closest active/occupied Greater sage-grouse (GRSG) lek to the proposed treatments is over 2 miles. Additionally, the closest known active/occupied Columbian Sharp-tailed grouse (CSTG) lek is over 1.2 miles from any treatment area. Project activities would be outside of the largest GHMA buffer provided (Surface disturbance within 2 miles of leks) in the

Management Decision Number	Apply?	Management Decision Text	Conformance Statement.
		Sage-Grouse habitat; however, impacts on leks should be analyzed and those impacts should be minimized to the extent practicable. New MD SSS 44: In collaboration with the Idaho Governor's Office of Species Conservation, Idaho Department of Fish and Game, US Fish and Wildlife Service, and potentially other state and federal agencies, the BLM will form two teams (a technical team and a policy team) through a memorandum of understanding. These teams will be responsible for reviewing proposed infrastructure developments, exceptions, variances, adaptive management triggers and responses, habitat management area adjustments, and mitigation, as described in detail in Appendix K.	2019 GRSG ARMPA, and outside the 0.6 buffer for CSTG provided in the 2012 PFO RMP.
MD SSS 38	Yes	Monitor the effectiveness of projects (e.g., fuel breaks. fuels treatments) until objectives have been met or until it is determined that objectives cannot be met, according to the monitoring schedule identified for project implementation.	Although not monitoring specifically for sage-grouse habitat objectives, treatment effectiveness will be monitored in accordance with monitoring plan/adaptive management procedures provided in appendix F
MD SSS 39	Yes	Monitor invasive vegetation post vegetation management treatment.	BMP's for weed/invasive species monitoring/treatment can be found in Appendix D of the EA
MD SSS 40	Yes	Monitor project construction areas for noxious weed and invasive species for at least 3 years, unless control is achieved earlier.	See MD SSS 39

Management Decision Number	Apply?	Management Decision Text	Conformance Statement.
MD VEG 3	Yes	Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success (Richards et al. 1998). Non-native seeds may be used as long as they support GRSG habitat objectives (Pyke 2011) to increase probability of success, when adapted seed availability is low or to compete with invasive species especially on harsher sites.	A combined seed mix of both native and non-native species will be utilized for both temporary road and logging landing areas, to ensure restoration objectives are met in these harsher, more heavily disturbed areas. On fire lines/hose lay disturbance areas, where native species dominate, a more, or entirely native seed mix will be utilized.
MD VEG 10	Yes	Implement noxious weed and invasive species control using integrated vegetation management actions per national guidance and local weed management plans for Cooperative Weed Management Areas in cooperation with State and Federal agencies, affected counties, and adjoining private lands owners.	See MD SSS 39
MD VEG 11	Yes	Conduct integrated weed management actions for noxious and invasive weed populations that are impacting or threatening GRSG habitat quality using a variety of eradication and control techniques including chemical, mechanical and other appropriate means.	A variety of weed/invasive species eradication/control techniques will be utilized, dependent on a variety of factors (e.g. species of weed, distance from roads, size of infestation, etc.). See Section Appendix D for weeds BMP's/treatment protocols
MD VEG 13	Yes	Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	See MD SSS 39

Management Decision Number	Apply?	Management Decision Text	Conformance Statement.
MD FIRE 19		Apply appropriate seasonal restrictions for implementing vegetation and fuels management treatments according to the type of seasonal habitats present. Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around and/or in the winter range and will protect, maintain, increase, or enhance winter range habitat quality. Ensure chemical applications are utilized where they will assist in success of fuels treatments. Strategically place treatments on a landscape scale to prevent fire from spreading into PHMA or WUI.	See MD SSS 33. No treatments proposed within GRSG winter range. Proposed treatments expected to reduce fire intensity within forested stands, which would be expected to reduce the likelihood of fire conveyance from forested stands to adjacent shrub land habitats, including GRSG winter areas, downslope/gradient from these forested stands.
MD FIRE 22	Yes	Fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, and protect GRSG habitat which considers a full range of cost effective fuel reduction techniques, including: chemical, biological (including grazing and targeted grazing), mechanical and prescribed fire treatments.	The BLM PFO ID Team developed proposed action treatment prescriptions, which include a variety of techniques [mechanical, fire].
MD FIRE 26	Yes	Protect vegetation restoration and rehabilitation efforts/projects from subsequent fire events.	Interconnected firebreaks on the BLM Pocatello Field Office managed lands and also the Carbiou-Targhee Curlew Grasslands, would be expected to effectively reduce stop/fire conveyance into the Pleasantview Hills from the East/Southeast/South (prevailing wind direction).

Management Decision Number	Apply?	Management Decision Text	Conformance Statement.
MD FIRE 31	No	If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized.	Although identified as within GHMA, the Forest Stands within the Pleasantview Hills are not considered Greater sage-grouse habitat. These forested areas were largely NOT included in the Key habitat data-set, nor within the Seasonal Use Area's (Breeding, Summer, Winter). Moreover, recent telemetry data also suggests that these areas of contiguous forested habitats are avoided by GRSG.
MD FIRE 34/35/36	Yes/No	Provide adequate rest from livestock grazing to allow natural recovery of existing vegetation and successful establishment of seeded species within burned/ESR areas. All new seedings of grasses and forbs should not be grazed until at least the end of the second growing season, and longer as needed to allow plants to mature and develop robust root systems which will stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management. Adjust other management activities, as appropriate, to meet ESR objectives. And Adjust, as appropriate, livestock management on adjacent unburned areas to mitigate the effect of the burn on local GRSG populations.	See MD SSS 38 Although not monitoring specifically for sage-grouse habitat objectives, treatment effectiveness will be monitored in accordance with monitoring plan/adaptive management procedures provided in Appendix F

Management Decision Number	Apply?	Management Decision Text	Conformance Statement.
		And Following seedling establishment, modify grazing management practices if needed to achieve long-term vegetation and habitat objectives.	
MD LG 6	Yes	When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and • Grazing schedules (including rest or deferment). *Not in Priority Order	See MD FIRE 34/35/36.
MD TTM 5	Yes	Conduct road construction, upgrades, and maintenance activities to avoid disturbance during the lekking season – see Appendix C.	See MD SSS 33.
MD CC 1		Collaborate, coordinate and utilize cooperative planning efforts to implement and monitor activities to achieve desired conditions and to maximize the utilization of	Idaho Department of Fish and Game, namely their Mule Deer Initiative, was instrumental in providing staff time, research, and funding to achieve project implementation. They also served as members of the ID

Management Decision Number	Apply?	Management Decision Text	Conformance Statement.
		available funding opportunities. Coordination efforts can include: adjacent landowners, federal and state agencies, local governments, tribes, communities, other agencies, resource advisory groups, public lands permit holders and nongovernmental organizations.	Team during treatment prescription/development. Relevant issues derived from public scoping were integrated into project design/treatment prescriptions/monitoring plans.

Required Design Features that Seem Applicable:

Apply?	RDF Text	Conformance Statement.
Yes	Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of projects	Expertise considered from local state wildlife agency. Project scoped with a variety of landowners, federal, state, county and private organizations.
No	No repeated or sustained behavioral disturbance from large scale infrastructure or facilities (e.g., visual, noise over 10 dbA at lek above ambient, etc.) to lekking birds from 6:00 pm to 9:00 am within 2 miles (3.2 km) of leks during the lekking season.	See MD SSS 35. Should new leks be discovered within applicable buffer distances, implementation would conform with seasonal restrictions, assuming the 2019 GRSG ARMPA isn't enjoined. See RDF from 2019 amendment below.
Yes/no	Avoid mechanized anthropogenic disturbance, in nesting habitat during the nesting season and in wintering habitat during the winter season when implementing infrastructure construction or maintenance, during geophysical exploration activities, and during organized motorized recreational events. – Routine road blading, where no water turnouts or culverts are cleaned, repaired, or replaced and no road upgrades occur, is not included in this restriction. –	All applicable RDFs are considered conditions of approval.

Apply?	RDF Text	Conformance Statement.
	Emergency actions to protect life or property are excluded from these restrictions. – Fuels and vegetation treatments specifically designed to improve or protect Greater Sage-Grouse habitat are not subject to this restriction. Restoring and improving Greater Sage-Grouse habitat is a high priority of this plan and the activity's effects will be analyzed for that Greater Sage-Grouse population.	
Yes	Power-wash all vehicles and equipment involved in off-road activities, including firefighting vehicles, construction equipment, and seeding equipment, before allowing them to enter the area, to minimize the introduction of undesirable or invasive plant specie	All applicable RDFs are considered conditions of approval.
Yes	Seed aboveground disturbance areas with perennial vegetation, as per vegetation management	All applicable RDFs are considered conditions of approval.
Yes	Control the spread and effects of nonnative plant species, for example by washing vehicles and equipment (Gelbard and Belnap 2003; Bergquist et al. 2007; Evangelista et al. 2011)	All applicable RDFs are considered conditions of approval.
Yes	Clean up refuse (Bui et al. 2010)	All applicable RDFs are considered conditions of approval.
Yes	Eliminate or minimize corvid subsidies, as practicable	All applicable RDFs are considered conditions of approval.
Yes	Utilize existing roads or realignments of existing routes to the extent possible	All applicable RDFs are considered conditions of approval.
Yes	Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose	All applicable RDFs are considered conditions of approval.

Apply?	RDF Text	Conformance Statement.
Yes	Construct road crossings at right angles to ephemeral drainages and stream crossings	All applicable RDFs are considered conditions of approval.
Yes	Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community	All applicable RDFs are considered conditions of approval.
Yes	Irrigate interim reclamation if necessary for establishing seedlings more quickly	All applicable RDFs are considered conditions of approval.
Yes	Utilize mulching techniques to expedite reclamation and to protect soils	All applicable RDFs are considered conditions of approval.
Yes	Use burning prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of annual grass invasion)	All applicable RDFs are considered conditions of approval.
Yes	Emphasize the use of native plant species, especially those from a warmer area of the species' current range, recognizing that nonnative species may be necessary, depending on the availability of native seed and prevailing site conditions	All applicable RDFs are considered conditions of approval.
Yes	Use available plant species, based on their adaptation to the site when developing seed mixes (Lambert 2005; VegSpec)	All applicable RDFs are considered conditions of approval.
Yes	Consider using the warmer component of a species' current range when selecting native species for restoration, when available (Kramer and Havens 2009)	All applicable RDFs are considered conditions of approval.
Yes	Use effective techniques to introduce desired species to the site, based on site-specific conditions (e.g., drill seeding,	All applicable RDFs are considered conditions of approval.

Apply?	RDF Text	Conformance Statement.
	broadcast seeding followed by a seed coverage technique, such as harrowing, chaining, or incorporation by livestock trampling, and transplanting container or bare-root seedlings)	
Yes	Use post-treatment control of annual grass and other invasive species	All applicable RDFs are considered conditions of approval.
Yes	Use temporary range infrastructure, such as troughs, fences, and supplements, where feasible and appropriate, to meet management objectives	All applicable RDFs are considered conditions of approval.
Yes	Ensure that permittees are informed of management and movement requirements related to avoiding recent burns, habitat rehabilitation, or other restoration sites	All applicable RDFs are considered conditions of approval.

Is Mitigation Required: No
Rationale or Brief Description of Mitigation: Habitat restoration within forested ecotypes.
Based on the Above Review, Is the Project in Conformance with the Sage-grouse ARMPA: Yes
Rationale: The proposed action meets all 2015, and 2019 GRSG ARMPA requirements including goals, objectives, recommended management decisions and best management practices.

----------Pocatello Field Office----------	
Reviewers: David Price	**Date: 09/09/2019**
Is this a Preliminary or Final Review: Final	
Additional Needs: None	
Conclusion: Based on the above review the proposal complies with the Pocatello RMP, as amended.	

Timber Harvesting

Soil Protection -Select for each harvesting operation the logging method and type of equipment adapted to the given slope, landscape and soil properties in order to minimize soil erosion.

- Ground based skidding shall not be conducted if it will cause rutting, deep soil disturbance, or accelerated erosion. On slopes exceeding forty-five percent (45%) gradient and which are immediately adjacent to a Class I or II stream, ground based skidding shall not be conducted except with an approved variance.
- Limit the grade of constructed skid trails on geologically unstable, saturated, or highly erodible or easily compacted soils to a maximum of thirty percent (30%).
- In accordance with appropriate silvicultural prescriptions, skid trails shall be kept to the minimum feasible width and number. Tractors used for skidding shall be limited to the size appropriate for the job.
- Uphill cable yarding is preferred. Where downhill yarding is used, reasonable care shall be taken to lift the leading end of the log to minimize downhill movement of slash and soils.

Location of Landings, Skid Trails, and Fire Trails -Locate landings, skid trails, and fire trails on stable areas to prevent the risk of material entering streams.

- All new or reconstructed landings, skid trails, and fire trails shall be located on stable areas outside the appropriate stream protection zones. Locate fire and skid trails where sidecasting is held to a minimum.
- Minimize the size of a landing to that necessary for safe economical operation
- To prevent landslides, fill material used in landing construction shall be free of loose stumps and excessive accumulations of slash. On slopes where sidecasting is necessary, landings shall be stabilized by use of seeding, compaction, riprapping, benching, mulching or other suitable means.

Drainage Systems -For each landing, skid trail or fire trail a drainage system shall be provided and maintained that will control the dispersal of surface water to minimize erosion.

- Stabilize skid trails and fire trails whenever they are subject to erosion, by water barring, cross draining, outsloping, scarifying, seeding or other suitable means. This work shall be kept current to prevent erosion prior to fall and spring runoff.
- Reshape landings as needed to facilitate drainage prior to fall and spring runoff. Stabilize all landings by establishing ground cover or by some other means within one (1) year after harvesting is completed.

Treatment of Waste Materials -All debris, overburden, and other waste material associated with harvesting shall be left or placed in such a manner as to prevent their entry by erosion, high water, or other means into streams

- Wherever possible trees shall be felled, bucked, and limbed in such a manner that the tree or any part thereof will fall away from any Class I streams. Continuously remove slash that enters Class I streams as a result of harvesting operations. Continuously remove other debris that enters Class I streams as a result of harvesting operations whenever there is a potential for stream blockage or if the stream has the ability for transporting such debris. Place removed material five (5) feet slope distance above the ordinary high water mark.

- Remove slash and other debris that enters Class II streams whenever there is a potential for stream blockage or if the stream has the ability for transporting the debris immediately following skidding and place removed material above the ordinary high water mark.
- Deposit waste material from construction or maintenance of landings and skid and fire trails in geologically stable locations outside of the appropriate Stream Protection Zone.

Stream Protection -During and after forest practice operations, stream beds and streamside vegetation shall be protected to leave them in the most natural condition as possible to maintain water quality and aquatic habitat.

- Lakes require an approved site specific riparian management prescription prior to conducting forest practices within the stream protection zone.
- Ground based skidding in or through streams shall not be permitted. When streams must be crossed, adequate temporary structures to carry stream flow shall be installed. Cross the stream at right angles to its channel if at all possible. Remove all temporary crossings immediately after use and, where applicable, water bar the ends of the skid trails.
- Operation of ground based equipment shall not be allowed within the Stream Protection Zone except at approaches to stream crossings.
- When cable yarding is necessary, across or inside the Stream Protection Zones it shall be done in such a manner as to minimize stream bank vegetation and channel disturbance.
- Provide for large organic debris (LOD), shading, soil stabilization, wildlife cover and water filtering effects of vegetation along streams.
- Leave hardwood trees, shrubs, grasses, and rocks wherever they afford shade over a stream or maintain the integrity of the soil near a stream. (10-14-75).
- Leave seventy-five percent (75%) of the current shade over the Class I streams. (7-1-96).
- Carefully remove timber from the Stream Protection Zone in such a way that shading and filtering effects are not destroyed. (7-1-96).
- Standing trees, including conifers, hardwoods and snags will be left within fifty (50) feet of the ordinary high water mark on each side of all Class I streams, and within thirty (30) feet on each side of those Class II streams that require thirty (30) feet stream protection zones, in the following minimum numbers per one thousand (1000) feet of stream: Minimum Standing Trees Per One Thousand (1000) Feet Required (each side).
- Snags will be counted as standing trees in each diameter class if snag height exceeds one and one-half (1 ½) times the distance between the snag and the stream's ordinary high water mark. Not more than fifty percent (50%) of any class may consist of snags. (7-1-96).
- As an alternative to the standing tree and shade requirements, the operator may notify the BLM authorized officer that a site specific riparian management prescription is requested. The BLM and operator may jointly develop a plan upon consideration of stream characteristics and the need for large organic debris, stream shading and wildlife cover which will meet the objective of these rules. (3-13-90).
- Where the opposite side of the stream does not currently meet the minimum standing tree requirements of the table, the BLM and the operator should consider a site specific riparian prescription that meets the large organic debris needs of the stream. (3-13-90).
- Stream width shall be measured as average between ordinary high water marks.

Road Maintenance -Conduct regular preventive maintenance operations to minimize disturbance and damage to forest productivity, water quality, and fish and wildlife habitat

- Place all debris or slide material associated with road maintenance in a manner to prevent their entry into streams.

- Repair slumps, slides, and other erosion sources causing stream sedimentation to minimize sediment delivery.
- Active roads -a forest road being used for hauling forest products, rock and other road building materials. The following maintenance shall be conducted on such roads.
- Culverts and ditches shall be kept functional. During and upon completion of seasonal operations, the road surface shall be crowned, out-sloped, in-sloped or cross-ditched, and berms removed from the outside edge except those intentionally constructed for protection of fills. The road surface shall be maintained as necessary to minimize erosion of the subgrade and to provide proper drainage. Hauling shall be postponed during wet periods if necessary to minimize sediment delivery to streams. If road surface stabilizing materials are used, apply them in such a manner as to prevent their entry into streams.
- Inactive roads -a forest road no longer used for commercial hauling but maintained for access (e.g., for fire control, forest management activities, recreational use, and occasional or incidental use for minor forest products harvesting). The following maintenance shall be conducted on inactive roads.
- Following termination of active use, ditches and culverts shall be cleared and the road surface shall be crowned, out-sloped or in-sloped, water barred or otherwise left in a condition to minimize erosion. Drainage structures shall be maintained thereafter as needed. The roads may be permanently or seasonally blocked to vehicular traffic.
- Long-term Inactive Roads -a road not intended to be used again in the near future but will likely be used again at some point in the future. No subsequent maintenance of a long-term inactive road is required after the following procedures are completed:
- The road is left in a condition suitable to control erosion by out-sloping, water barring, seeding, or other suitable methods. The road is blocked to vehicular traffic. The BLM may require the removal of bridges, culverts, ditches and unstable fills. Any bridges or culverts left in place shall be maintained by the landowner.
- Permanently Abandoned Roads -a road not intended to be used again. All drainage structures must be removed and roadway sections treated so that erosion and landsliding are minimized.
- Drainage structures shall be removed and stream gradients restored to their natural slope. The road prism shall be treated to break up compacted areas. Fill slopes of roads within stream protection zones shall be pulled back to a stable configuration unless long-term stability has already been achieved. Unstable sidehill fills shall be pulled back to a stable configuration. Ditch line erosion shall be controlled by cross-ditching, outsloping, or regrading to eliminate ditches.
- All bare earth areas created by regrading, ripping, and drainage removal shall be stabilized by seeding, mulching, armoring, or other suitable means.

Winter Operations -Due to risk of erosion and damage from roads and constructed skid trails inherent in winter logging, at minimum the following shall apply:

- Roads to be used for winter operations must have adequate surface and cross drainage installed prior to winter operations. Drain winter roads by installing rolling dips, drivable cross ditches, open top culverts, outsloping, or by other suitable means.
- During winter operations, roads will be maintained as needed to keep the road surface drained during thaws or break up. This may include active maintenance of existing drainage structures, opening of drainage holes in snow berms and installation of additional cross drainage on road surfaces by ripping, placement of native material or other suitable means.

APPENDIX J – Example of Aspen Response Post Timber Harvest

Figure 1. Post Treatment Aspen Photo Locations

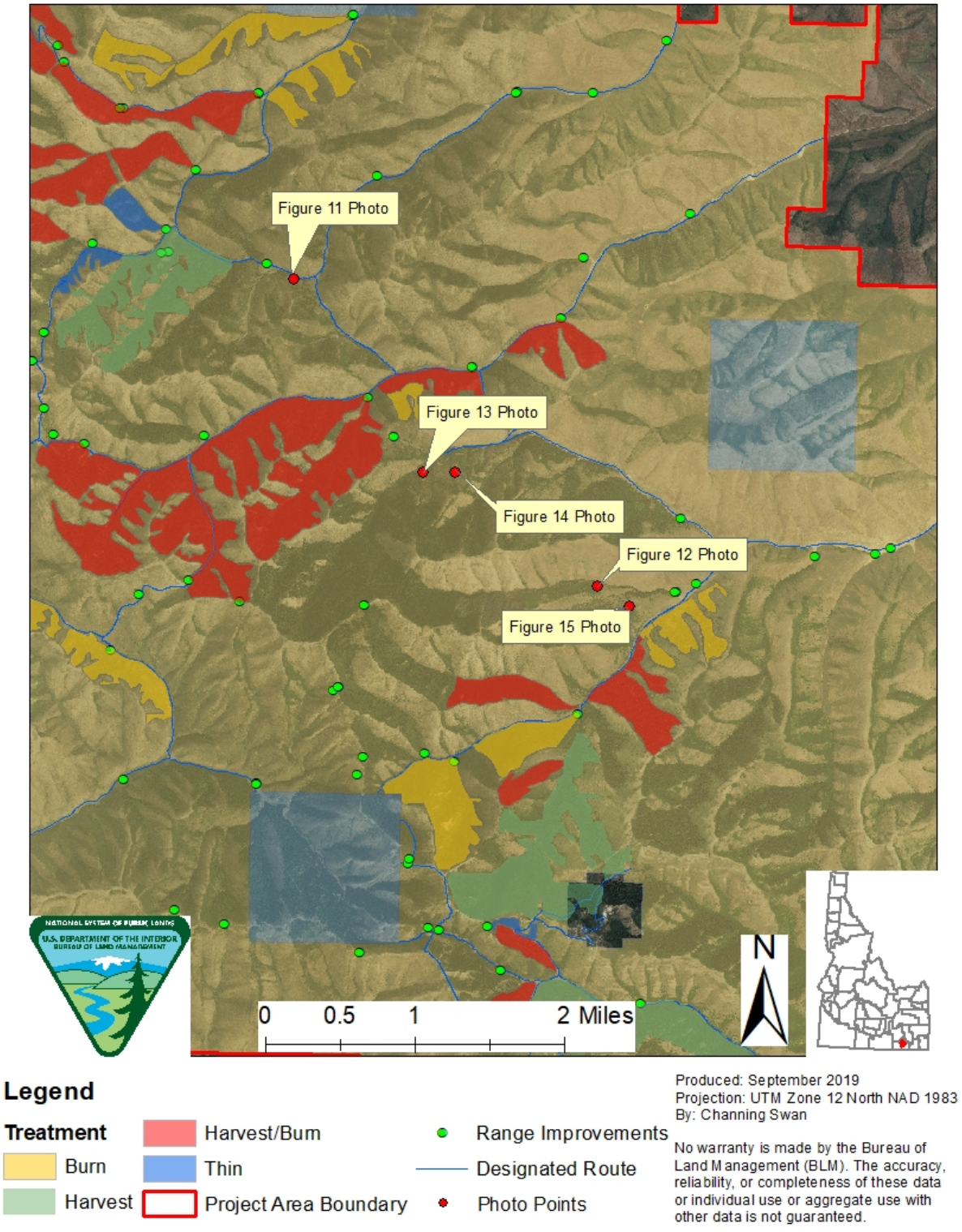


Figure 2. Photos taken within harvest treatments completed in 2011; Sites located within 1000 feet of active livestock water trough within the Pleasantview Hills, John Evans Pasture.

This photo (Figure 2) was taken following a salvage harvest, the intent of which was to capture value of the saw timber killed by a Tussock Moth outbreak. Aspen was present in the stand and in the vicinity of the treatments units. Aspen can be seen sprouting in the disturbed areas. This photo is approximately 1000 feet from a livestock watering site and salting area. In 2016 (5 yrs. after disturbance), this location was randomly selected to have aspen transects for the Pleasantview Land Health Evaluation. Transects 36 and 37 were in the vicinity of this photo. Transect 36 showed aspen regeneration (< 5 ft. high) consisted of 1,400 seedlings/ac and aspen recruitment (5-15 ft. high) averaged 110 stems/ac. Transect 37 (840 seedlings/ac; and regeneration of 200 stems/ac) showed similar results. It is expected that these stands will continue on an ecological path toward becoming mature aspen stands in the future. Prior to the salvage harvest, Douglas fir dominated the over story and the aspen was barely present. It will take time for the aspen seedlings to grow into a mature stand.

The next four photos show aspen and maple retuning 10 years post-harvest in John Evans Canyon. This site photo (Figure 3) is in John Evans Canyon and is within 0.4 miles of an active livestock trough. Aspen number average approximately 600 seedlings/ac. It is expected that these stands will continue on an ecological trajectory toward mature aspen stands in the future.

Figure 3. Photos taken within harvest treatments completed in 2009; Sites located within 0.4 mile of active livestock water trough within the Pleasantview Hills, John Evans Pasture.

Figure 4. Photos taken within harvest treatments completed in 2009; Sites located within 0.4 mile of active livestock water trough within the Pleasantview Hills, John Evans Pasture.

Figure 5. Photos taken within harvest treatments completed in 2009; Sites located within 1 mile of active livestock water trough within the Pleasantview Hills, John Evans Pasture.

Figure 6. Photos taken within harvest treatments completed in 2009; Sites located within 1 mile of active livestock water trough within the Pleasantview Hills, John Evans Pasture.

Appendix K – Fire Ecology of Aspen

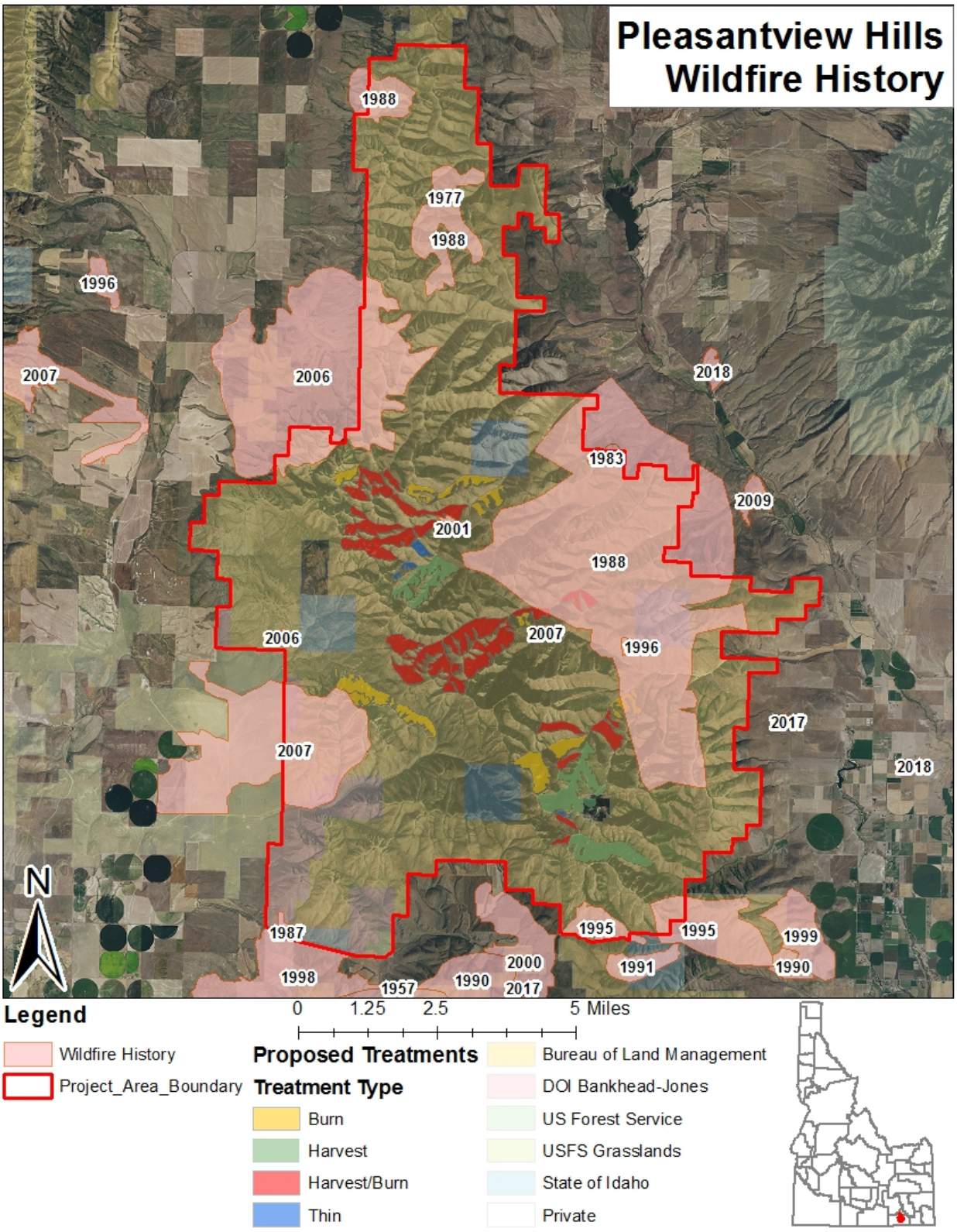
The aspen understory structure is complex with multiple shrub and herbaceous layers. Common shrubs include Rocky Mountain maple (*Acer glabrum*), serviceberry (*Amelanchier alnifolia*), Mountain big sagebrush (*Artemisia tridentata* var. *vaseyana*), chokecherry (*Prunus virginiana*), Woods' rose (*Rosa woodsii*), and mountain snowberry (*Symphoricarpos oreophilus*) (BLM 2016; LANDFIRE 2013a). Common graminoids may include wheatgrass (*Elymus spp.),* Thurber's fescue (*Festuca thurberi*) and 'needle and thread' (*Hesperostipa comata*). Associated forbs include yarrow (*Achillea millefolium*), asters (*Eucephalus spp*.), sticky purple geranium (*Geranium viscosissimum*), lupine (*Lupinus spp.*), sweetcicely (*Osmorhiza berteroi*), coneflower (*Rudbeckia spp.*), arrowleaf balsamroot (*Balsamorhiza sagittata*), mule-ears (*Wyethia amplexicaulis*) and many others (BLM 2016; LANDFIRE 2013a). Additional vegetation environmental details may be found in the Pleasantview Assessment and Evaluation (Chapter III – Existing Resources, Section C - Vegetation; BLM 2016).

Fire regimes in the aspen cover types have been significantly altered by past management actions and fire exclusion. The situation is characterized by the dominance of late seral aspen stands.

Fire suppression in the project area has increased Douglas fir stand densities. This situation has shifted the seral balance toward greater representation of climax vegetation, with a corresponding loss of early and intermediate seral stages. There is little record of fire occurring within project treatment areas in the past 42 years (Figure 1). However, before and during the mid-nineteenth century, fires were apparently more frequent. Larger acreages of aspen and aspen-conifer mix burned more than any time since (Howard 1996). In central Utah, Baker (Howard 1996; Baker 1925) and Meinecke (Howard 1996; Meinecke 1929) found few aspen fire-scarred later than 1885. Earlier fire scars were common and showed a 7 to 10 year fire frequency. Since aspen is fire-sensitive, these fires were likely low severity (Howard 1996; Davidson et al 1959).

These data indicate a great reduction of aspen fire rejuvenation in the West since about 1900. Extensive young stands of aspen are currently uncommon in the West (Howard 1996; DeByle et al 1987) as also seen in the project area (BLM 2016). Conifers now dominate the seral aspen within the project area due to a lack of disturbance, particularly wildfire (Figure 1).

Figure 1. Pleasantview Wildfire History



Stable Aspen
Stable aspen stands in the project area are generally terrain isolated. Rogers et al. (2014) defines these as stable aspen communities isolated by terrain or substrate, often limited in extent. These are upland forests and woodlands dominated by aspen without a significant conifer component. These stands are outside of natural conifer sites, so they experience little encroachment.

Disturbance Description: Older stable aspen stands would be susceptible to disease and insect outbreaks every 200-years where 80% of outbreaks would thin older trees greater than 40 years (average return interval 250 years; LANDFIRE 2013a). Disturbance effects varies from clone to clone. Many stable aspen clones situated on steep slopes are prone to disturbance caused by avalanches and mud/rock slides (LANDFIRE 2013a).

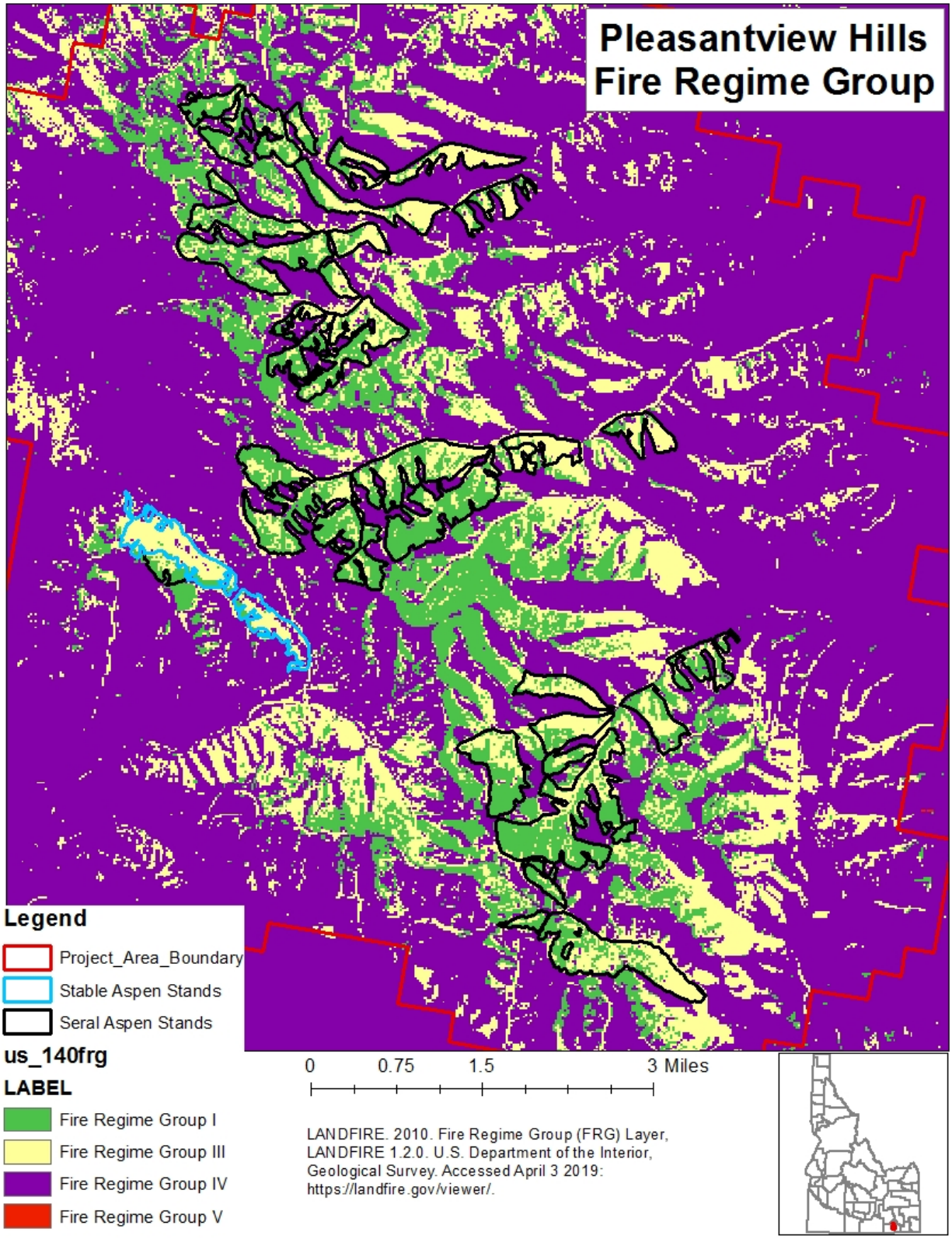
Both stand replacement and ground fire were common in stable aspen. It is important to understand that aspen is considered a fire-resistant vegetation type which typically does not burn during the normal lightning season. Burning occurred mostly during spring and/or fall by humans (LANDFIRE 2013a).

Stable aspen stands are categorized within Fire Regime Group III (stand replacement severity: 35-100+ years; Figure 2). There are two fire return intervals for stable aspen stands dependent upon vegetation and weather conditions dictating fire severity. An average fire interval for mixed-severity fires (54% of all fires) is 57 years (LANDFIRE 2013a). The average fire interval for stand replacement fires (46% of all fires) is 68 years (LANDFIRE 2013a). Historical fire size for stable aspen stands are approximately 10 acres, with an average max size around 100 acres (LANDFIRE 2013a). However, a lack of fire for 100 years would allow moderate conifer encroachment transitioning to co-dominate conifers, with conifers present in the mid-story, perhaps overtopping aspen in older stands (LANDFIRE 2013a).

Seral Aspen
Seral aspen is more highly threatened by conifer encroachment/replacement than stable aspen. Most occurrences at present represent a late-seral stage of aspen shifting to a pure conifer existence.

Disturbance Description: Disease and insect mortality do not appear to have major effects; however, older seral aspen stands would be susceptible to outbreaks every 200 years on average. Older conifers (greater than 100 years) would experience insect/disease outbreaks every 300 years on average (LANDFIRE 2013b). In 2005-2006, some seral aspen stands in the project area, heavily dominated by Douglas fir, were hit by Tussock moths (*Lymantriinae spp.*), resulting in large scale Douglas fir mortality and, returning these stands to early to mid-seral stands of aspen. The LHA (BLM 2016) determined these stands were at a very low risk. This is a strongly fire adapted community, more so than stable aspen. Fire return intervals vary for mixed-severity fire, especially with the encroachment of conifers (LANDFIRE 2013b). Seral aspen stands are categorized within Fire Regime Group I (frequent low severity fires: 0-35 years; Figure 2). Seral aspen's average fire interval for mixed severity fire (71% of all fires) is 40 years with the average fire size of around 50 acres, maxing to around 100 acres (LANDFIRE 2013b). However, the average fire interval of mixed severity fire increases from 40 years in stands less than 100 years to 60 years in stand greater than 100 years with conifer encroachment (LANDFIRE 2013b).

Figure 2. Pleasantview Fire Regime Groups (LANDFIRE)



APPENDIX L – REFERENCES

40 CFR 1500-1508. Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA.

16 USC 80. Neotropical Migratory Bird Conservation Act.

16 USC 703. 1918 Migratory Bird Treaty Act.

16 USC 1531. Endangered Species Act of 1973.

16 USC 6512. Authorized hazardous fuel reduction projects.

16 USC 6513. Prioritization.

42 USC 4321-4347. National Environmental Policy Act of 1969.

43 USC 1701. Federal Land Policy and Management Act of 1976.

Baker, Frederick S. 1925. Aspen in the central Rocky Mountain region. Department Bulletin No. 1291. Washington, DC: U.S. Department of Agriculture. 47 p.

Barrett, Stephen, W.; Arno, Stephen F. 1982. Indian fires as an ecological influence in the Northern Rockies. Journal of Forestry. 80(10): 647-651.

Barrett, Stephen W., Doug Havlina, Jeffrey L. Jones, Wendel J. Hann, Christine K. Frame, Dale Hamilton, Kathy Schon, Thomas E. Demeo, Lee C. Hutter, and James P. Menakis. 2010. Interagency Fire Regime Condition Class (FRCC) guidebook. Version 3.0. USDA Forest Service, US Department of the Interior, and The Nature Conservancy, September. Fire and Research Management Exchange System (FRAMES). Accessed on 03/28/2019: https://www.landfire.gov/frcc/documents/FRCC_Guidebook_2010_final.pdf

Bartos, Dale L., Amacher, Michael C. 1998. Soil Properties Associated with Aspen to Conifer Succession. Rangelands 20(1).

Belt, G.H., J.O'Laughlin, and T. Merrill. 1992. Design of forest Riparian Buffer Strips for the Protection of Water Quality: Analysis of Scientific Literature. Rep. No. 8, Moscow, ID: University of Idaho, Idaho Forest, Wildlife and Range Policy Analysis Group.

Brown, James K.; Simmerman, Dennis G. 1986. Appraising fuels and flammability in western aspen: a prescribed fire guide. Gen. Tech. Rep. INT-205. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 48 p.

Buckman, Henry O. and Nyle C. Brady. 1966. The Nature and Properties of Soils. Charleston, SC: Nabu Press, January 1966. Sixth Edition - Print.

Bureau of Land Management (BLM). 2011. Roads Design Handbook, H-9113-1, Release 9-388; 10/21/2011. Office of the Assistant Director, Business and Fiscal Resources; Washington, DC.

Bureau of Land Management (BLM). 2012. Record of Decision and Approved Pocatello Resource Management Plan (PFO ARMP). Idaho Falls District - Pocatello Field Office, Pocatello, Idaho. April 2012.

Bureau of Land Management (BLM). 2014. Sensitive Species listed by the Idaho Bureau of Land Management. Department of Interior, Bureau of Land Management, Idaho State Office, Boise, Idaho.

Bureau of Land Management (BLM). 2015. Idaho and Southwestern Montana Greater Sage-grouse Approved Resource Management Plan Amendment. U.S. Department of the Interior, Bureau of Land Management, Idaho State Office. https://eplanning.blm.gov/epl-front-office/projects/lup/31652/63337/68679/IDMT_ARMPA_print.pdf

Bureau of Land Management (BLM). 2016. Pleasantview Assessment and Evaluation. Idaho Falls District - Pocatello Field Office, Pocatello, Idaho. July 2016.

Bureau of Land Management (BLM). 2017. Upper Snake-Pocatello Integrated Weed Control Program Environmental Analysis (DOI-BLM-ID-I010-2016-0011-EA). Prepared by the Idaho Falls District BLM, Upper Sake and Pocatello Field Offices.

Cook, M.J. and J.G. King. 1983. Construction Cost and Erosion Control Effectiveness of Filter Windrows on Fill Slopes. Research Note INT-355. USDA-Forest Service, Intermountain Forest and Range Experiment Station, Ogden, Utah. November 1983.

Coulloudon, Bill; Eshelman, K.; Gianola, J.; Habich, N.; Hughes, L.; Johnson, C.; Pellant, M.; Podborny, P.; Rasmussen, A.; Robles, B.; Shaver, P.; Spehar, J.; Willoughby, J. 1999. Sampling Vegetation Attributes, Interagency Technical Reference. Tech. Ref. 1734-4. Bureau of Land Management, National Business Center, Denver, CO.

Cryer, Douglas H. and John E. Murray. 1992. Aspen Regeneration and Soils. Rangelands 14(4).

Davidson, Ross W.; Hinds, Thomas E.; Hawksworth, Frank G. 1959. Decay of aspen in Colorado. Station Paper No. 45. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 14 p.

DeByle, Norbert V. and Winokur, R.P. 1985. Aspen: Ecology and Management in the Western United States. USDA Forest Service, General Technical Report RM-119, Fort Collins, Colorado, USA

DeByle, Norbert V.; Bevins, Collin D.; Fischer, William C. 1987. Wildfire occurrence in aspen in the interior western United States. Western Journal of Applied Forestry. 2(3): 73-76.

Eastern Idaho Aspen Working Group (EIAWG). 2014. Aspen Stand Risk Assessment (version 1.7). Eastern Idaho Aspen Working Group – Science and Technology Committee, Idaho.

Elliot, William J., Miller, Mary Ellen, Enstice, Mic. 2016. Targeting forest management through fire and erosion modeling. International Journal of Wildland Fire, 25, 876-887.

Elliot, William J., Hall, David E., Scheele, Dayna L. 2000. Disturbed WEPP (Draft 02/2000) WEPP Interface for Disturbed Forest and Range Runoff, Erosion and Sediment Delivery. Technical Documentation. U.S.D.A. Forest Service, Rocky Mountain Research Station and San Dima Technology and Development Center.

Executive Order (EO) 13112 of February 03, 1999. Federal Register Vol.64, No. 25, Monday, February 8, 1999. p 6183. Accessed on 02/8/2017: https//www.federalregister.gov/documents/1999/02/08/99-3184/invasive-species

Executive Order (EO) 13186 of January 10, 2001. Federal Register Vol.66, No. 11, Wednesday, January 17, 2001. p 3853. Accessed on 05/24/2019: https://www.govinfo.gov/content/pkg/FR-2001-01-17/pdf/01-1387.pdf

Gray, D.J. and W.F. Megahan. 1981. Forest Vegetation Removal and Slope Stability in the Idaho Batholith. USDA Forest Service, Intermountain Research Station. Research Paper INT-271.

Green, R.A., Bear, G.D. 1990. Seasonal cycles and daily activity patterns of Rocky Mountain elk. Journal of Wildlife Management. 54, 272–279

Griffis-Kyle, K.L. and Beier, P. 2003. Small isolated aspen stands enrich bird communities in southwestern ponderosa pine forests. Biological Conservation. 110, 375-385

Gruell, G. E.; Loope, L. L. 1974. Relationships among aspen, fire, and ungulate browsing in Jackson Hole, Wyoming. Lakewood, CO: U.S. Department of the Interior, National Park Service, Rocky Mountain Region. 33 p. In cooperation with: U.S. Department of Agriculture, Forest Service, Intermountain Region.

Heath, S.K. 2004. Effects of conifers on aspen-breeding bird communities in the Sierra Nevada. Transactions of the Western Section of the Wildlife Society. 40, 68-81

Howard, Janet L. 1996. Populus tremuloides. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Accessed on 03/27/2019: https://www.fs.fed.us/database/feis/plants/tree/poptre/all.html

Hungerford, Roger D. 1988. Soil temperatures and suckering in burned and unburned aspen stands in Idaho. Research Note INT-378. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 6 p.

Idaho State Department of Environmental Quality (IDEQ). 1997. Idaho Forest Practices Water Quality Audit. IDHW-DEQ, Boise, Idaho. February 1997.

Idaho Department of Fish and Game (IDFG). 2008. Mule Deer Management Plan 2008-2017. Idaho Department of Fish and Game, Boise, USA.

Idaho Department of Fish and Game (IDFG). 2014. Idaho Elk Management Plan 2014-2024. Idaho Department of Fish and Game, Boise, USA.

Idaho Department of Fish and Game (IDFG). 2015. Idaho State Wildlife Action Plan. Boise (ID): Idaho Department of Fish and Game. Grant No.:F14AF01068 Amendment #1. Available from: http://fishandgame.idaho.gov/. Sponsored by the US Fish and Wildlife Service, Wildlife and Sport Fish Restoration Program.

Idaho Department of Fish and Game (IDFG). 2019. Idaho Fish and Wildlife Information System, Species Diversity Database. Idaho Natural Heritage Data. Accessed February 3, 2019: https://idfg.idaho.gov/data

Idaho State Forest Products Commission, 2005. Best Management Practices, Forestry for Idaho, Forest Stewardship Guidelines for Water Quality. Idaho Forest Products Commission. Boise, Idaho.

Jones, B. E.; Rickman, T. H.; Vazquez, A.; Sado, Y.; Tate, K. W. 2005. Removal of encroaching conifers to regenerate degraded aspen stands in the Sierra Nevada. Restoration Ecology. 13: 373-379.

LANDFIRE. 2013a, June - last update. Biophysical Setting Model: 1810110 – Rocky Mountain Aspen Forest Woodland. U.S. Department of Agriculture, Forest Service; U.S. Department of Interior. Accessed on 03/08/2018: https://www.landfire.gov/bps-models.php

LANDFIRE. 2013b, June - last update. Biophysical Setting Model: 1810610 – Inter-mountain Basins Big Aspen-Mixed Conifer Forest and Woodland. U.S. Department of Agriculture, Forest

Service; U.S. Department of Interior. Accessed on 03/08/2018: https://www.landfire.gov/bps-models.php

Luce, C.H. 1997. Effectiveness of Road Ripping in Restoring Infiltration Capacity of Forest Roads. Restoration Ecology. 5(3) p265-270

Mealor, B., RD Mealor, WK Kelly, DL Bergman, SA Burnett, TW Becker, B Fowers, ME Heget, CE Noseworthy, JL Richards, CS Brown, KG Beck, M Fernandez-Gimerez, 2013. Cheatgrass Management Handbook: Managing an invasive annual grass in the Rocky Mountain region. University of Wyoming, Laramie, Wyoming and Colorado State University, Fort Collins, Colorado. August 2013.

Meinecke, E. P. 1929. Quaking aspen: A study in applied forest pathology. Tech. Bull. No. 155. Washington, DC: U.S. Department of Agriculture. 34 p.

Munoz, Bethany L. 2013. Influence of silvicultural treatments, overstory, and understory vegetation on Quaking Aspen (*Populous tremuloides*) regeneration in southeastern Idaho (Unpublished master's thesis). Oregon State University, Corvallis, Oregon. Accessed on 08/12/2019: https://pdfs.semanticscholar.org/f22e/c6a2f6de8592c6603e37e2893103894ad385.pdf

Natural Resources Conservation Service (NRCS). 2014a. Keys to Soil Taxonomy, 12th edition. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Washington, D.C.

Natural Resources Conservation Service (NRCS). 2014b. Official Soil Series Descriptions. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Available online. Accessed on 07/29/2019: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053587

Perala, D. A. 1990. Populus tremuloides Michx. Quaking aspen. In: Burns, Russell M.; Honkala, Barbara H., technical coordinators. Silvics of North America: Volume 2, Hardwoods. Agriculture Handbook 654. Washington, DC: U.S. Department of Agriculture, Forest Service: 555-569.

Rogers, P. C., S. M. Landhäusser, B. D. Pinno, and R. J. Ryel. 2014. A Functional Framework for Improved Management of Western North American Aspen (*Populus tremuloides* Michx.). Forest Science 60(2):345-359.

Rogers, P. C. 2017. Guide to Quaking Aspen Ecology and Management, with emphasis on Bureau of Land Management Lands in the Western United States. Logan, Utah, Western Aspen Alliance. 98 P.

Sheley, R.L. and J.K. Petroff (eds.). 1999. Biology and Management of Noxious Rangeland Weeds. Oregon State University Press. Corvallis, Oregon. 438 pgs.

Shallow, J.R., Hurley, M.A., Monteith, K.L. and Bowyer, R.T. 2015. Cascading effects of habitat on maternal condition and life-history characteristics of neonatal mule deer. Journal of Mammalogy. 96, 194-205

Seyedbagheri, K.A. 1996. Idaho Forestry Best Management Practices: Compilation of Research on Their Effectiveness. USDA-FS, Intermountain Research Station. General Technical Report INT-GTR-339, October 1996, Boise, Idaho.

Sommers, William T; Stanley G Coloff; Susan G Conard. 2011. Synthesis of Knowledge: Fire History and Climate Change. Joint Fire Science Program Project 09-02-1-09 (https://www.firescience.gov/JFSP_fire_history.cfm). Chapter 3 - Accessed on 03/27/2019: https://www.firescience.gov/projects/09-2-01-9/supdocs/09-2-01-9_Chapter_3_Fire_Regimes.pdf

Swift, C.E., Vierling, K.T., Hudak, A.T. and Vierling, L.A., 2017. Relationships among Vegetation Structure, Canopy Composition, and Avian Richness Patterns across an Aspen-Conifer Forest Gradient. Canadian Journal of Remote Sensing. 43, 231-243

Thiel J. R. 2012. Forage selection by maternal mule deer: body condition of maternal females, and birth characteristics and survival of neonates. M.S. thesis, Idaho State University, Pocatello, Idaho

Thurow, T. I., Blackburn, W. H., Taylor, C. A., Jr. 1986. Hydrologic Characteristics of Vegetation Types as Affected by Livestock Grazing Systems, Edwards Plateau, Texas. Journal of Range Management, 39(6).

U.S. Forest Service 2002 Fire Effects Information System, http://www.fs.fed.us/database/FEIS, Rocky Mountain Research Station, Fire Sciences Laboratory, July.

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at http://www.fws.gov/migratorybirds/]

Western Association of Fish and Wildlife Agencies (WAFWA), 2009. Habitat Guidelines for Mule Deer in the Intermountain West Ecoregion. 2009, Pages 17-21.