U.S. SHEEP EXPERIMENT STATION GRAZING AND ASSOCIATED ACTIVITIES PROJECT 2010

BOTANY REPORT ADDENDUM

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Introduction

This addendum to the U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010 Botany Report dated June 16, 2011 (Laufman and Smith 2011) is to address U.S. Department of Agriculture, Agricultural Research Service (ARS), U.S. Sheep Experiment Station, Dubois, Idaho (Sheep Station) management and grazing operations effects on whitebark pine (Pinus albicaulis).

U.S. Fish and Wildlife Service (FWS) reviewed all available scientific and commercial information related to whitebark pine and concluded, on July 19, 2011, that listing the species (WBP) as threatened or endangered under the Endangered Species Act of 1973 (ESA) is warranted, but precluded by higher priority actions.

Whitebark pine is listed as a Sensitive Species by the USDA Forest Service Intermountain and Northern Regional Foresters applicable to adjacent National Forest lands. Regulatory framework for managing sensitive plant species is discussed in the Botany Report.

ARS has no land management guidelines or standards that focus management of specific botanical resources at the agency level. There is no management direction from ARS for special status sensitive or candidate plant species. Therefore, the main focus of this report addendum is to summarize management actions effects on whitebark pine. For a complete analysis of U.S. Sheep Experiment Station properties rangeland conditions and management effects on vegetation composition, species diversity, and rangeland health, see the U.S. Sheep Experiment Station Grazing and Associated Activities Project, 2010 Rangeland Resource Report, 07-2011, Updated April, 2014 (Smith and Yurczyk 2013).

As described in the Botany Report, the purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. Under provisions of the ESA, federal agencies are directed to conserve endangered and threatened species and to ensure that actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of their critical habitats. Whenever an action may affect a species that is listed (or proposed for listing) or its habitat, federal agencies must consult with the U. S. Fish and Wildlife Service.

Overview of Issues Addressed

How would sheep grazing, research, related operations and management affect whitebark pine. Sheep driveways are the primary potential disturbance to whitebark pine vegetation type where large diameter down trees are cleared for sheep travel. Sheep travel along the driveways when moved from one grazing area to another. Sheep are not grazed in forested areas.

Due to the northern rocky mountains currently experiencing a mountain pine beetle epidemic along with white pine blister rust, successional change and adverse effects of a changing climate, whitebark pine populations are declining. Climate change has allowed the native barkbeetles to survive the warmer winters and to attack high elevation tree species that in the past were not affected. Fire suppression and climate change has contributed to the recent altered fire regimes with high intensity burns more likely to occur. Whitebark pine can survive low intensity fire but not high intensity burns. Successional replacement with shade tolerant species has also contributed to whitebark pine decline. The combined effects of mountain pine beetle, white pine

blister rust, successional replacement and high intensity wildfires have adversely affected high-elevation five-needle pine forests including whitebark pine.

Issue Indicators

An issue with declining whitebark pine populations is reduced food supply for grizzly bears. Whitebark pine as a food source, is discussed in the U. S. Sheep Experiment Station Grazing and Associated Activities Project 2010 Wildlife Specialist Report, July 15, 2011 (2011 Kozlowski). Amount of seed (potential food) produced is related to the total area stocked with whitebark pine, percent of whitebark pine in the stands and stand age class. As whitebark pine trees are replaced by more shade tolerant tree species, the amount of pine seed produced is reduced.

Affected Environment

Existing Condition

Whitebark pine is distributed on high elevation sites where it is the primary timberline species. Whitebark pine grows in pure and mixed stands at elevations ranging from 3,000 feet in its northernmost distribution in Canada to well over 12,000 feet in the southern part of its range (McCaughey & Schmidt 2001). On ARS summer range, whitebark pine grows at elevations from 7,000 to over 9,800 feet, see Appendix A, USDA Agricultural Research Service US Sheep Experiment Station West Summer Range Whitebark pine Map and USDA Agricultural Research Service US Sheep Experiment Station East Summer Range Whitebark Pine Map. Whitebark pine presence in forested areas influences water retention, ecosystem processes and is central to the ecology of other species of concern including grizzly bears (Tomback et al 2001). Whitebark pine is present on about 3,280 acres on ARS east and west summer range property, this includes 1,070 acres, 27% of east summer range area and 2,214 acres, 19% of west summer range area.

LANDFIRE and Silc3 whitebark pine GIS data were used to determine whitebark pine area, source data are described in the methodology section below. LANDFIRE potential natural vegetation group, biophysical setting description coded PNVG, in the interior west upper subalpine forest, occurs in the upper subalpine zone on moderately steep to steep terrain (e.g., 40-70% slope). Relatively dry sites usually are dominated by whitebark pine in the northern to central Rockies, moist sites usually are dominated by Engelmann spruce and subalpine fir. Both mixed severity and stand replacement fires (Fire Regimes III-V) occur at highly variable frequency, trending toward long-intervals of 100-200 plus years (Landfire 2008).

Specific mortality levels and demographic structure of timber stands in the ARS summer range area are unknown. No recent forest stand inventory has been done on ARS lands.

Whitebark pine is currently at risk in much of its historic range due to a combination of recent mountain pine beetle outbreaks, white pine blister rust (white pine blister rust is an introduced disease); successional replacement by shade tolerant species, (Keane et al 2002) and (Gibson et al 2008) and fire exclusion that could alter fire regimes. Although mountain pine beetle outbreaks have occurred in whitebark pine stands in the past, causing mature tree mortality, the additional impacts of white pine blister rust on cone production and regeneration, have caused population declines exceeding previous levels. The introduction and spread of white pine blister rust, mountain pine beetle infestation and changes in successional dynamics caused by altered fire regimes have caused whitebark pine to decline in recent years over most of its range (Kendall & Keane 2001). There is considerable variation in whitebark pine mortality rate within a specific region or geographic area. Most whitebark pine stands have about 10% mortality and in some

areas as high as 60%. Whitebark pine mortality rate appears to be accelerating in most areas (Kendall & Keane 2001). A changing climate seems to compound the three major mortality agents making management more difficult.

Successional whitebark pine communities are dependent on fire and other disturbances for renewal (Arno 2001). Partial-stand replacing and low-severity surface fires occur in whitebark pine ecosystems with highly variable mean fire-return intervals ranging from 13 to 400 plus years. Mixed-severity fire regimes, that are common in whitebark pine ecosystems, include low intensity surface fire and crown fire components or torching that create complex patterns of live and dead stands on the landscape (Murray et al 1998) and (Romme and Knight 1981). The presence of charcoal in lake sediment cores from the northern Rocky Mountains indicates that fires burned in areas supporting whitebark pine for at least the past 14,000 years (Brunelle and Whitlock 2003) and (Minckley et al 2007).

With somewhat thicker bark, higher and thinner crowns, and deeper roots, whitebark pine is better adapted to survive low intensity surface fires than its shade-tolerant competitors (Morgan et al 1994). When surface fires are relatively frequent, mature cone-bearing whitebark pine survive fires that generally kill competing species, such as subalpine fir (Abies lasiocarpa) and Engelmann spruce (Picea engelmannii), that have denser canopies that typically extend closer to the ground, ladder fuel for crowning. Low intensity surface fires delay the successional process (Keane 2001) typically producing stands with fire-scarred and multiple age class whitebark pine. Whitebark pine is also adapted to severe, large stand-replacing fires. Clark's nutcrackers (Nucifraga Columbiana) disperse whitebark pine seeds up to 100 times farther (over 10 km) than wind can disperse seeds of its major competitors (Tomback 2005). Whitebark pine can more readily colonize large burned areas and seedlings have time to grow without competition before lodgepole pine, Engelmann spruce and subalpine fir become established.

Clark's nutcrackers remove seeds from whitebark pine cones and cache them at high- and low-elevation forest terrain for their future food supply. Nutcrackers are the principal mode of seed dispersal for whitebark pine, cached seeds are the primary source for regeneration (Hutchins and Lanner 1982; Tomback 1982, 2001). Whitebark pine regenerates from Clark's nutcrackers cached seeds in relation to seed and seedling environmental tolerances (Tomback 2001).

Fire disturbance provides critical regeneration opportunities for most high-elevation five-needle pines but fire exclusion over the last century may be causing whitebark pine declines on ARS lands. Projected climate change could influence vegetation patterns and plant community composition, either directly through increased species mortality and shifts in species distributions, or indirectly through increased wildfire activity and extent, shifting fire regimes, and pathogen distribution. ARS east and west summer range high-elevation landscapes are particularly sensitive to climatic change and could experience notable impacts if change occurs as predicted.

A 2008 on-site review of west summer range indicated bark beetle activity is prevalent on much of the conifer timber types on West Summer Range in Odell Creek. There are extensive areas of Engelmann spruce, lodgepole pine and whitebark pine mortality. Casey Smith, with Mell Montgomery, Centennial Outfitters, Lakeview, Montana, indicated there are extensive areas of recent, red needle, dead whitebark pine on Baldy Mountain (Smith 2008). High mortality in other tree species has added dead wood fuels in mixed species stands that could contribute to large uncharacteristic wildfires.

Existing tree insect and diseases on West Summer Range (Odell Creek) area include:

- Mountain pine beetle (Dendroctonus ponderosae) in lodgepole pine and whitebark pine

- Spruce beetle (Dendroctonus rufipennis) in Englemann spruce
- Douglas-fir beetle ((Dendroctonus pseudatsugae) in Douglas-fir
- Western balsam bark beetle (Dryocoetes confuses) is evident in subalpine fir.
- White pine blister rust (Cronartium ribicola) introduced to north America about 1910, is also causing whitebark pine mortality. Ribes (alternate host) is present on much of the Odell drainage.
- Western spruce bud worm (Choristoneura occidentalis) is active in Douglas-fir and Engelmann spruce at lower elevations just below ARS summer range property.
- Fir broom rust (Melampsorella caryophyllacearum) common in alpine fir overstory and understory trees on much of the area may be weakening and contributing to subalpine fir mortality.
- Snow mold (Herpotrichia nigra), present on much of the timbered area with heavy infections in spots, is affecting understory lodgepole and whitebark pine.

Tree mortality in all stands will continue which will add standing dead and down fuels to timbered areas. Lodgepole pine, Engelmann spruce, and subalpine fir will fall to the forest floor, two to ten years after they are killed. Well stocked mature stands, with high mortality, could accumulate 150 tons or more of dead fuel per acre contributing to the risk of high-severity fire. Similar stand conditions exist on East Summer Range.

ARS has an MOU with USDA Forest Service to manage wildland fire on ARS summer range (USDA.FS 2008). The MOU provides authority and a basis for cooperation among the ARS and FS concerning management of wildland fires that may affect ARS lands. The agencies agree to cooperate with implementation of wildland fire use, wildland fire management activities and events to achieve land management goals.

The agencies MOU agreement provides for cooperative arrangements to cover administrative and jurisdictional responsibilities that provide for mutual assistance for managing wildland fires for resource benefits. When wildland fires burn on or threaten ARS lands, joint planning would be conducted by local officials of the representative agencies to manage the fires for desired results. The Forest Service works closely with ARS to determine management objectives and strategies and is the responsible agency for managing wildland fires that ignite on or spread onto ARS (USSES) lands. These management objectives apply to ARS summer range lands including whitebark pine forest types, aspen, Douglas-fir, mixed conifer and other timber types. Allowing wildfire to burn under managed conditions would be beneficial for whitebark pine regeneration, age class diversity, and would reduce competing shade tolerant conifer species.

ARS has about 0.4 miles of about 12 foot wide sheep driveways on East Summer Range and 0.8 miles of driveways on West Summer Range in whitebark pine stands. Large diameter down trees are cleared from these driveways affecting about 0.6 acres on east summer range and about 1.2 acres on west summer range where native species understory vegetation is retained. Soil compaction and vegetation disturbance could occur in heavy use areas, a complete description is included in the Rangeland Resource Report (Smith and Yurczyk, 07-2011, updated April-2014). See Appendix A, USDA Agricultural Research Service US Sheep Experiment Station West Summer Range Whitebark Pine Map and USDA Agricultural Research Service US Sheep Experiment Station East Summer Range Whitebark Pine Map for driveway locations.

Desired Condition

The desired condition for whitebark pine would be to maintain the existing whitebark pine stands, reduce mortality or to increase whitebark pine area stocking throughout its habitat.

Desired condition would be to retain or reestablish diverse cohort whitebark pine stands on suitable habitat on ARS summer range. Whitebark pine is considered a climax species, however, it is less shade tolerant than subalpine fir, Engelmann spruce, and mountain hemlock. These shade tolerant species occur in some ARS Summer Range whitebark pine stands and could dominate those areas if fire were excluded. Near the lower elevation limits, whitebark pine is often successional to shade tolerant species (Tomback 2001).

Environmental Consequences

Methodology

Whitebark pine cover type locations and acres for East and West Summer range were determined from LANDFIRE data. LANDFIRE uses the Society of American Foresters (SAF) definition for whitebark pine stands where stands are pure whitebark pine, or in mixed species stands where whitebark pine comprises a majority or plurality of stocking (LANDFIRE 20108).

LANDFIRE is an interagency vegetation fire and fuel characteristics mapping program sponsored by the U.S. Department of Interior, Office of Wildland Fire and U.S. Department of Agriculture, Forest Service. Vegetation is mapped using predictive landscape models based on extensive field-referenced data, satellite imagery and biophysical gradient layers using classification and regression trees. LANDFIRE uses a 30 meter grid to produce a comprehensive, consistent, and scientifically credible suite of spatial data layers (LANDFIRE 2011).

Summer pasture vegetation cover types were also mapped from SILC3 image interpretation. SILC3 data for ARS summer range area was acquired from the Beaverhead-Deerlodge National Forest. SILC3 is a landscape, satellite land classification method with 30 meter cells used to map vegetative cover types. A limitation to SILC3 data is that the area right along the border between Montana and Idaho on ARS Summer Range is not covered by SILC3 and not included in the cover type acres.

Compared to SILC3 vegetation type maps, that may underestimate whitebark pine cover in this area, LANDFIRE may be over estimating whitebark pine cover area on a landscape scale, particularly on steep south aspects, inclusions where lodgepole pine (Pinus contorta), forbs and grass provide the plurality of stocking. These dryer, well drained sites may be represented in LANDFIRE cover type with light whitebark pine stocking,

Incomplete and Unavailable Information

As noted earlier, specific whitebark pine mortality levels and timber stands demographic structure, stocking and composition in the project area are not known. No recent forest stand inventory has been done on ARS whitebark pine cover type lands.

Spatial and Temporal Context for Effects Analysis

The spatial boundary for management effects on whitebark pine is all ARS Sheep Station lands. Whitebark pine cover type is limited to East and West Summer Range. Cumulative effects analysis includes ARS lands and adjacent high elevation National Forest lands. The temporal boundary for grazing management effects on resources would include activities across five or more years. The five-year or more timeframe allows for yearly fluctuations while being appropriate to identify condition and trend. Wildfire management effects would span longer time periods.

There would be no irretrievable or irreversible commitment of whitebark pine resources from management action effects associated with continued sheep grazing and fuels management under all alternatives.

Alternatives (modified alternative 1, alternative 2 and modified alternatives 3, 4 and 5)

Direct and Indirect Effects

Direct and indirect effects include the potential for direct physical impacts to whitebark pine trees and their habitat from grazing research operations or fuels (wildfire) management.

All alternatives (modified alternative 1, alternative 2 and modified alternatives 3, 4 and 5) would have similar direct, indirect and cumulative effects on whitebark pine and its habitat. There are no grazing management activities in whitebark pine vegetation cover types under all alternatives. No activities are proposed other than existing sheep driveway maintenance and actions included in the MOU agreement for fire control and wildfire management. Under the ARS/FS MOU plan, managed wildfire on ARS summer range would reduce fuels and reduce risk of future large uncharacteristic stand replacement burns on the landscape.

Approximately 4.4 total acres of east and west summer range are affected by sheep driveways. Of that total area, about 1.8 acres are within whitebark pine cover type, less than 1/100 percent of the summer range area.

Under modified alternative 1 and modified alternative 5, East Summer Range has 0.4 miles of sheep driveway. Under modified alternatives 1, 4 and 5, West Summer Range has 0.8 miles of about 12 foot wide sheep driveways in whitebark pine stands. Large diameter down trees, over 10 inches in diameter, are cleared from these driveways, to facilitate sheep travel. Driveway area would affect about 0.6 acres on East Summer Range and about 1.2 acres on West Summer Range. Native species understory vegetation is maintained on these driveways. Soil compaction and disturbed vegetation occurs at concentrated use areas, see U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010 Rangeland Resource Report 07-2011 Updated 06-2013 for a complete description of grazing operation effects including sheep driveway mitigation measures. Under alternative 2 and modified alternative 3 there would be no grazing on East and West Summer Range, sheep driveways would not be maintained and down trees on the driveways would be retained. Under modified alternative 4, sheep grazing operation effects on West Summer Range driveways through whitebark pine stands, would be the same as modified alternative 1. There would be no grazing on East Summer Range under modified alternative 4, effects on whitebark pine would be the same as alternative 2. Effects of sheep driveways through whitebark pine stands under modified alternative 5 would be the same as modified alternative 1. Table 1 displays whitebark pine vegetation type area affected by driveways for each alternative.

Table 1. Area affected by driveways in whitebark pine forest type

Alternative	East Summer Range Driveways Miles	East Driveway Affected Acres	West Summer Range Driveways Miles	West Driveway Affected Acres
Modified Alt 1	0.4	0.6	0.8	1.2
Alt 2	0	0	0	0
Modified Alt 3	0	0	0	0
Modified Alt 4	0	0	0.8	1.2
Modified Alt 5	0.4	0.6	0.8	1.2

Direct and indirect effects of sheep grazing operations on driveways located in the whitebark pine stands include increased potential for noxious weed establishment and spread; soil compaction and vegetation trampling. Amount of compaction and vegetation disturbance is related to number of sheep moved through the driveway and amount of time sheep spend on the driveway, use time and number of sheep traveling on each driveway are shown in table 2. Long term impacts would be low. Sheep quarantine preventive measures before moving from one grazing area to another decrease the chance of noxious weeds establishing along driveways (Lewis 2011). A complete description of sheep grazing operations and effects including noxious weeds is described in U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010 Rangeland Resource Report 07-2011 Updated April, 2014 (Smith, Yurczyk 2013).

Table 2 displays sheep numbers and amount of time sheep use specific driveways

Table 2. Sheep numbers trailed on pastures as an average of last five years

Driveway	Length	Use Time	Horse	Ewes	Lambs
West Summer Range					
Skyline Unit - used twice a year	~1 mile	~2 hours	2	785	1,165
Odell Unit 6 - usually used once a year	~1/8 mile	~1 hour	2	785	1,165
Odell Unit 4 - usually used twice a year	~1/8 mile	~½ hour	1	785	1,165
Little Odell - used once a year	~¼ mile	~1 hour	1	785	1,165
Big Odell -- used once a year	~¼ mile	~1 hour	1	785	1,165
Big Mountain - generally used only once a year	~½ mile	~1 ½ hours	2	782	1,157
Corrals to Top - usually used 4 times a year	~½ mile	~1 ½ hours	2	782	1,157
Canyon Unit – used once or twice a year	~¼ mile	~45 minutes	2	782	1,157
East Summer Range					
Toms Units 5 & 6 – used once or twice a year	~½ mile	~1 ½ hours	1	838	1,273
Toms Units 6 & 7 – generally used once a year	~½ mile	~2 hours	1	838	1,273

Cumulative Effects

Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative effects spatial extent includes whitebark pine vegetation types within ARS summer range along with adjacent National Forest whitebark pine stands. Temporal bounds include effects of fire exclusion and driveway use over the past 75 or more years.

Past, present and future cumulative effects on whitebark pine populations include potential spread of noxious weeds, soil compaction and vegetation trampling on driveways, mountain pine beetle and white pine blister rust mortality, successional replacement by shade tolerant species, warming climate and altered fire regimes (fire exclusion).

Considering these potential non-grazing cumulative effects, continued past, present, and foreseeable future grazing related actions would not adversely affect whitebark pine.

Summary of Effects

Continued grazing and related ARS research management activities including past, present, and foreseeable future grazing and related actions, would not adversely affect whitebark pine under all alternatives. ARS sheep grazing and driveway use would not contribute to whitebark pine decline.

Cumulative effects not related to grazing activities, mountain pine beetle, white pine blister rust, fire exclusion and climate change could reduce amount of area occupied by whitebark pine on ARS summer range.

Design Features and Mitigation Measures

Project design features including BMPs are included in the DEIS, none of the design features are specifically directed at whitebark pine.

Monitoring Recommendations

Sheep driveways would be monitored annually, maintenance and mitigation measures and noxious weed control action would be implemented when needed.

Appendix A Maps

USDA Agricultural Research Service US Sheep Experiment Station West Summer Range Whitebark pine Map

USDA Agricultural Research Service US Sheep Experiment Station East Summer Range Whitebark Pine Map

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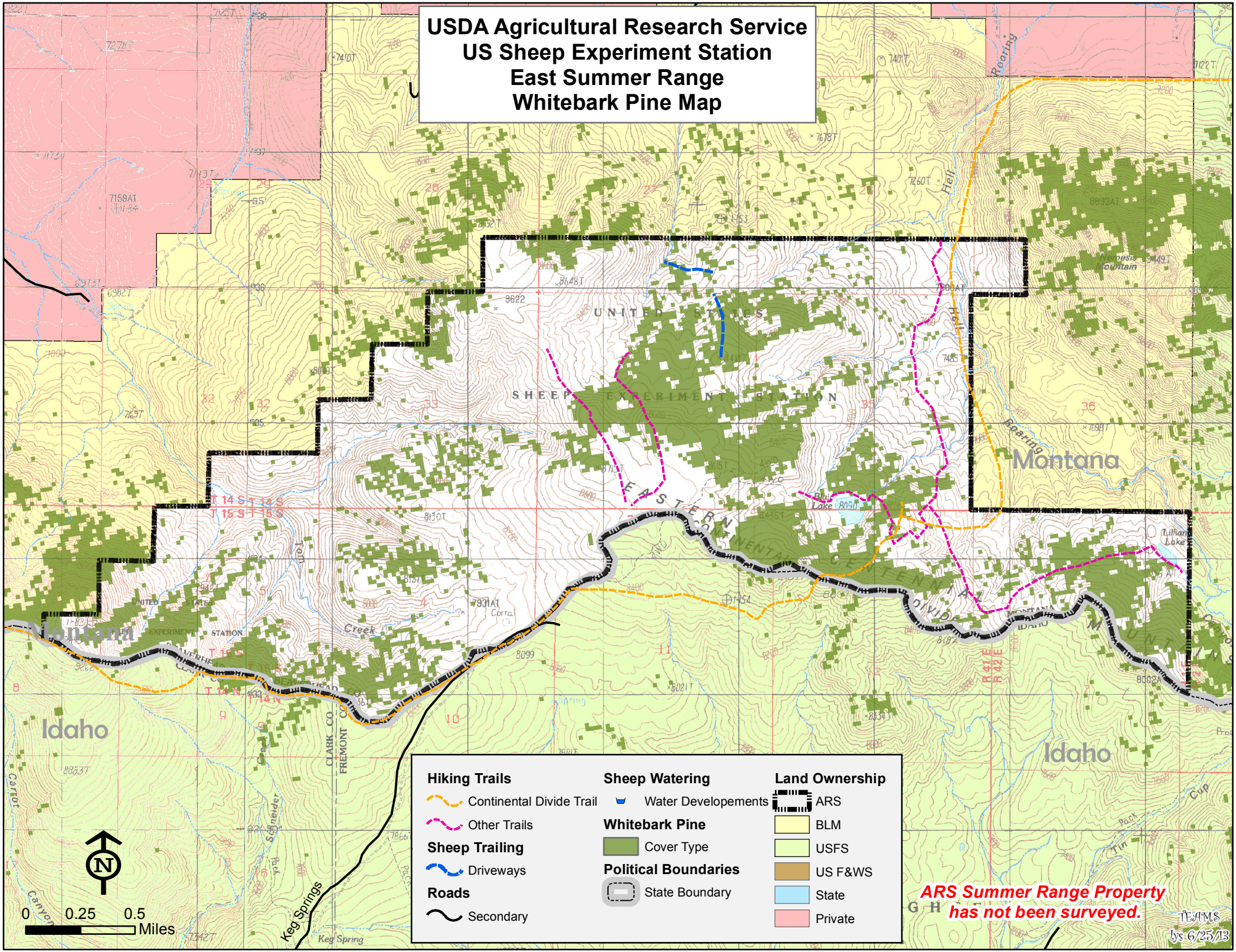
USDA Agricultural Research Service
US Sheep Experiment Station
East Summer Range
Whitebark Pine Map



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