Forested Vegetation Specialist Report

Lower Portneuf Cooperative Vegetation Management Project

Westside Ranger District

Caribou Targhee National Forest

Prepared By:	**Sheven Andersen**, Forester **Stephanie Merrill**, Forester	Date:	01/15/2025	Signatures:	*/S/ Sheven Andersen* */S/ Stephanie Merrill*

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Introduction

This document has been prepared for the Lower Portneuf Cooperative Vegetation Management Project, which is in the Bannock Range of Southeast Idaho on the Caribou-Targhee National Forest. This Forest System land is managed under the 2003 Caribou National Forest Revised Forest Plan (RFP). The Lower Portneuf VMP will be analyzed using an Environmental Assessment (EA). The project includes prescribed fire, mechanical treatments, and regeneration timber harvest treatments with prescribed fire being a possible component of all treatments. Additionally, this project includes trail fuel breaks to enhance the local trail system as potential wildfire containment features.

The purpose of this report is to summarize the existing condition of the forest resources and analyze the effects that will result from the proposed action. Two alternatives (No Action and Proposed Action) will be analyzed in this report and the effect of each described.

A USDA Forest Health Protection site visit report lists schweinitzii root and butt rot (*Phaeolus schweinitzii*), Douglas-fir dwarf mistletoe (*Arceuthobium douglasii*), balsam wooly adelgid (*Adelges piceae*), Douglas Fir beetle (*Dendroctonus pseudotsugae*), Douglas-fir tussock moth (Orgyia pseudotsugata), and spruce engraver beetles *(Ipps spp.)* as the primary insect/disease damaging agents of concern in the project area. They concluded that treatment through various means would benefit forested vegetation, particularly treatments that reduce the basal area of Douglas fir to increase resiliency to insect and disease damage. A more detailed look at Forest Health Protection's evaluation BFO-TR-2024-04 can be found in the project record (Green, N., 2024).

A fire regime condition class assessment was conducted in 2023/2024 at the initiation of the project to help better understand the condition of the landscape. The assessment indicated that this forest landscape was in condition class 2, meaning that the forest ecosystem in the area has a moderate departure from conditions that would occur under a natural disturbance regime. The primary cause of departures from historical conditions is succession in the absence of disturbance.

Following the fire regime condition class assessment, District Ranger Kim Obele directed an Interdisciplinary Team (IDT) to develop a proposed action to address the current condition of the forest ecosystem in the project area. The fire regime condition class assessment highlighted the changes that have occurred. It shows that forested stands in the landscape had gotten denser, and species composition has shifted favoring climax species. The combination of lack of disturbance and succession has resulted in an imbalance in forest structure.

This project area is in a landscape that is outside of the historic range of variability (HRV) and the desired future conditions (DFC) identified in the 2003 Caribou National Forest Revised Forest Plan (RFP). Being outside of the HRV puts the forest ecosystem at risk to uncharacteristic disturbances and reduces its resilience to these disturbances. The RFP DFCs were set because they represent a safe and sustainable condition where the Forest can provide all the goods and services identified during the Forest Planning process (timber, wildlife & fisheries habitat, water, recreation opportunities, etc.). The proposed action was designed to improve the condition of forest stands in the project area while meeting RFP direction. The analysis shows that the Proposed Action improves forested vegetation conditions and follows RFP direction. The No Action allows succession to continue to move project area stands and the landscape further from desired conditions.

Relevant Policy and Forest Plan Direction

Regulatory Framework

Land and Resource Management Plan

The RFP provides forest-wide direction in the form of goals, desired future conditions (DFC's), standards, and guidelines. The RFP also provides additional direction for the various prescription areas identified in the RFP. Below, forest-wide goals, DFC's, standards, and guidelines, specific ecological factors in the prescription area(s) which are applicable to forested vegetation in this project area are outlined. The intent here is not to repeat the whole RFP but provide a regulatory context. An assessment of how this proposed project addresses each of these items is in Appendix B of this document.

Ecological Processes and Patterns (RFP 3-3 to 3-4)

- Ecological systems and their components are maintained to be dynamic and resilient to disturbances. Vegetation structure, compositions, and densities are appropriate for maintaining physical and biological processes at any temporal or spatial scale. Ecosystems are not at risk of disturbance beyond the point of resiliency and sustainability. (goal)
- Insects and diseases are allowed to play their role as natural disturbance agents in ecosystems processes and patterns to the extent compatible with other goals. (goal)
- Fire use, both prescribed fire and wildland fire use, enhances ecosystem integrity and resiliency, and maintains desired fuel levels. (DFC)
- Wildland fire operates with historic fire regimes appropriate for the vegetation and site. (DFC)
- Fire is allowed to play its natural role where appropriate and desirable to reduce the risk of uncharacteristic wildland fires. (goal)
- All fires shall be suppressed if they are in areas not covered by a pre-approved fire management plan. (Standard)
- Prescribed and wildland fires use is allowed and encouraged unless prohibited by individual prescription direction. (guideline)
- When developing vegetation treatments projects, give priority to those reducing fuels in wildland/urban interface. Strive to move vegetation currently in Fire Condition Class 3 to Condition Classes 1 and 2. (guideline)

Soils (RFP 3-6&7)

- Sustain site productivity by providing the minimum amounts of woody residue greater than or equal to 3 inches in diameter dispersed on the site as outlined in Table 3-1, RFP 3-7. These do not apply within a 300-foot corridor on either side of roads designated as open on the most current version of the Travel Plan. (guideline)

Watershed and Riparian Resources (RFP 3-16)

- Watersheds provide a well-distributed pattern of nutrients and energy as well as diverse age-classes of vegetation that contribute to watershed health. (DFC)
- Riparian areas have a range of vegetative structural stages that are at, or moving towards, a properly functioning condition, have features necessary to promote stable stream channels,

provide diverse habitat conditions for both aquatic and terrestrial wildlife species, and deliver clean water in support of the Clean Water Act and State Drinking Water Act. (DFC)

- Not more than 30% of any of the principal watersheds and their sub-watersheds should be in a hydrologically disturbed condition at any one time. (guideline)

Vegetation (RFP 3-19 & 20)

- Forest habitats display a diversity of structure and composition. Productive and diverse population of plants are maintained or restored. (DFC)
- In conifers, a range of structural stages exists where 30 to 40% of the acres are in mature and late seral (old) age classes. Early successional stages are maintained through endemic insect and disease disturbance, vegetation management and fire. Patterns are within historical ranges of variability with functional corridors present. (DFC)
- Conifer types are maintained, and disturbance processes are restored through vegetation management, endemic insect and disease disturbances, and fire. (DFC)
- Quaking aspen communities are moving towards historical ranges with fire and other practices influencing structural class distribution and patterns across the landscape. Aspen forests are managed to achieve desired vegetative conditions with 20 to 30 percent in mature and late seral (old) classes and to reduce the decline of aspen acres due to succession of aspen to conifer. (DFC)
- Diverse forested and non-forested ecosystems are maintained within their historical range of viability and/or restored through time with emphasis on aspen, aspen-conifer, mixed conifer, big sagebrush, mountain brush and tall forbs. (goal)
- Aspen forests are managed to reduce or halt the decline of aspen acres due to succession of aspen to conifer. (goal)
- Forested ecosystems are moving toward a balance of age and size classes in each forested vegetation type on a watershed or landscape scale. Early seral species are recruited and sustained while still providing a diversity of successional stages. (goal)
- Biodiversity is maintained or enhanced by managing for a diverse array of habitats tied to natural process occurrence and distribution of plant communities. (goal)
- Do not conduct management activities that may alter canopy vegetation within 400 feet of a Natural Resource Conservation Service (NRCS) snow measuring site without first contacting NRCS. (standard)
- In each 5th code HUC which has the ecological capability to produce forested vegetation, the combination of mature and late seral (old) age classes (including old growth) shall be at least 20 percent of the forested acres. At least 15% of all the forested acres in the HUC are to meet or be actively managed to attain old growth characteristics. (standard)
- The definition of old-growth characteristics by forest type found in “Characteristics of Old-growth Forests in the Intermountain Region” (USDA Forest Service 1993) shall be used unless more current direction is developed. (standard)
- Silvicultural prescriptions shall be completed for all forested vegetation treatments. (Standard)
- Manage to reduce the decline of aspen and promote aspen regeneration and establishment. Provide protection from grazing where needed and consistent with management objectives. (guideline)
- Focus treatments on aspen clones, which are at the greatest risk of conversion to conifer. (guideline)
- For aspen and conifer types, acres classified as mature and old growth should be in blocks over

200 acres in size unless the natural patch size is smaller. (A block can consist of a combination of mature, and old-growth forest types). Within these blocks: (guideline)
    - Maintain the dead and down woody material guidelines for wildlife.
    - Silvicultural techniques may be used to maintain or improve old growth and mature forest characteristics.
    - If a catastrophic event (such as fire) reduces the acres of old growth, and mature forest below 20 percent of the forested acres in a principal watershed, identify replacement forested acres. When necessary, use silviculture techniques to promote desired characteristics in the replacement areas.
- When delineating late seral (old) forests, use the definitions of late seral stages by forest type as shown in RFP table 3.2. These are guidelines and site-specific stand structure should determine delineation of late seral stands. (guideline)
- Use methods of vegetation treatment that emulate natural disturbance and successional processes. (guideline)
- Forest vegetation manipulation is allowed on unsuitable timberlands to accomplish individual management prescription directions, other resource benefits, or for the reduction of hazardous fuels in urban interface zones. Production of wood products should not be the primary consideration. (guideline)
- Vegetation manipulation may include mechanical treatments, chemical treatments, commercial or non-commercial timber harvest of wood products, prescribed fire, wildfire for resource benefit, or other appropriate methods. Manipulations should emphasize ecological and multiple use outcomes over being "above cost". (guideline)
- Wood fiber should be utilized consistent with ecosystem management and multiple use goals. (guideline)
- Give priority to vegetation treatments in private land interface zones or those vegetation types identified as having a high degree of departure from HRV. (guideline)

Plant Species Diversity (RFP 3-21 & 22)

- Forest-wide vegetation communities have the necessary structure and composition, ecological processes, and function to maintain native plant species. (DFC)

Special Forest Products (RFP 3-23)

- Permits may be issues to authorize the collection of plant species (e.g., vascular and non-vascular for personal use where collection is not likely to adversely affect species viability. (Guideline)
- In cases where plant collection permits are issued, encourage collection from areas where plants would be removed as a result of other activities. Encourage collection of seeds or cuttings instead of removing whole plants (Guideline).

Wildlife Resources (RFP 3-24 to 3-33)

- Vegetation composition and structure is adequate to sustain wildlife species occurring on the Forest. (goal)
- Wildlife biodiversity is maintained or enhanced by managing for vegetation and plant

communities within their historical range of variability. (goal)

- Maintain multiple vegetation layers in woody riparian habitats that are stable or increasing with all age classes (seedlings, young plants, mature and decadent) represented to support native bird communities and other wildlife. (goal)
- Maintain and where necessary and feasible, provide for habitat connectivity across forested and non-forested landscapes. (goal)
- In project analyses affecting the habitats listed below, assess impacts to habitat and populations for the following management indicator species: (standard)
    - Grassland and open canopy sagebrush habitats – Columbian Sharp-tailed Grouse
    - Sagebrush habitats – Sage Grouse
    - Mature and late seral (old) forest habitat – Northern Goshawk
- Following forested vegetation treatments an average of 11 logs per acre should be left consisting of logs in decomposition classes 1, 2 and/or 3 (where they exist) (guideline)
    - In specific areas where fuel loading and fire hazard are a concern (i.e., urban areas), the number of logs per acre can be reduced to meet acceptable fuel loading standards.
    - This guideline does not apply within 300 feet of an open designated route.
    - These guidelines can be achieved, in part with the down woody debris requirements for soils; they are interrelated and are not cumulative.
    - Logs do not need to be evenly distributed over the forested acres. Some acres may have no logs, while others may have many more than 11 logs per acre. The guideline is to have an average of 11 logs per acre on at least 60% of the forested acres of each analysis area.
- Public, workforce, and contractor safety shall be considered and provided for in selecting the arrangement of retained snags and trees. (standard)
- Snags with existing cavities or nests shall be the priority for retention. (standard)
- Snag height shall be 15 feet or greater for all forest types. (standard)
- Snags ≥12 inches diameter breast height or the largest diameter for the stand should be retained in clusters, where possible. (guideline)
- Hard-snags densities for various biological potentials (see Table 3.3 in RFP) should maintained. The analysis area for calculating biological potential for woodpeckers should usually be the specific management prescription area polygon. Smaller analysis areas can be used when identified for site-specific projects. (guideline)
- Retain live trees for future snag recruitment following guidelines for various biological potentials in Table 3.4 of the RFP. (guideline)
- If existing snag levels are below the biological potential for woodpeckers that is identified for a prescription area, no dead standing trees should be harvested. Snag creation should only occur if specified as mitigation in a project level analysis. (guideline)
- Strive not to disturb or destroy existing nests, whether active or inactive. (guideline)
- Goshawk Habitat: The management standards and guidelines in Table 3.5 in the RFP apply to all forest types within active and historic goshawk nesting territories. (Standard and guideline)
- Do not allow timber harvest activities with a 30-acre area around all known flammulated owl nest sites. (guideline)
- Within a 3,600-acre area around all known boreal owl nest sites, maintain over 40% of the forested acres in mature and late seral (old) age classes. (guideline)
- Within a 1,600-acre area around all known great gray owl nest sites, maintain over 40% of the forested acres in mature and late seral (old) age classes. (guideline)
- Provide for vegetation buffers of at least one sight distance around big game concentration/use

areas such as wallows and mineral licks. Sight distance is the distance at which 90% of a deer or elk is hidden from an observer. (guideline)
- Provide for security or travel corridors near created openings. (guideline)

Grazing Management (RFP 3-42 to 43)

- Livestock grazing shall be restricted following prescribed or natural fire and/or rangeland planting or seeding before seed set of the second growing season, or until the objectives of the treatment are achieved. (standard)

Timber Management (RFP 3-44 to 46)

- Provide wood fiber while maintaining a healthy and sustainable forest (DFC).
- Management prescriptions preserve and enhance the diversity of plant and animal communities over time, including endemic and desirable naturalized plants an animal species (DFC).
- A variety of silvicultural techniques and harvest systems are used to restore ecological function, structure, composition and provide products and services to the public. (goal)
- All commercial sales, including sawtimber, convertible products, select material, and commercial firewood, shall be advertised, and sold on a bid basis, unless demand can be met and "sale on demand" sales can be justified. (standard)
- For tree planting projects, tree seedlings used shall be native species grown from seed from the appropriate seed zone, matched to site and elevation. (standard)
- The maximum size of limit for forested vegetation openings created in one harvest operation by an even-aged silvicultural system shall normally be 40 acres. Openings may exceed 40 acres in aspen and lodgepole types -contingent on Regional Forester approval, or as a result of natural catastrophic conditions such as fire, insect and disease, or windstorm. (standard)
- A harvested area of commercial forestland shall not be considered a created opening for silvicultural purposes when stocking surveys indicate the minimum stocking is achieved and average tree height equals or exceeds seven feet. When other resource management considerations prevail, a created opening shall no longer be considered an opening when the vegetation meets a particular management objective stated in the applicable management prescription. (standard)
- Suitability shall be verified at the site-specific level. (standard)
- Design timber management projects to simulate natural patch sizes and shapes, connectivity, species composition, and age-class diversity in accordance with silvicultural prescriptions. (guideline)
- The silvicultural system used on managed timberlands should allow for control of pests, animal damage, including livestock, and vegetation competition to promote regeneration and tree growth at optimum levels. (guideline)
- When feasible and appropriate, use prescribed burning to dispose of slash to reduce fire hazard and to promote seedbeds for natural regeneration. (guideline)
- A full complement of harvest systems and techniques may be used across the Forest unless specifically prohibited or limited by individual prescription direction. (guideline)
- Minimum stocking levels for regeneration treatments by vegetation type are: 170 trees/acre for lodgepole, 140 trees/acre for Doulas-fir, 200 trees/acre for mixed conifer and 5,000 trees/acre for aspen stands on at least 70% of the stand (unless specified differently in the site-specific

prescription). (guideline)

- The maximum size limit for forested vegetation openings created in one harvest operation by the even-aged silvicultural system shall normally be 40 acres. Openings may exceed 40 acres in aspen and lodgepole pine types- contingent on Regional Forester approval, or as a result of natural catastrophic conditions such as fire, insect and disease, or windstorm. (standard)
- A harvested area of commercial forestland shall not be considered a created opening for silvicultural purposes when stocking surveys indicate that minimum stocking is achieved, and average tree height equals or exceeds seven feet. When other resource management considerations (such as wildlife habitat, watershed needs, or visual requirements) prevail, a created opening shall no longer be considered an opening when the vegetation meets a particular management objective stated in the applicable management prescription. (standard)
- Limit tractor skidding to slopes less than 40 percent and generally prohibit logging on slopes over 60%. (guideline)
- Consider the use of helicopter logging methods or other specialized logging methods on slopes in excess of 40%.
- Yarding operations should not take place when ground conditions are wet enough that there is a risk of rutting and compaction as determined by the sale administrator. (guideline)
- Minimize skid trails and temporary roads during logging operations. Identify skid trails and temporary roads requiring construction in the sale planning process and assure appropriate rehabilitation of these trails by the purchaser or in post-sale activities. (guideline)
- Commercial sales of forest products should be offered in a variety of sale-size packages to meet the needs of small and large operations. (guideline)
- Woody debris and dead standing snags are available, by permit, within 300 feet of an open motorized road for public firewood gathering unless the area is designated otherwise. (Guideline).

Revised Forest Plan Management Prescriptions

Table 1 shows the RFP prescription areas that fall within the project area and the acreage of each. The direction for these precription areas as they related forest vegetation and timber are are summarized below. For more details on RFP direction in general and for each prescription area see the RFP at the following web location.
https://www.fs.usda.gov/detail/ctnf/landmanagement/planning/?cid=stelprdb5228906.

***Table 1**: Lower Portneuf Cooperative Project RFP Prescription Areas*

RFP RX	RFP RX Description	Acres	Percent
2.1.2(b)	Visual Quality Maintenance	524	1.6%
2.1.3(b)	Municipal Watershed	5396	16.5%
2.2(a)	Research Natural Area	3030	9.3%
2.7.2(d)	Elk and Deer Winter Range	5441	16.6%
3.2(b)	Semi- Primitive Motorized	13083	40.0%
3.2(f)	Semi- Primitive Motorized	528	1.6%
4.3(b)	Dispersed Camping Management	3661	11.2%
5.2(b)	Forest Vegetation Management	972	3.0%
8.1u	Concentrated Development Area- Utilities	60	0.2%
	Total	**32697**	**100.0%**

Direction for Affected RFP Prescription Areas

Areas in RFP Prescription 5.2(b) (Forest Vegetation Management) have an emphasis on scheduled wood-fiber production, timber growth and yield while maintaining or restoring ecosystem processes and functions to resemble historical ranges with consideration for long term resilience. Goods and services are provided within the productive capacity of the land. The value of the timber receives consideration prior to the use of fire. Lands in the prescription contribute to the Allowable Sale Quantity (ASQ). (RFP 4-71)

Prescription areas 2.1.2b, 2.7.2d, 3.2b, 3.2f, 4.1(unmapped), 4.3b and 8.1 are removed from the suitable timber base and do not contribute to ASQ. Timber harvest can occur for such things as public safety, visual quality, long-term sustainability of ecosystem components, meeting the goals of the prescription area, and utilizing silvicultural practices to restore vegetation patches, patterns, structure, and species composition so long as the ground being harvested meets NFMA suitability requirements. Prescription area 2.1.3b Municipal Watershed is removed from the suitable timber base and does not contribute to ASQ; Timber harvesting is allowed in municipal watershed areas on a site-specific basis for such things as public safety, visual quality, and/or long-term maintenance of vegetation to meet the goals of the prescription. No timber harvest is permitted in prescription 2.2a Research Natural Areas.

Federal Law

All Federal laws applicable to forest vegetation management are addressed through RFP direction and Forest Service Manual Direction. An assessment of NFMA compliance is included in Appendix C.

Manual Direction

Forest Service Manual 2400 Timber Management

The Forest Service 2400 Timber Management manual has eight chapters related to the management of timber resources on National Forest Lands. Chapters include Planning, Appraisal, Commercial Sales, Designating/Measuring/Accountability, Contract Administration, use other than commercial Timber Sales, Silviculture, and information management. Each chapter outlines: Authority, Objectives, Policy, and Responsibilities related timber management and specifically to the topic of the chapter. The two chapters that most relate to this assessment and project at this stage are chapter 30 (Commercial Timber Sales) and chapter 70 (Silvicultural Practices).

The primary information found in chapter 30 related to this phase of the project is Gate 1 (Initial Planning of Timber Sale Project) and Gate 2 (Project Analysis, Design and Decision). Chapter 70 provides a list of silviculture definitions, describes the various silviculture systems and harvest methods, provides direction on reforestation, stand improvement, exams, diagnosis, and prescriptions. These two chapters of this manual are incorporated by reference. (Link) Associated handbooks are also incorporated by reference. Link

Topics and Issues Addressed in this Analysis

Purpose and Need

Multiple agencies, jurisdictions, communities, neighborhoods, and citizens have been affected by wildfire in Bannock County since the Caribou National Forest was established in 1907. Since this time, Forest Service fire management has shifted from a direction of fire exclusion to a recognition that fire is a natural ecosystem process on the Caribou-Targhee National Forest that has shaped ecosystem species composition, structure, and function. It is important to find ways to promote and maintain resilient

ecosystems, encourage fire adapted communities, and provide opportunities for effective, safe, and risk-based wildfire response for Pocatello and surrounding areas, as envisioned in the National Cohesive Wildland Fire Management Strategy.

The purpose of the Lower Portneuf project is to cooperatively restore forest health and reduce hazardous fuels across the project area, and to address wildfire risks in the wildland urban interface (WUI) of Pocatello. Forest health refers to the resiliency of the forest and its ability to self-renew following drought, wildfire, insect outbreaks, and other forest stresses and disturbances. The 2003 Revised Forest Plan for the Caribou National Forest provides the overall direction and guidance to manage for the longer-term landscape conditions and outcomes that provide ecological and social sustainability, including allowing fire to play a natural role where appropriate and desirable to protect values in the human environment.

In the absence of disturbance, primarily suppressed naturally ignited fire, current areas of unfavorable vegetation conditions exist. These conditions often consist of overly dense and homogeneous forested conifer stands as well as conifer species that are encroaching and displacing aspen stands on the landscape. Aspen ecosystems especially provide valuable habitat for a rich diversity of animal and plant species in comparison to associated coniferous forest types. However, exclusion of one for the benefit of the other is not appropriate in this area. Non-forested areas also are affected in a similar way in the absence of disturbance, with juniper and other woody species encroaching and replacing valuable sagebrush and grass forb communities. These undesirable areas of vegetation have an abundance of accumulated fuels which increase the risk of un-characteristic wildfire behavior, and influence where, how quickly, and how big a fire spreads. Some of these stands are in or near the WUI areas of Trail Creek, Johnny Creek, Gibson Jack and Mink Creek.

To address these current conditions, there is a need to reduce vegetation densities where appropriate, reduce fuel accumulations in both forested and non-forested cover types to mimic a historic mixed severity wildfire regime, and maintain or increase aspen where it exists to promote plant and animal habitat. Within the WUI, there is a need to design vegetation treatments to reduce wildfire intensity, to create and maintain strategic fuel breaks along the Forest Boundary, and to promote fire-adapted human communities. The overall need for action is to promote a healthy and resilient forest and to reduce the risks and impacts of wildfire to communities and responders in the greater Pocatello area.

Issues

The Fire Regime Condition Class (FRCC) assessment indicated that the landscape is at moderate risk to the loss of key ecosystem components due to the disruption of the natural disturbance regime and the resulting shift in species composition, density, and structure. The key ecosystem components that stand out are age-class homogeneity, aspen health, and conifer density. Aspen is being lost due to succession (lack of openings where young aspen age-classes are formed), and the high percentage of closed canopy conifer conditions.

Other Resource Concerns

Forested stands in the project area are in multiple RFP prescription areas as shown in Table 1. Forest land in the RFP prescription area 5.2 was classified as suitable. Forest land outside 5.2 prescription area was not classified as "suitable" since that class was only given to forest lands in the RFP 5.2 Timber Management prescription area. Forest lands outside of RFP 5.2 areas in this project area fall into two categories, "unsuitable" and "tentatively suitable." Neither of these classes contribute to ASQ. Lands in the "unsuitable" category should not be managed for timber production. Lands in the "tentatively suitable" class can be managed for timber production, but it is not the primary objective and thus they do not contribute to ASQ. All lands not classified as 5.2 ground that are proposed for treatment are tentatively suitable meaning they met the definition of suitable in National Forest Management Act, but are in an RFP prescription area that has an emphasis other than timber management.

Resource Indicators and Measures

The resource measures used in this report to understand the existing condition and quantify effects or change are outlined below in Table 2. All these indicators address the purpose and need and issues relevant to the forested vegetation resource. The first four are resource and effect indicators. The last three are measure of outputs that result from the action alternatives.

Table 2: Resource indicators and measures for assessing condition and effects

Resource Element	Resource Indicator	Measure (Quantity if possible)	Used to Address: Condition P/N, or key issue?	Source
Landscape Risk	Risk to uncharacteristic disturbance	Fire Regime Condition Class and departure	Yes	FRCC assessment worksheet based on FSveg spatial data
Landscape Structure	Forest Structure Stage by Canopy Cover Class	% seedling/sapling (all densities) % Young/mid (open canopy) % Young/mid (closed canopy) % Late seral/mature (open) % Late seral/mature (closed)	Yes	RFP DFC Various GIS coverages summarized in excel
Composition	Aspen Health	% Landscape Low Risk % Landscape High Risk	Yes	RFP DFC Various GIS coverages summarized in excel
Project Area Stand Risk	Risk to uncharacteristic disturbance	% FRCC 1 %FRCC 2 %FRCC 3	Yes	FRCC assessment worksheet based on FSVeg spatial data
Aspen	Aspen Health	Aspen Acres Treated	Yes	RFP DFC and guideline; Various GIS coverages summarized in excel
Fuels	Acres Treated	Acres	Yes	RFP DFC and guideline; Various

				GIS coverages summarized in excel
Forest Products	Volume	CCF	Yes	RFP DFC Estimates based on previous timber cruises on Caribou in similar vegetation types

Methodology

Information Sources

FSVeg Spatial: is a forest wide stand GIS data set. The data recorded in FSVeg Spatial is from a variety of sources, but mostly aerial photo interpretation. Most of data in FSVeg Spatial was originally produced for Cstands, the existing GIS stand coverage of the Caribou National Forest. The CStands coverage is documented in detail in Beck 2016a. Since Cstands was transferred some additional data has been added and improved. The advantage of FSVeg Spatial is that it allows for better integration with stand exam data.

Stand Exams: Common Stand Examinations have been completed within the project area and the VMU. The purpose of conducting stand exams was to collect key data such as fuel load transecting, variable plot overstory stocking, fixed plot understory stocking, habitat type, stand structure, snag counts, tree age, etc. This data was used to assess existing condition and set a baseline for comparing alternatives for this project analysis.

Walkthrough Exams: Wayne Beck, Arik Jorgensen, Stephanie Merrill, Sheven Andersen, Dan Bartel, Jose Contreras, Logan Pfeiffer, all Vegetation and Fire/Fuels personnel (to name a few), have spent many hours walking through stands within the project area and the surrounding landscape. Observations made were key to understanding the natural disturbance regime. Locations of relic trees with fire scars, recent insect and disease activity, aspen conditions, and general stand attributes all add to the understanding of the area.

Literature Review: A review of literature related to this project area and conditions found there was conducted. Information and concerns brought forward in scoping were also covered in the literature review. Many of the documents reviewed are referenced throughout this document, the existing condition report, and the draft prescription. Countless others have just added to the overall understanding and treatment design. Other existing condition assessments done around the project area, like the 2010 Lower Portneuf Watershed Assessment were reviewed to help build on key understandings that have been building over time.

Past Projects Monitoring and Reviews: The Westside Ranger District and the resource staffs associated with the area have a robust history of implementing projects in these forest types. See the Existing Condition Assessment below for a summary of past harvest within the project area.

Incomplete and Unavailable Information

It is impossible to know the age of every tree in the forest. Efforts were made to age a reasonable representation of trees to help ascertain ages by phenotypical attributes within the project area. Identifying relics, trees old enough to survive the last major stand disturbance, is not exact. Crown shape, limb size, DBH, and bark characteristics do provide a reasonable method to identify after some age sampling, which was done.

It is also impossible to precisely know what the historical landscape and stand structural characteristics were like. How exactly the natural disturbance regime shaped structure and composition or where this landscape fell along the disturbance regime continuum. However, every effort was made for this project to understand the ecosystem by spending time in the landscape observing the clues previous disturbances left in the landscape. While knowledge is not perfect, we do understand enough to act.

Spatial and Temporal Context for Effects Analysis

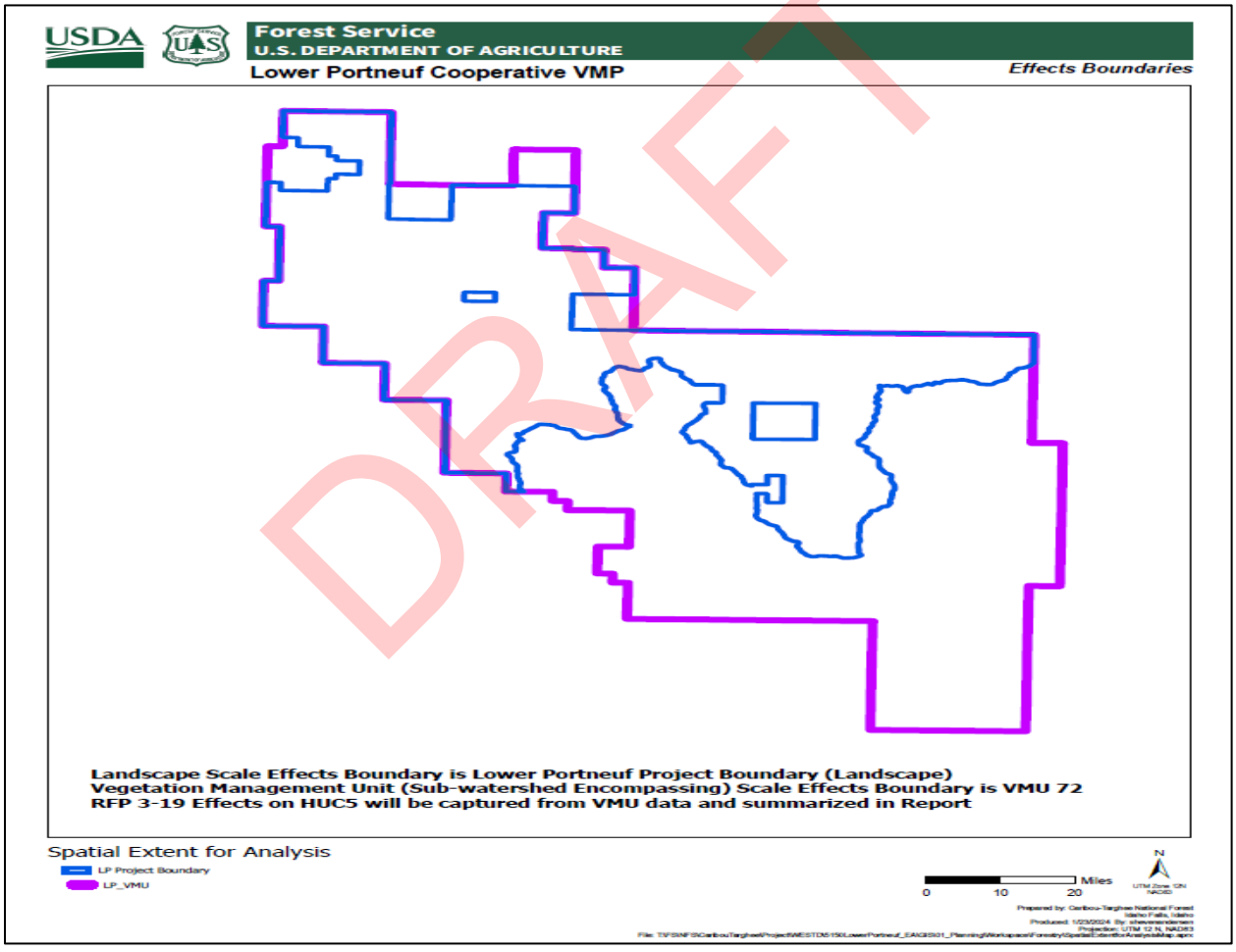

Figure 1: *A map showing the LPCVMP project area, the primary target for analysis to capture landscape scale effects. This map also depicts where the Vegetation Management Unit (Sub-watershed Encompassing) scale effects will be assessed.*

Effects Boundaries- Overview

Within the field of landscape ecology, it is often recommended to assess ecological processes and their relation to environmental patterns (and in turn how these patterns further drive processes) at multiple scales to gain a more informed understanding (Wiens, 1989). When applied to silviculture, this concept is often related to questions like *is management scenario "x" at the stand scale positively or negatively affecting process, pattern, or biological outcomes at the i.e. patch, habitat, landscape, watershed, forest, or ecosystem scale*? Relevant scales of assessment are often already specified within land and resource management plans, such as the 2003 Caribou National Forest Revised Forest Plan. To adequately capture the effects to forested vegetation in relation to our forest plan, a look at multiple scales was applied by analyzing changes in vegetation at a stand level scale and further applying/assessing said effects to forested vegetation at both the landscape (project boundary) and a Vegetation Management Unit (Sub- watershed Encompassing) scale.

Landscape Scale Effects Boundaries

The primary spatial scale for analyzing the effects to forest vegetation is the landscape boundary which is the Lower Portneuf Project Area. The selected landscape is large enough to be a reasonable landscape unit as described in the RFP and in Beck 2016b. The RFP states effects should be assessed at the landscape scale. A landscape analysis boundary was created that is comprised of locations 720001, 721001, 721002, 722001, 722002, 723001, 723002, 724001, 725001, 725002, 726001, 727001, 727002, and 727003 in VMU 72 (See Beck, 2016a for details on VMU, compartment and stand mapping). The landscape analysis unit is 32,697 acres.

The temporal boundaries for analyzing landscape effects are two-fold: short term (5-15 years after implementation) and long term (15-40 years). Using 5-15 years for short term impacts was chosen because it is a reasonable estimate of the timeline of implementation should the project move forward. Most effects will be displayed based on short term impact. For long term, 15-40 years was chosen because that is within the approximate fire return interval for most of the area and within a timeline where the vast majority of vegetation treatments would be regrown/infilled and largely not be noticeable to the average forest user. There is more uncertainty the further into the future we forecast. However, we have records going back 50-60 years which allow for looking at effects of past management and applying what we have seen and learned to the landscape without complex modeling. Short term effects will be the primary focus of this report.

Vegetation Management Unit (Sub-watershed Encompassing) Effects Boundaries

The RFP set the goal of maintaining a balance of age and size classes in each forest type on a watershed or landscape scale because it is a good indicator of overall forest condition. The Forest developed vegetation management units (VMU) to track the desired landscape conditions outlined in the RFP. VMU's were developed to be large enough to sustain a balance of age classes under a natural disturbance regime. The Forest has found in several recent assessments of age-class structure that regardless of the assessment scale used, (Forest, Subsections, HUC, VMU's or PWI (project work inventories)) there is a surplus of the mature/late seral forest structure stage, across the Forest. (Beck, 2016b & Beck 2022).

The spatial boundary for relevant VMU effects is Vegetation Management Unit (VMU 72). The primary reason for choosing to assess effects at the VMU scale in addition to the landscape scale were that RFP includes direction on assessing forested vegetation at the 5th code HUC scale; the landscape boundary

spans multiple 5th code HUCS. Most of the Lower Bannock Creek and Lower Portneuf River HUC5s are located off forest and at times span across valley floors, which can make accurately assessing change in forested structure difficult. The VMU has a readily available stand coverage for the Bannock range that can be used to not only capture the effects to each HUC5 at a relevant scale but also the ability to write to each respective HUC5 affected as well, which will satisfy the requirements listed on RFP 3-19. The VMU spans three 5th code HUCs (Lower Bannock Creek, Lower Portneuf River, and Garden Creek- Marsh Creek). Effects to sub watershed will be analyzed and summarized back into the encapsulated VMU.

Existing Condition Assessment

This assessment describes the forested vegetation existing condition found in the Lower Portneuf landscape area defined above. This assessment will compare the existing condition to the desired future condition (DFC) of the Caribou Revised Forest Plan (RFP). Below are some key definitions that helped to shape the framework of the existing condition assessment.

Key Definitions FSH 1909.12 2015

Ecosystem. (36 CFR 219.19) A spatially explicit, relatively homogeneous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. An ecosystem is commonly described in terms of its:

1. Composition. The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.

2. Structure. The organization and physical arrangement of biological elements such as, snags and down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.

3. Function. Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods.

4. Connectivity. Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change (36 CFR 219.19)

Biophysical Settings

In 2005, the LANDFIRE Project began creating models to describe natural ecosystems – also known as "biophysical settings." Biophysical settings (BpS) describe the vegetation that may have been dominant on the landscape prior to Euro-American settlement. BpS descriptions are based on both the current biophysical environment and an approximation of the historical disturbance regime. The LANDFIRE BpS models describe vegetation, geography, biophysical characteristics, succession stages, and disturbance regimes for each BpS and some of the major disturbance types affecting these ecosystems prior to significant alterations by European settlers (LANDFIRE 2022).

The RFP highlighted that managing landscapes to be within the historical range of conditions represent sustainable and resilient condition. The BpS modeled historical condition descriptions are used as a baseline to compare to current conditions against. By identifying what conditions are overrepresented or are lacking on a specific landscape, appropriate management actions can be developed. Using LANDFIRE BpS models and the associated descriptions and direction from the RFP, it is possible to develop landscape specific desired future conditions.

Table 3 *This table shows the Biophysical Settings for the types found in the landscape assessment area. It shows the % in each structural class (early, Mid and Late succession) broken down by canopy cover class for each type. It also shows the typical fire regime group and the percent of the landscape represent by each type. Additionally, the percent of each vegetation form is summed and highlighted.*

BPS	E	M	L		M-O	M-C	L-O	L-C	FRG	%
F1 – Stable Aspen (1011)	14%	40%	46%		-	-	-	-	III	10.1%
F2- Montane Dry Mix (1051) CC^@30%	15%	20%	65%		15%	5%	60%	5%	III	10.5%
F3- Seral Aspen Conifer (1061)	10%	60%	30%		-	-	-	-	III	10.0%
F4- Douglas-fir (1166) CC^@40%	10%	20%	70%		10%	10%	50%	20%	III	6.3%
F5- Montane Mixed Conifer (1052) CC^@40%	10%	60%	30%		30%	30%	20%	10%	III	1.4%
W1- Maple Woodland (1012)	10%	20%	70%		-	-	-	-	III	1.3%
W3- Montane Juniper Woodland	5%	25%	70%		5%	20%	35%	35%	III	4.1%
W4- Mahogany Woodland (1062)	10%	25%	65%		15%	10%	20%	45%	IIII	3.2%
N3- Montane Sage Steppe (1126)	25%	45%	30%		-	-	-	-	III	39.7%
N5- Shrubland	5%	20%	75%		-	-	-	-	III	12.9%
R1- Montane Riparian	5%	30%	65%		-	-	-	-	IV	0.6%

E= Early Seral/Development, M= Mid Seral/Development, L= Late seral/Development. C-O=Mid-Open Canopy, M-C=Mid Closed Canopy, FRG= Fire Regime Group, %= the percent of the landscape in each type.

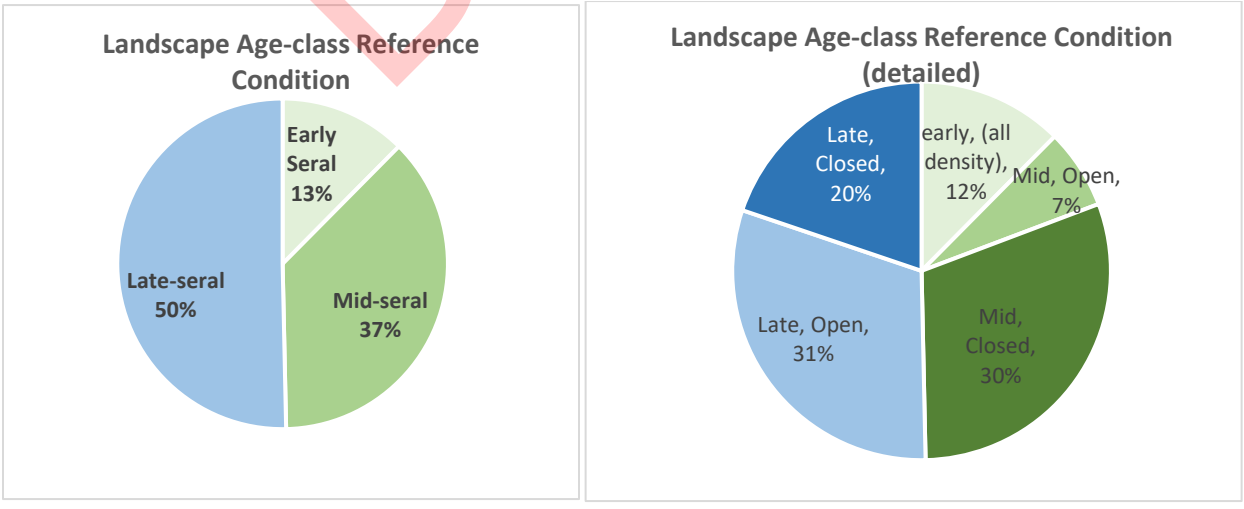

Figure 2 *These figures represent the historical average condition of the forested sites in the land scape, based on a weighted average of the biophysical types in the landscape. Historically the late seral conditions dominated the landscape at 50%*

followed by mid seral conditions (37%), and early seral conditions of ~12-13%, which matches well with RFP desired conditions. Further detailed breakdown by canopy cover class is also shown.

Composition

To describe the composition of the landscape **vegetation form**, **dominance types** and then **vegetation types** will be summarized. The data summarized is from the C-T FSveg Spatial GIS coverage and the 1914 Pocatello vegetation atlas also located in the Forest GIS. (USDA-FS-Cache, 1914).

Vegetation Form

Vegetation form describes the life form that dominates each stand in the landscape. Three life form categories are used: forest, woodland, and non-forest. Available information indicates that the forest life form has increased over the last 100 plus years. The landscape is currently 38% forested, 53% non-forest and 9% woodland. The current and 1914 atlas percentages of the landscape in each of these vegetation forms is shown in Figure 3.While the data sets were mapped at different resolutions and there were some estimatable null values in the 1914 historical coverage, the results match with what has been observed across the landscape, forest and woodland types have increased and non-forest has decreased in the absence of fire. The same goes for the 2010 Lower Portneuf Watershed Analysis (which lumped the nonforest/woodland into nonforested coverages); the mapping capability and GIS technology has improved significantly over even the past 10-15 years, but the same general conclusions can be drawn: forest and woodland types have increased over the last 110+ years, and non-forest has decreased. (USDA-C-T, 2010).

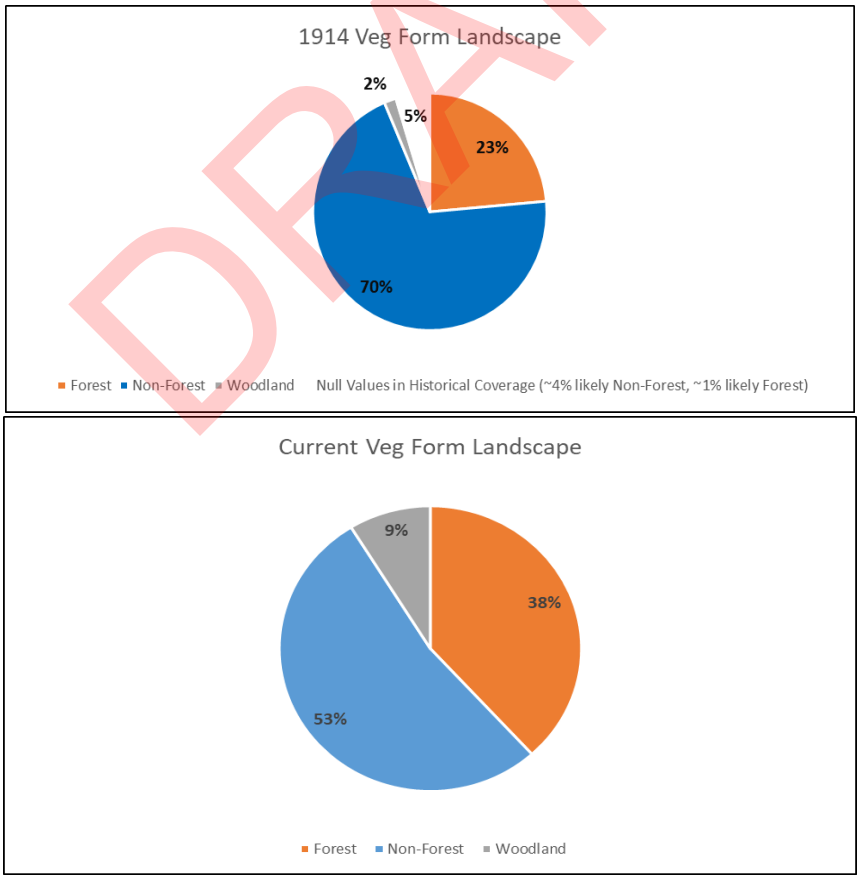

Figure 3 *Comparison of Current vegetation forms found within the landscape compared to what was mapped in 1914.*

Dominance Type

The vegetation form has shifted toward taller woody plants since 1914, the dominance type has also changed. Figure 4 shows how the forest vegetation dominance types grouped into conifer and aspen has changed since 1914. This figure illustrates the shift of forested areas from aspen to conifer over the last 110 years. This change is the result of succession. Conifer are replacing aspen due to competition and lack of disturbance. In the absence of relatively frequent fire aspen are reaching an age where they succumb to old age and disease. Aspen is regenerating but is being out competed in the shade of the conifer overstory. More information is provided on the condition of aspen regeneration later in this document.

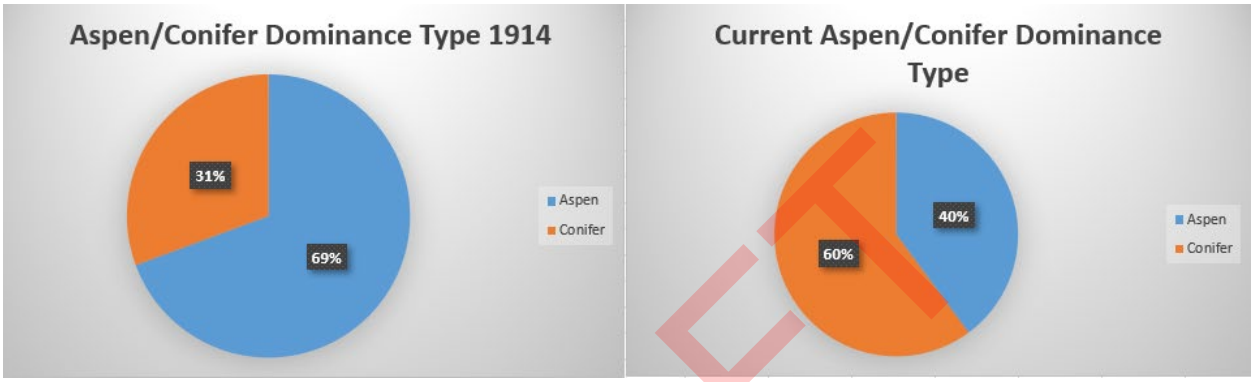

Figure 4 *Percentage of forested area in aspen and conifer dominance types has changed notably since 1914. The scale and map accuracy of the 1914 data is not great, but it provides an approximation of change.*

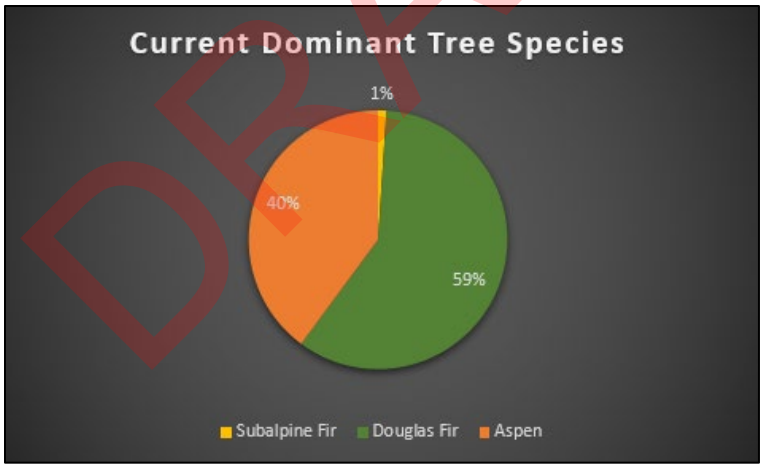

Figure 5 *This chart shows the percent of forested acres in each dominance type.*

Most of the forested acres in the landscape currently have Douglas fir as the dominant overstory tree (~59%) Most of these occurrences happen in the Douglas Fir PNVG. Aspen is the next most dominant tree species (~40%). Approximately 1% of forested acres are currently classified as being Subalpine fir dominant. Visits to the landscape will find that Lodgepole Pine (*Pinus contorta*), Engelmann Spruce (*Picea engelmannii*), and Limber Pine (*Pinus flexilis*) are minor conifer components of the landscape and are not found to be the dominant type but rather are a part of the composition of the landscape. Aspen has lost notable ground to conifer

over the last 110 years, moving from 69% dominant in 1914 to 40% dominant today. All conifer species especially Douglas fir have increased in the absence of fire. Douglas-fir also gained dominance in areas that where historically maintained as non-forest types.

Caribou Vegetation Types

There are 8 Caribou Forest Vegetation types located in the landscape. Table 4 outlines the acres and percentages of the forested vegetation types found within the landscape. The table provides a general description of the types. The forest vegetation types found across the Caribou Zone are derived from C stands spatial coverage. The most predominant forested vegetation type in the landscape is Aspen Conifer.

Table 4 *Descriptions of Forested Vegetation types in the landscape. The types are sorted from most common to least. The mixed conifer and aspen conifer types make up more than half of the forest acres.*

Cover Type	Acres%	Description (see below for abbreviations)
Aspen Conifer (ac)	3302 26%	Aspen and conifer each represents at least 15% of the basal area. Stands in this type may have resulted from two different disturbance regimes. They may have resulted from a mixed severity event that maintained some conifer species (typically, Douglas-fir) on site resulting in a two or multi-aged stand, with conifer being represented in the older age-class. Or they could have resulted from a lethal regime that cleared the site of most mature trees including conifer for much of the stand's life, where conifer return through time with succession and will be in the younger age class. In both cases these are stands where aspen will be replaced by succession in the absence of disturbance. Site quality is variable from stand to stand but are typically moderate to high quality sites.
Dry Aspen (ad)	2377 19%	These stands are dominated by aspen that serves as climax or as the long-term stable species for the site. Conifer species are rare on these sites. These stands appear to have aspen as a climax species due to the poor site quality; conifer is not capable of growing on these sites except in favorable micro sites. Site quality is variable from stand to stand, but in general low quality.
Dry Aspen Conifer (dac)	2279 18%	These stands differ from aspen conifer stands due to the harsh sites occupied. Canopy cover potential and current condition is lower than in aspen conifer stands. Aspen represents at least 15% of the basal area/canopy cover. Conifer also represents at least 15% of the basal/area canopy cover. The most common conifer species present is PSME but may also be PICO, PIFL2 or ABLA. Aspen on these sites tends to be small in stature and somewhat clumpy, the conifer may be scattered or clumpy. Site quality is variable from stand to stand, but in general low quality.
Douglas-fir (psme)	2017 16%	These are stands were Douglas-fir represents most of the basal area. Other conifer species may be present but will generally represent less than 33% of the basal area as a group. Aspen may be present but represents less than 15% of the basal area. Site quality is variable from stand to stand but are typically moderate to high quality sites.
Dry Conifer Mix (dcm)	1060 8%	These stands differ from other conifer dominated sites due to harsh site conditions. The dominate species is often PSME but may also have PIFL2, PICO or ABLA. The sites may have any of these species as a co-dominate. Aspen may be present but will usually be in small patches and represent less than 15% of the canopy with little chance of increase following disturbance, it tends to be restricted to micro sites within the site. Site quality is variable from stand to stand, but in general low quality.
Aspen (potr5)	979 8%	These stands are dominated by aspen. Aspen is seral in many of these stands but may also be considered stable in some. Conifer species may be present but represents less than 15% of the basal area. It appears that most stands in this type would have historically been dominated by aspen due to a relatively frequent disturbance regime. They are low to high quality sites (site class, IV, III or II).
Mixed Conifer (mc)	455 4%	These stands have various mixtures of PSME, PICO, ABLA, and PIEN. Most appear to have developed with a mixed severity fire regime because they tend to be mid to lower elevations stands. Aspen may be present but represent less than 15% of the basal area. There are also some stands in this type that have become mixed due to succession (i.e.

Cover Type	Acres%	Description (see below for abbreviations)
		Douglas-fir and other conifer have become dominate over aspen). Site quality is variable from stand to stand but are typically moderate to high quality sites.
Forest Riparian Mix (frm/rsm)	39 <1%	**S**tands where there is a map-able riparian area (Rosgen B through G channels). These stands have at least 10% CFA of forest tree species.
8 Total	**12508**	PSME=Douglas-fir, PIFL2=limber pine, PICO=lodgepole pine, ABLA=alpine fir, PIEN=Engelmann spruce, POTR5=aspen

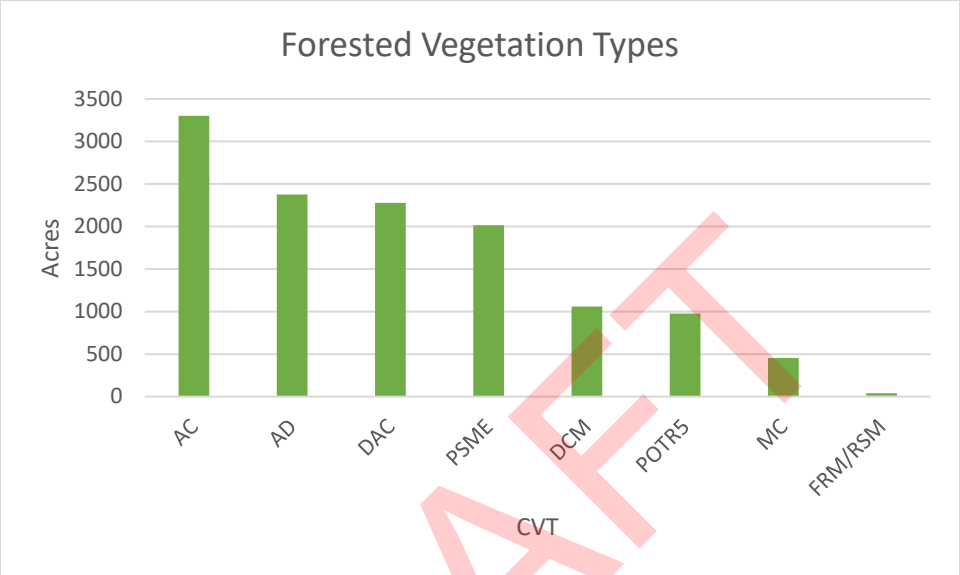

Figure 6 *This chart shows the distribution of forest vegetation types across the landscape.*

Seral Aspen

Aspen was historically widely distributed across the west and is being lost because of changes in the natural disturbance regimes. Bartos (2001) reported that aspen in the western United States has declined 50-96%. The RFP reported that aspen had declined across the Forest an estimated 40%. Aspen is considered a keystone species so the loss of aspen is a concern, which is why the RFP emphasized the need for management in this type.

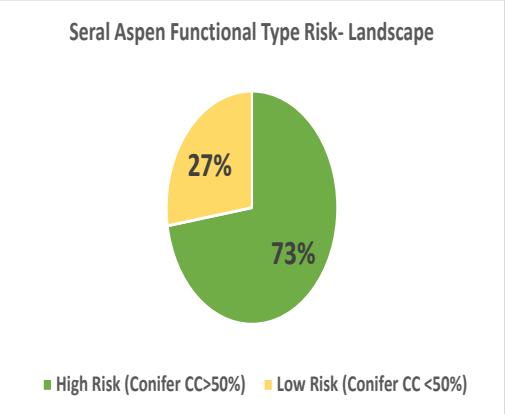

Figure 7 *This chart shows that conifer dominate on most acres classified as seral aspen. These are sites where it is natural for conifer to be present and even dominate in some areas. However, the current percentage dominated by conifer is outside of desired conditions.*

In recent years, aspen functional types have been developed to help classify aspen types in the west, to better understand the loss of aspen (Rogers, et al. 2014, P. C. Rogers 2017, Kitchen, et al. 2019). The "seral aspen" functional type represents acres where aspen and conifer have historically co-existed. This section focuses on this type.

Without fire to stop their progression, conifer have increased across the landscape. Currently conifer dominate on 73% of the acres that were classified as "seral aspen" in the landscape. Due to high conifer canopy cover aspen regeneration is below desired levels in many stands. This is a threat to the health and resilience of aspen stands and the ecosystem. The change in aspen health, an easily measured seral species, is likely reflected in a host of species that rely on fire and other disturbances ((Hollenbeck & Ripple 2007, (Rumble, et al. 2001), (Wan, et al. 2014), (Bartos 2001), (Bartos and Campbell 1998), (Shields 1981), (Flack 1976), (Finch and Ruggiero 1993), (Campbell and Bartos 2001), (DeByle 1985a), (Debyle 1985b), (Kitchen, et al. 2019)). For example, Finch and Ruggiero (1993) reported that insect density and diversity was twice as high in aspen dominated stands than conifer dominated stands, which likely explains the high biomass and abundance of avian insectivores in aspen dominated stands.

Sites visits across this landscape and FSveg data (both spatial and tabular) indicate that aspen are common in the "seral aspen" functional type, but approximately 73% of the landscape acres conifer makes up more than 50% of the canopy cover. Campbell and Bartos (2001) state that stands with greater than 50% relative conifer cover are at high risk.

Desired future conditions developed for this landscape are displayed in Table 6. The DFC is that less than half of the seral aspen acres are at high risk. This DFC was based on the aspen types present and the historical composition (Williams 2009).

There is a need to reduce conifer and increase aspen across the project area to reduce the risk to aspen, a keystone species. In many locations across the west, aspen is also at risk due to herbivory, this is less of a concern in this area than succession. Herbivory is discussed in a later section of this report.

Table 5 Aspen stands where less than 50% of the basal area is aspen, can be considered at risk. (Campbell and Bartos 2001). The desired condition for this landscape is to keep most acres at low risk. Relative canopy cover is a reasonable surrogate for basal area and can be estimated from aerial photography, so it was used as the metric.

Aspen Risk	DFC	Current	Trend
Lower Risk (Relative aspen canopy cover is >50%)	50-66%	27%	Underrepresented
High Risk (Relative aspen canopy cover is <50%)	33-50%	73%	Overrepresented

Figure 8 *Example of seral aspen stand where aspen is experiencing succession to conifer. Dense conifer crowd out aspen and outcompete for nutrients and space in many stands. Overstory aspen are dying from old age (can be found as standing or down snags in the landscape) and replacement aspen suckers that grow quickly die due to the deep shade in the understory.*

Structure

Based on the condition of this landscape and RFP direction, this section will highlight the following structural elements: age- class structure or forest structure stage, old-growth characteristics, canopy cover, and snags.

Age Class Structure

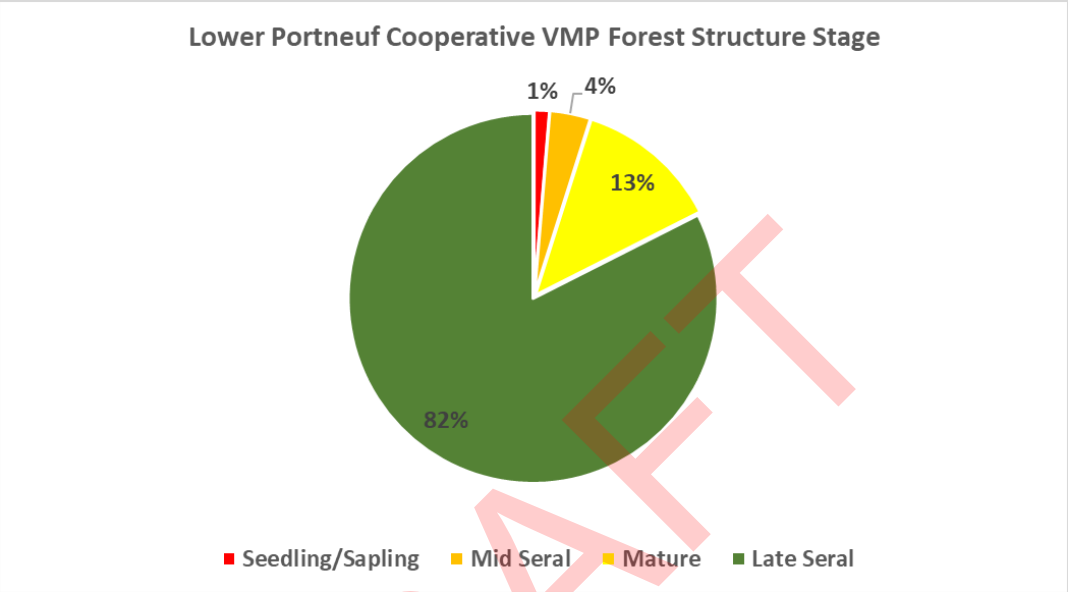

Figure 9 *Age class structure of the Landscape. Labels show structural stage, percentage of the landscape in each structural stage is shown in the pie slice. The FSS were combined into map units to simplify the classification and improve the accuracy. The Forest wide assessment indicated that the user accuracy for this data is 91% (Beck 2019)*

The RFP set a balance of age-class structure at the landscape scale as a desired future condition. Forest structure stage is used to assess age-class structure on the Caribou portion of the C-T. The desire is to have a balance of age-classes where at least 30 to 40% of conifer types are in the mature/late seral class and 20 to 30% in mature/late seral class for aspen at the landscape scale.

The RFP set a goal of moving toward a balance of age classes at the watershed or landscape scale. Table 9, below, shows the assessment of the current condition compared to RFP desired future conditions (DFC) and estimated reference conditions. Clearly, there is a need to increase age-class diversity across the landscape. Having such a large percentage of the landscape in the late seral class increases the risk that a large portion will be moved to the seedling stage all at once by a large future disturbance. There is a need to create a more balanced age-class distribution across this landscape. Figure 10 below additionally shows the age class distribution by forested cover type and helps portray the need to begin introducing younger age classes back into the landscape.

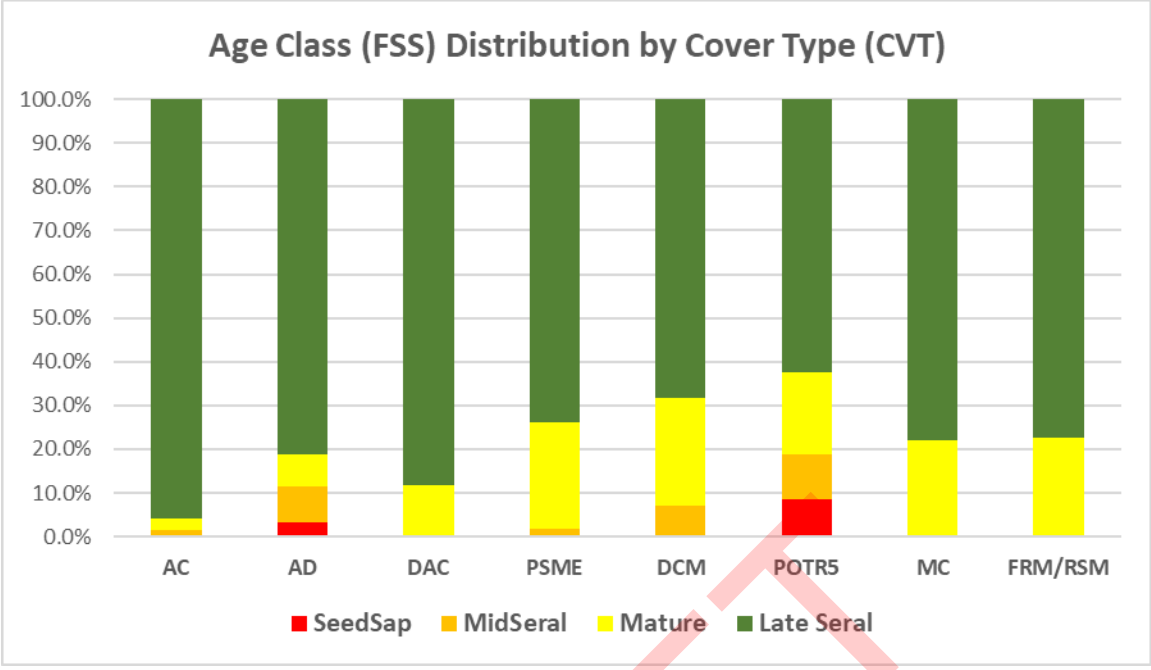

Figure 10 *Age-Class Distribution by Cover Type. This figure shows the relative percentage of each forest structure stage map unit by forest cover type. The cover types are arranged from most common to least. This table helps to portray the rarity of seedling/sapling stands and the surplus of mature/late seral stands on the landscape and supports the need for introducing younger forested age classes back into the landscape. See Table 4 for type description and abbreviations.*

Table 6 *Forest Structure Stage. These tables show the combined FSS map units that were used to classify every stand in the landscape. Landscape Reference numbers are based on weighted averages of the forested bio-physical settings in the landscape.*

Forest Structural Stage	RFP DFC	Landscape Reference	Current Condition	Trend
Seedling/Sapling	5 - 25% (20%)	12-13%	1%	underrepresented
Mid Seral	30 – 50% (40%)	37%	4%	underrepresented
Mature/Late Seral	30 - 50% (40%)	50%	95%	overrepresented

Forest Structural Stage	Landscape Reference Conditions	Current Condition	Trend
Seedling/Sapling	5-15% (12%)	1%	This structure is underrepresented
MidSeral Open Canopy	5-15% (7%)	1%	This structure is underrepresented
MidSeral Closed Canopy	25-35% (30%)	3%	This structure is underrepresented
Mature/Late Seral Open Canopy	25-35% (31%)	9%	This structure is underrepresented
Mature/Late Seral Closed Canopy	10-20% (20%)	86%	This structure is overrepresented

characteristics within this landscape and across the Forest. The Forest can meet the RFP standard that 15% of all the forested acres in a watershed meets or is actively managed to attain old-growth characteristics.

There are limited opportunities to manage any stands within the project area for the sole purpose of attaining old-growth characteristics. However, there are opportunities to reduce the risk that large old relics within treated stands do not succumb to bark beetles by reducing the density around them. There is also opportunity to reduce the risk that the identified stands will not be lost due to major disturbance event by treating a portion of the landscape outside of the blocks.

Canopy Cover

Natural disturbances, especially fire, reduce canopy cover creating heterogeneity at the group, patch, stand, and landscape scale (North, et al. 2009). Historically, forests shaped by relatively frequent mixed severity fire, were dominated by clusters and groups of trees separated by sparsely treed openings and gaps that shifted and moved across the landscape with time. The heterogeneity, created by the natural disturbance regime, provided for increased plant diversity, shrub cover, sites for shade-intolerant species to regenerate, moderated the surface and canopy microclimate, as well as provided a variety of habitats for birds and animals (North, et al. 2009). Forests with closed canopy conditions have different species assemblages than those with open canopies (Flack 1976). Closed canopy conditions favor late succession species while open canopies favor early seral species.

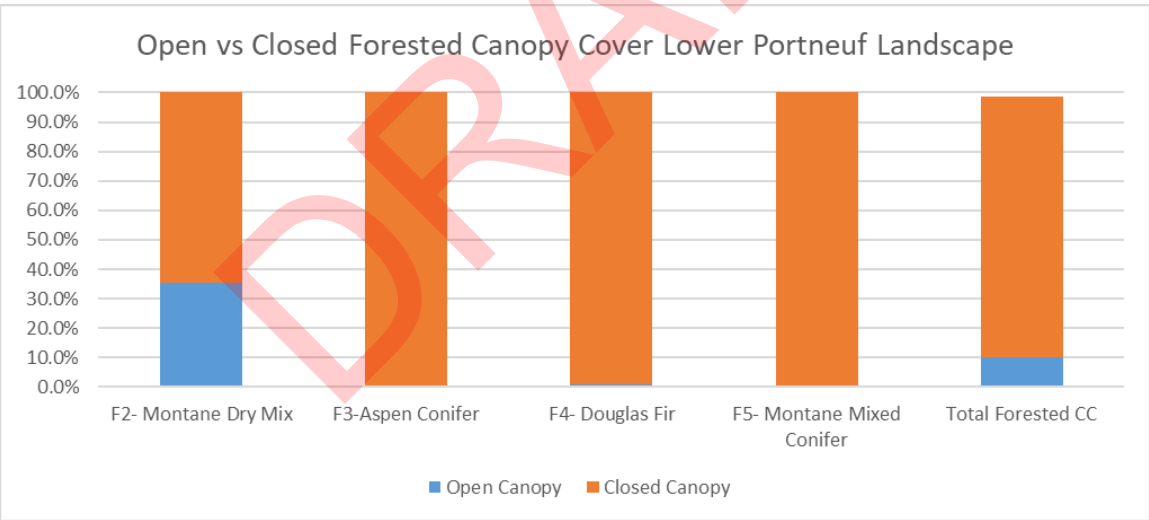

Figure 11 *Canopy Cover in Late Seral Primary Cover Types. This figure shows the canopy cover class for the primary late seral types. The Montane Dry Mix type should be mostly open, the other types should be a more even mix of open and closed canopy. None of the forested cover types in the landscape are close to historical canopy cover conditions.*

The mixed severity regime that historically shaped forested stands in the analysis area would have resulted in different canopy cover conditions for each forest type, and it would have varied through time. LANDFIRE biophysical models provide reasonable estimates of canopy cover reference condition for the various biophysical settings.

Figure 12 shows the percent of closed and open canopy stand acres for the most common late seral cover types in the landscape. Under a natural disturbance regime, the dry conifer mix and dry aspen

conifer stands would have been mostly open. Aspen conifer, mixed conifer, and Douglas-fir types would have been a much more balanced mix of classes.

The current condition has departed from the reference conditions outlined for the various biophysical settings. The lack of disturbance has allowed the forest to become more dense and more homogenous.

Currently, 90% of forested stands in the landscape are in closed canopy state, and 10% are in open canopy. There is a need to increase the percentage of stands acres that have open canopies. Open canopy conditions provide ideal growing conditions for many annual and perennial flowering forbs and thus are important habitat for butterflies, moths, and other pollinators (Swanson, et al. 2010, Potts, et al. 2003, Roberts, King and Milam 2017). The early-successional environments found in canopy openings play and important role in sustaining ecosystem processes and biodiversity because of the resource rich environment and varying conditions found in there (Swanson, et al. 2010). Reducing density and creating open canopy conditions will increase the health and resilience of the affected stands and the landscape as a whole (North, et al. 2022). Field walkthroughs also show that aspen recruitment is being negatively affected by closed canopy conditions in stands dominated by conifer, and at times the conifer is dense enough to cause recruitment to disappear entirely in portions of stands. Below is a table further showing the breakdown of open vs closed canopy by forest structure stages. Note: Mature and Late Seral were lumped to create the table.

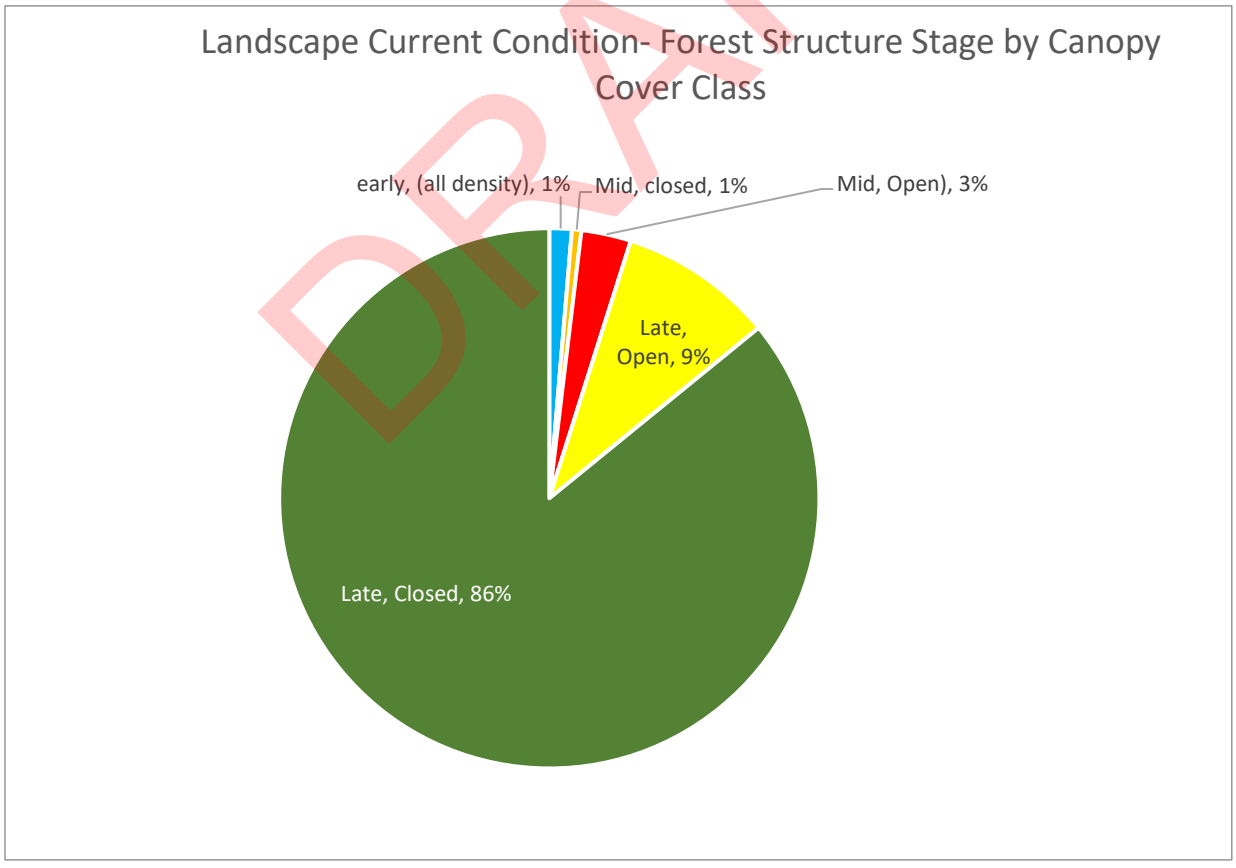

Figure 12 *The table below shows a breakdown by percentage of Forest Structure Stage broken into open vs closed canopy. This shows that only 10% of forested stands within the Lower Portneuf project area are in an open canopy state.*

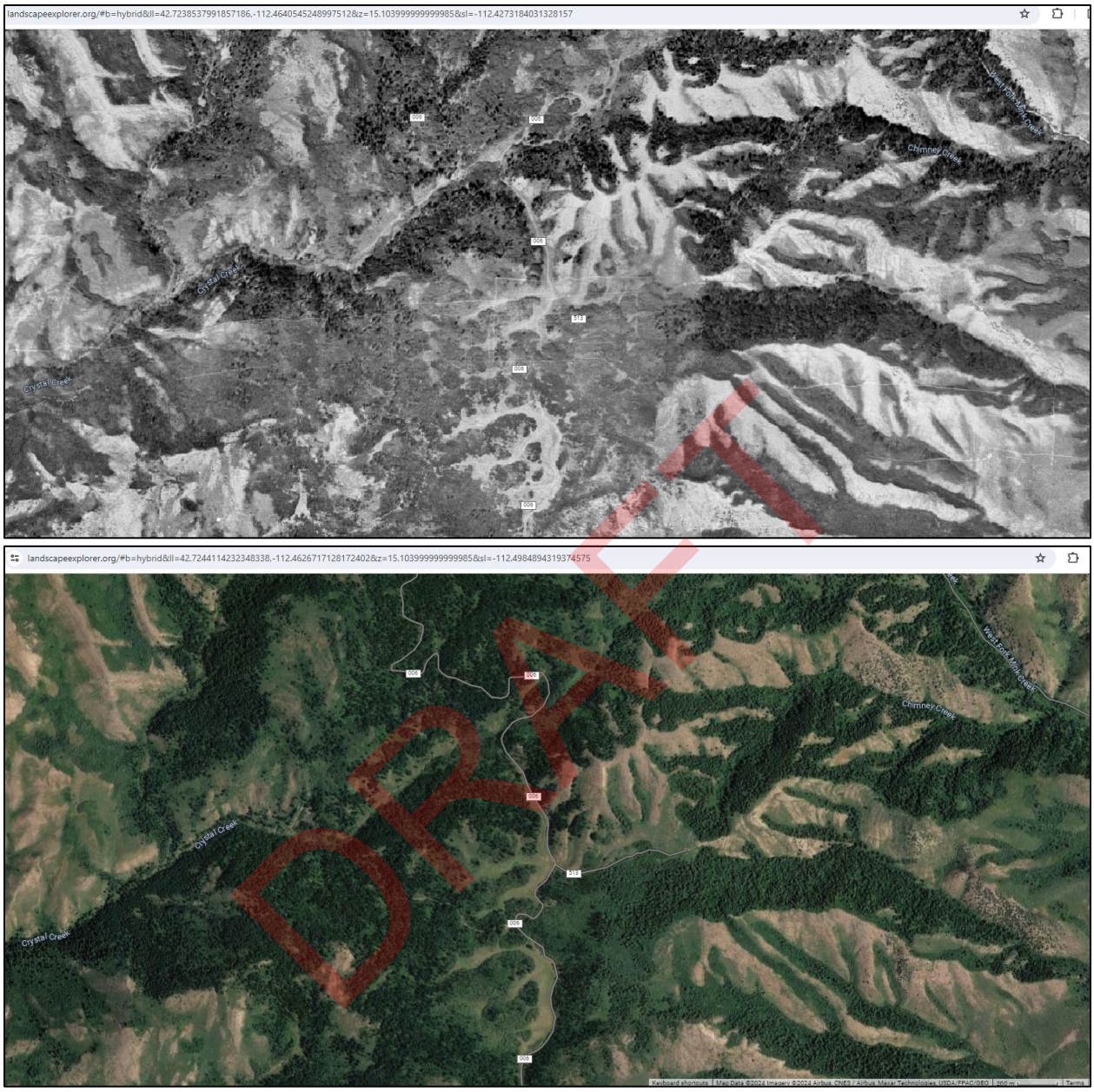

Figure 13 *Paired historic and current aerial imagery. This pair of historic (1953) and current (2023) aerial photos, both within the landscape, illustrates the large change that has occurred across the landscape in the absence of fire. In the historic photo individuals, clumps and groups of large old trees were prominent as were larger stands of seral aspen dominated by Aspen. In the recent photo it is very clear that aspen dominated acres have decreased, and conifer cover has increased. In some cases, the large old Douglas-fir are being lost to insects, disease, old age, and density related mortality. Source Rangeland Analysis Platform, - https://landscapeexplorer.org*

Snags

Snags are an important landscape scale structure for many wildlife species. The RFP has a guideline that directs managing snags at the RFP prescription scale for various biological potentials for woodpeckers. It also outlines a guideline for retaining live trees for snag recruitment.

The Forest has recently assessed snags across the Forest several ways. One used aerial detection survey data to estimate the average number of conifer snags created and standing across the Forest (Beck 2016c). Another used plot data collected to validate the CStand GIS coverage (Beck 2016c). Additionally, a mix of Forest wide and Forest Inventory Analysis (FIA) plots was used (Silvey 2018). All three assessments showed that the Caribou Forest is at or near the snag biological potential (BP) outlined in the RFP. The most extensive assessment (Silvey 2018) indicated there is an average of 20 snags/forest acre when averaged across the Forest. It did show that snag numbers vary by Forest Subsection. The Basin Range Subsection, where this project is located has an average of 17.5 snags/forested acre in that assessment, which is lower than the Forest average, but still meets the 100% biological potential (BP) level.

Table 7 *Snags by cover type assessment. This table shows the number of 6 inch or greater snags to meet 100% biological potential. It also shows the Silvey (2018) results for the Forest as a whole and the Basin Range subsection.*

Cover Type	**Snags/ac needed to meet 100% BP for DBH 6+ inch.**	**CNF Assessment by SAF Cover Type snags/acre Silvey 2018**	**Basin Range subsection Silvey 2018**	**Meets 100% BP?**
Aspen	8.28	21.2	25.3	yes
Douglas Fir	9.78	17.8	14.7	yes
Engelman Spruce/Subalpine Fir	9.78	13.4	N/A	N/A

Table 8 *This table shows that the Forest is meeting the BP requirements for all prescription areas. In fact, we are meeting 100% BP for each RX area relevant to this landscape area.*

RFP RX Type	**RFP Requirements**	**Snags/ac required to meet RFP compliance.** (Used Douglas Fir SAF cover, most restrictive)	**CNF RFP Assessment snags/ac per RFP RX Type Silvey 2018**	**Basin Range subsection snags/ac per Rx Type Silvey 2018**
3.2	60% BP	6	23.4	17.2
5.2	40% BP	4	22.7	6

Table 9 *Snag Requirements by diameter class for maintaining various percentages of biological potential for woodpecker populations (snags per 100 acres) according to the RFPCNF. Silvey 2018.*

	Aspen (% Biological Potential)				Douglas-fir, spruce/fir (% Biological Potential)				Lodgepole pine (% Biological Potential)			
DBH (inches)	40%	60%	80%	100%	40%	60%	80%	100%	40%	60%	80%	100%
>= 12	40	61	81	101	100	151	201	251	60	90	120	150
>= 10	15	23	30	38	15	23	30	38	15	23	30	38
>= 9	132	198	264	330	132	198	264	330	132	198	264	330
>= 7	24	35	47	59	24	35	47	59	24	35	47	59
>= 6	120	180	240	300	120	180	240	300	120	180	240	300
Total Snags	**331**	**497**	**662**	**828**	**391**	**587**	**782**	**978**	**351**	**527**	**702**	**877**

Both Beck (2016c) and Silvey (2018) agree most snags in the landscapes are less than 12 inches. Silvey notes when determining biological potential, larger snags can be substituted for smaller snags but the reverse in not true. Which is why the RFP set a guideline to retain snags greater than 12 inches when doing management.

Silvey (2018) stated that from 2003 to 2015 timber harvest forest wide has not had a measurable effect on the number of snags on the Forest due to the relatively small acres treated. Across the landscape, new snags are being created each year due to natural mortality in the mature/ late seral age classes (which are overrepresented). Causes of mortally include insects, disease, age, and physical damage from wind. Due to natural mortality, the current surplus of mature and old trees, and low harvest levels, it is expected that snags will not decline below the prescribed biological potential at the Forest scale.

To comply with the Caribou RFP guidance for live snag recruitment (RFP 3-27) between 1,000 and 2,500 trees per 100 acres must be left to meet the live snag recruitment guideline. Rx areas 5.2 must meet 40% Biological potential (1,000 T/100ac), Rx area 3.2 requires 60% biological potential (1,500T/100ac). In AIZ's there should be 100% BP or 2,500 trees/100 acres. Treatments that are designed to mimic a low-mixed severity disturbance regime will easily meet this guideline. Most units should be less than 100 acres so trees along the perimeter plus other trees left in the unit will far exceed this requirement.

RFP 4-63 outlines direction for managing snags in Developed Recreation sites. Site specific areas may have snags removed for human safety and other resource management needs. Biological potential for woodpeckers is not a management consideration (RFP Standard). Hazard trees shall be removed to provide for public safety (RFP Standard).

Beyond developed recreation sites, snags should not be targeted for removal. This includes merchantable sized dead trees larger than 12" in diameter at breast height. In harvest units where dead class 2-5 trees >12" do not create an unacceptable risk to forest workers they should be marked to leave. Since Douglas-fir bark beetle activity appears to be on the increase if large patches of bark beetle infected trees are encountered in harvest units, we recommend they be sanitized if the need arises at a stand by stand basis. Beetles will likely kill additional trees after harvest which will create additional snags. Additionally, prescribed burn treatments will increase snags at the landscape and subsection

scale. If snags are sanitized, extra care should be taken into ensure that units and the area around them will still meet the appropriate biological potential for >12" diameter classes.

Function

All of the RFP Desired Future Condition (DFC) statements related to forest vegetation (summarized earlier in this document) have a functional element. In an ecosystem management, function is defined as processes such as energy flow, nutrient cycling, soil development, predation, herbivory, and natural disturbances regimes such as wind, fire, and insects, which sustain the composition and structure of the ecosystem. Franklin and others (2002) define function as *'the "work" carried out by an ecosystem, including such processes as productivity, conservation of nutrients and regulations of hydrologic cycles.*' The RFP glossary defines function as: "*All the processes within an ecosystem through which the elements interact, such as succession, the food chain, fire, weather and the hydrologic cycle*." The work, processes and or functions that occur in forest ecosystems are nearly endless.

This section will focus on natural disturbance regimes, specifically fire and insect disturbances (these functional elements were also highlighted in the Caribou Revised Plan FEIS (2003)). Some attention will also be given to regeneration, and herbivory, because the public is often concerned with these functional elements.

Succession is not covered directly in this report, but it is an important functional element. It is however covered indirectly. The RFP defines succession as: *The natural replacement, in time, of one plant community with another. Conditions of the prior community (or successional stage) create conditions that are favorable for the establishment of the next stage.* On the project and landscape scale having a balance of age-classes with the proper composition and structure for time to work on is an important functional aspect. Composition and structure have been previously covered. As noted, regeneration is covered in some detail so that there is some assurance that trees (the right trees) will grow and allow for natural successional processes and time frames. These sections adequately cover succession albeit indirectly.

Fire

Forests on the Caribou are fire dependent (USDA-FS-C-T 2003b, Barrett 1994)(RFP FEIS 3-68). Fire historically played a central role in the Caribou's forested ecosystems (Barrett 1994). Fire is a natural and vital ecosystem process and is necessary for maintaining ecosystem function. Historically fire reduced biomass, cycled nutrients, regenerated vegetation, set back succession, and created diverse landscapes that provided for an array of structures and a diverse composition (both plant and animal). Fire suppression (direct and indirect) in forested ecosystems on the Caribou has affected ecosystem function (Caribou FEIS, 2003, 3-68) by disrupting the natural disturbance regime.

Generally, the mean fire return interval (MFI) for fire events increases with elevation and corresponding cover type (Barrett 1994, Bradley, Fischer and Noste 1992, USDA-FS-C-T 2003b). The mean fire interval for this project area would have ranged between 20 years at lower elevations and 120+ years at upper elevations. The overall mean fire interval is estimated to have been approximately 41 to 53 years, a range from 26 to 71 years, and comparatively long fire intervals (e.g. 100-125 years) were uncommon. Most of this landscape historically would have been classified as a mixed severity fire regime, the

Past Activities

In the Forest Activity Tracking System (FACTS) database of past management activities, most of the treatments in the landscape have been centered around non-forested and woodland fuels work, the most notable being the Blind Springs RX project. This burning involved repeated spring entries into mostly nonforested vegetation (sagebrush steppe/shrubland communities) in low intensity burns. The burn objectives were not to change forested/nonforested/woodland structure; objectives were to break up fuel continuity of mountain brush, reduce juniper canopy cover, reduce conifer encroachment in aspen stands and create small mosaic openings where opportunities existed. (Blind Springs burn plan, on file at Westside Ranger District office). Acres for Blind Springs RX shown in the table below are inflated as they show the total from repeat entries, not the original 3,700-acre footprint. Effects from Blind Springs RX burns were captured in the CStands coverage and included in this existing condition assessment. Other similar fuels work was also captured in this existing condition assessment (Buck-Doe RX, West Fork, Wild Horse, etc.).

There have been 3 documented timber sales within the Lower Portneuf landscape area: The Crystal Creek sale, Lucky Dog sale, and Mink Creek sale totaling 180 acres. These cuts were largely lighter cuts such as preparatory or establishment cuts to help prime the stands for a future Two- Aged removal cut. These cuts did not have a significant effect on forested structure and were captured in the CStands coverage and included in this existing condition assessment. There is a high likelihood of smaller timber sales or removal at small scales dating back before the database in incidental amounts; aerial imagery and Cstands coverage have been used to capture those effects in this existing condition assessment. There is also evidence of regular firewood cutting in the landscape in incidental locations, the effects have also been noted and captured in the existing condition assessment.

NAME	ACTIVITY_CODE	ACTIVITY	Total
BLIND SPRINGS RX	**1111**	**Broadcast Burning - Covers a majority of the unit**	8839.825583
2008-2014	1111 Total		8839.825583
	1113	**Underburn - Low Intensity (Majority of Unit)**	1767.965117
	1113 Total		1767.965117
BLIND SPRINGS RX Total			10607.7907
BUCK-DOE RX	**1111**	**Broadcast Burning - Covers a majority of the unit**	174.2070766
2007	1111 Total		174.2070766
BUCK-DOE RX Total			174.2070766
CRYSTAL CREEK TS	**4122**	**Seed-tree Preparatory Cut (EA/NRH/NFH)**	48.66276338
1998-1999	4122 Total		48.66276338
	4131	**Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)**	99.77687639
	4131 Total		99.77687639
CRYSTAL CREEK TS Total			148.4396398
LUCKY DOG TS	**4131**	**Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)**	9.996364603
1989	4131 Total		9.996364603
LUCKY DOG TS Total			9.996364603
MINK CREEK TS	**4121**	**Shelterwood Preparatory Cut (EA/NRH/NFH)**	21.36674681
1988	4121 Total		21.36674681
MINK CREEK TS Total			21.36674681
WEST FORK	**1111**	**Broadcast Burning - Covers a majority of the unit**	280.7794274
2010	1111 Total		280.7794274
WEST FORK Total			280.7794274
WILD HORSE	**1113**	**Underburn - Low Intensity (Majority of Unit)**	643.5104382
2007	1113 Total		643.5104382
WILD HORSE Total			643.5104382
Grand Total			11886.09039

Table 10 *Table of Forest Activity Tracking System Prescribed Fire and Harvest entries within the Lower Portneuf Landscape.*

Within the Lower Portneuf landscape, there have been 57 fire occurrences (starts) documented going back to 1992. (Obviously, there would have been both human caused and natural fire occurrence before 1992; the effects of those fires are very similar to the ones listed below and most of the areas have fully recovered and some are even becoming primed for another disturbance event.) Thirty-nine of these documented occurrences were less than 1 acre in size, fifty-six of them were less than 200 acres in size. Seventeen of the fifty-seven fires were from lightning or natural causes, forty were human caused. These fifty-seven fire occurrences within the landscape sum to approximately 2,800 acres (Count 57, Min 0.1, Max 2150, Sum 2799). The most notable sized fire was the 1992 Michaud III Fire, which totaled 2150 acres. Most of the impact from these fires is in the non-forested vegetation, Montane Sagebrush Steppe/Shrubland cover types. All effects from past fires were largely captured to the extent possible in the Cstands coverage and included in this existing condition assessment. There have been notable fires slightly off forest in almost every cardinal direction of the landscape and some that have even burned onto forest, such as the 2017 Powerline fire; effects from adjacent fires of different ownership that burned onto Forest system lands are similar in nature to the other occurrences specifically on Forest Service land as described above.

There is not evidence of fires or past management that significantly affected stand conditions on historic aerial photos going back as far as the 1960s. In general, the impact of past fires and harvest has been minor and has fully recovered. Most of the harvest units have returned to closed canopy conditions. In fact, much of the disturbance history (or absence thereof) between the onset of EuroAmerican settlement and present day has caused much of the forested vegetation within the landscape to become notably departed from a naturally functioning disturbance regime. The existing vegetation in current condition is not situated well to be resilient to large disturbance. Many of the past harvest units require additional density management, both in the overstory and the understory.

Affected Environment

Forested ecosystems in the Rocky Mountains are highly diverse, complex, and dynamic (Long, 2003). Forests are constantly changing due to disturbances (natural and human-caused), growth and succession. Disturbance regimes are increasingly used to categorize the complex and dynamic ecosystems of the west. A disturbance regime is a general term that describes the temporal and spatial characteristics of the cumulative effects of multiple disturbance events over time and space (Keane, 2017). It is widely accepted that the biodiversity of an area is intimately linked to disturbance regimes, because disturbances create the natural mosaic of diverse plant communities and habitats typical for a landscape. If the intensity, severity, size, pattern, or timing change from the natural regime, biodiversity can be considered at risk. (RFP, RFP-EIS, Keane, 2017, FRCC, 2010, Long 2003, Long 2009). Mimicking the natural disturbance regime to create the spatial and temporal fluctuations of plant communities and habitat provides for the conservation of biodiversity (Keane, 2017).

Fire has been described as a keystone disturbance in the forests of the western United States (Marcoux 2015, Long 2009, & Falk 2006). The effects of fire are most often described and categorized by fire regime. Barrett (1994) sampled fire history across the Caribou National Forest in 1994. He reported that fire historically played a critical role in shaping forest ecosystems of the area and the characteristic fire regime of most forest types was a short to moderately long interval mixed severity regime.

Figure 14 *Legacy trees or relics that survived past mixed severity fire regime are relatively common across the landscape. This Douglas-fir relic (photo taken near Crystal Creek) is clearly larger and older, with very whirly branches. The relics found in this area tended to be widely spaced individuals or small groups or patches of relics.*

Landscape Risk

Keane (2017) stated that biodiversity is intimately linked to disturbance regimes, because disturbances create the structural mosaics, plant communities, and habitats across a landscape. Temporal fluctuations of these communities ensure the conservation of biodiversity. This idea is central to the RFP management direction.

Fire Regime Condition Class (FRCC) assessments are a useful tool in summarizing ecosystem trends at the landscape scale and provide useful context for ecosystem restoration efforts. FRCC assessment methods have been established to provide a relatively simple, fast, and effective way to evaluate ecosystem components that are fundamental to maintaining biodiversity on landscapes. FRCC provides a solid foundation for understanding historical fire regimes and associated vegetation (FRCC 2010).

FRCC was assessed using the worksheet method described in the FRCC Guidebook (2010) (work recorded in FRCC_worksheet_LP_Existing excel, in the project record). The assessment completed indicates the overall condition class of this landscape is "**2 -Moderate Departure** from natural conditions." FRCC assessments measure departure of two components of ecosystems: 1) fire regime (fire frequency and severity) and 2) associated vegetation (composition, density, and structure). Table 11 below summarizes the assessment of forested, woodland, and non-forest lands in the landscape. The stands in the landscape were grouped into ten biophysical settings. LANDFIRE biophysical setting (BpS) models which describe the fire regime, vegetation composition, and structures based on research of historic ranges of variations (FRCC 2010) were used. Some BpS were grouped based on similarities in fire regime.

Table 11 This landscape, when assessed with LANDFIRE FRCC protocol, was classified as condition class 2, meaning there is a moderate departure from natural conditions. The aspen/conifer and Douglas Fir setting are dominant in the landscape and had a vegetation condition class of 3, due to imbalance of structure and density. Mixed conifer, a minor component of the landscape, also had a vegetation condition class of 3.

Biophysical Setting	% of Area	Veg-Fuel Condition Class	Frequency-Severity Condition Class	Strata Condition Class
Stable Aspen (1810110)	10.1%	2	2	2
Dry Montane Mix (1810510)	10.5%	2	3	2
Seral Aspen/Conifer (1810610)	10.0%	3	2	3
Montane Douglas-fir (2111660)	6.3%	3	2	3
Montane Mixed Conifer (2110450)	1.4%	3	1	2
Maple (2110120)	1.3%	1	2	1
Juniper (2111150)	4.1%	2	2	2
Mohogany (1810620)	3.2%	2	2	2
Montane Sage Steppe (2111260)/ Shrubland	52.6%	1	2	2
Montane Riparian (2111590)	0.6%	1	1	1
Landscape Summary	**100%**	**2**	**2**	**2**

FRCC departure and condition classes measure the amount of characteristic versus uncharacteristic conditions that exist in the landscape. The landscape overall FRCC departure score was 46%, the range to be classified as condition class 2 is 33-66%. FRCC 2 means vegetation composition, structure, and fuels have moderate departure from the natural regime and predispose the system to loss of key ecosystem components. In this landscape, the scores for the vegetation and regime departures were 43% and 49% respectively. This indicates that vegetation condition is influencing the overall rating, but both vegetation and regime are outside of characteristic reference conditions.

The effects of fire exclusion, in forests historically shaped by mixed severity fire, are more apparent at the landscape scale than the stand level (Long 2003). Forested vegetation in this landscape lacks structural diversity. This landscape is dominated by stands that have dense late seral structure and species composition is trending towards climax, and fuels have accumulated in the absence of fire. A landscape in this condition is considered at moderate risk to loss of key ecosystem components (condition class 2). The lack of diversity in age structure, and the high percentage of stands that have closed canopies, creates a landscape that is susceptible to uncharacteristic fire and insect disturbances. It also creates a landscape that is less resilient to these type events.

The effects of fire exclusion in forests in mixed severity fire regimes is often more apparent at the landscape scale than the stand level (Long, 2003). Under a natural disturbance regime there would be a mix of conditions, a mosaic of age-classes and densities across the landscape. Currently forested vegetation in this landscape lacks structural diversity when viewed at the landscape scale. This landscape is dominated by stands that have dense late seral structure, species composition is trending towards climax, and fuels have accumulated in the absence of fire. A landscape in this condition is considered at moderate risk to loss of key ecosystem components (condition class 2). The lack of diversity in structure (age and density) creates a landscape that is susceptible to fire and insect disturbances that are outside or at the upper limits of the natural range of variability. It also creates a landscape that is less resilient to these types of events.

Landscape Structure

Swanson and others (2010) wrote a paper highlighting the importance of having a balance of age classes in a landscape. In the paper they highlight the need to maintain a good portion of a landscape in early successional ecosystems. They argue that where maintenance of biodiversity is an objective, early successional ecosystems must be provided for. They point out that the post-disturbance communities found in disturbance openings provide resources that attract and sustain high species diversity, because of highly productive/diverse plants, complex food webs, large nutrient fluxes, and high structural and spatial complexity. They state that across the west early successional conditions are poorly represented but provide a distinctive mix of physical/chemical/biological conditions, a diversity in species, and processes. They highlight the need to recognize the value of openings, which they argue is just as important in a landscape as old growth. They suggest a holistic approach to management where large landscapes are managed for diverse forest structure stages, like what is proposed in the RFP and this project. There is broad support in the literature that in fire adapted ecosystems where fire has become rare, biodiversity at the landscape scale increases with disturbance (Kennedy & Fontaine 2009, Fontaine & Kennedy 2012, Pilliod & Others 2006, Galbraith & Others 2019, Campbell & Donato 2014, Smucker & Others 2005).

Landscape age-class distribution is the most common structural attribute used to assess the condition of landscapes (Long 2009). RFP management direction is to maintain a balance of age classes at the landscape scale. Based on information found in the RFP, RFP Final Environmental Impact Statement (FEIS), and Reynolds (1992), a system to classify and map forest structural stages (FSS) was developed. Forest Structure Stage map units and associated GIS data form the basis for this analysis (Beck, 2016a; Beck, 2016b). The RFP used the terms “old” and “late seral” interchangeably. In this document the term “late seral” is used to avoid confusion between the RFP terms “old” (late seral) and “old-growth” which have different definitions.

The second most common structural attribute used to assess the condition of a landscape is density, often measured using canopy cover. The mixed severity regime that historically shaped this landscape would have resulted in a diversity of age classes and canopy cover conditions for each forest setting type, which would have shifted and varied through time.

Open canopy condition created and maintained by relatively frequent fire and other disturbances in conifer types, provide ideal growing conditions for many annual and perennial flowering forbs and thus are important habitat for butterflies, moths, and other pollinators (Swanson & others, 2011, Potts &

others 2003, Roberts & others 2017). The early-successional environments found in openings play and important role in sustaining ecosystem processes and biodiversity because of the resource rich environment and varying conditions found in openings (Swanson & others 2011).

Forests shaped by relatively frequent mixed severity fire, would have been dominated by clusters and groups of trees separated by sparsely treed openings and gaps that shifted and moved across the landscape with time. This heterogeneity provided for increased plant diversity, shrub cover, sites for shade-intolerant species to regenerate, moderated the surface and canopy microclimate, as well as provided a variety of habitats for birds and animals (North & others, 2009). Forests with closed canopy conditions have different species assemblages than those with open canopies (Flack, 1976). Closed canopy conditions favor late successional species assemblages and openings favor early seral species assemblages. Natural disturbances, especially fire, reduced canopy cover creating heterogeneity at the group, patch, stand, and landscape scale (North & others, 2009).

It is widely accepted that the HRV of ecosystems represents the range that best predicts resilience to disturbance. LANDFIRE models provide reasonable estimates of reference condition for the combination of forest structural stages and canopy cover for each biophysical setting (BpS). These reference conditions are based on the current understanding of a matrix of openings, gaps, low density, and dense areas that moved and shifted across the landscape with time. Using a weighted average of each LANDFIRE BpS provides an average landscape condition percentage for open and closed condition by forest structure stage. Table 3 outlines the approximate historical range of variability (HRV) and the central tendency for each structural class.

At the landscape scale there is a clear shortage of seedling/sapling, young/mid-aged patches at all densities and a shortage of open canopy late seral conditions. Table 12 below shows the current conditions for each structure class and the trend compared to reference conditions. This shift to older closed canopy conditions is the result of 110 plus years of succession. Succession is natural but so is disturbance. Historically, age-classes and densities were kept somewhat balanced by disturbance that set succession back to varying degrees. Table 12 shows that older age-classes (mature/late seral) currently dominate the landscape. It also shows that closed canopy conditions dominate. The current condition of this landscape does not meet the desired diversity outlined in the RFP. An additional supplement is included below table 3 to show the comparison to RFP DFC.

Table 12 *Forest Structure Stage. These tables show the combined FSS map units that were used to classify every stand in the landscape. Landscape Reference numbers are based on weighted averages of the forested bio-physical settings in the landscape. Note: This is the same table as Table 6 from the Existing Condition age class structure assessment in the Forested Vegetation Resource Report (above).*

Forest Structural Stage	RFP DFC	Landscape Reference	Current Condition	Trend
Seedling/Sapling	5 - 25% (20%)	12-13%	1%	underrepresented
Mid Seral	30 – 50% (40%)	37%	4%	underrepresented
Mature/Late Seral	30 - 50% (40%)	50%	95%	overrepresented

Forest Structural Stage	Landscape Reference Conditions	Current Condition	Trend
Seedling/Sapling	5-15% (12%)	1%	This structure is underrepresented
MidSeral Open Canopy	5-15% (7%)	1%	This structure is underrepresented
MidSeral Closed Canopy	25-35% (30%)	3%	This structure is underrepresented
Mature/Late Seral Open Canopy	25-35% (31%)	9%	This structure is underrepresented
Mature/Late Seral Closed Canopy	10-20% (20%)	86%	This structure is overrepresented

The current lack of balance in age-classes and density across the landscape is the result of direct and indirect fire control. Without relatively frequent mixed severity fires, succession has moved most acres in the landscape into the late seral closed canopy class. The lack of heterogeneity in the landscape puts forest habitats at risk to uncharacteristic disturbances and reduces the resilience to such disturbances (RFP, Beck 2016b). There is a need to shift some of the surplus closed canopy forest to seedling/sapling stage and open canopy conditions. Late-seral closed canopy conditions are important to maintain in the landscape, but the current surplus puts the landscape at risk.

Composition/Aspen Health

The amount of aspen on the landscape has significantly changed over the last 110 years. The 1914 vegetation atlas shows that 69 percent of the landscape was dominated by aspen, current data shows that has dropped to 40 percent, conifer now dominates on 60 percent of the forested acres. This shift in composition is a result of the absence of fire across the landscape.

Without fire as a disturbance to set back succession, conifer have increased across the landscape. Plant species composition in an ecosystem is influenced by complex interactions between species, disturbances, and chance events (Reynolds, 2013; Kitchen et al. 2019). Long (2009) stated that favoring disturbance-adapted species assemblages is an effective method to conserve biodiversity. It is well understood that disturbances like fire create conditions that favor shade-intolerant species, while closed canopy conditions that result from lack of disturbance favor shade-tolerant species. Historically, the natural disturbance regime maintained a mix of open and closed canopy conditions across the landscape that in general favored aspen and other disturbance adapted species assemblages. It is therefore logical that mimicking conditions created by the natural mixed severity regime will maintain and restore the natural biodiversity (plants and wildlife).

Aspen is considered a keystone species which is why management of aspen has been emphasized across the west and in the RFP. Bartos (2001) reported that aspen in the western United States had declined 50-96 percent. The RFP reported that aspen had declined across the Forest an estimated 40 percent. In the Lower Portneuf landscape, it has declined by 29 percent; in many stands, aspen is right on the edge of losing dominance. This change in aspen health, an easily measured seral species, is likely reflected in a host of species that rely on fire and other disturbances (Hollenbeck & Ripple 2007, Rumble & Others, 2001; Wan & Others, 2014; Bartos, 2001; Bartos & Campbell 1998; Shields, 1981; Flack, 1976; Finch & Ruggiero, 1993; Campbell & Bartos, 2001; DeByle, 1985a; DeByle, 1985b; Kitchen et al., 2019). For example, Finch & Ruggiero (1993) reported that insect density and diversity was twice as high in aspen dominated stands than conifer dominated stands, which likely explains the high biomass and abundance of avian insectivores in aspen dominated stands.

In recent years, aspen functional types have been developed to help classify aspen types, to better understand the loss of aspen across the west (Rogers et al. 2014; Rogers 2017; Kitchen et al., 2019). In this classification system the "seral aspen" functional type represents acres where aspen and conifer have historically co-existed.

Across the landscape and the project area, aspen regeneration and recruitment is below desired levels in many stands in the seral aspen functional type. Project level assessments indicate that low aspen recruitment levels are due to high conifer canopy cover (see regeneration section of Forested Report). This situation is a threat to the health and resilience of aspen stands and the ecosystem, because when aspen decrease so does the numerous species that rely on them.

Site visits across the Lower Portneuf landscape and project area data indicate that aspen is common in the "seral aspen" functional type. However, in the project area, within the seral aspen functional type, 73 percent of the acres have conifer occupying more than 50 percent of the canopy cover. Site visits found that aspen regeneration was **not** being limited by ungulate browsing as is the case in many areas across the west. In canopy openings, aspen is successfully regenerating; conifer cover is the primary factor limiting aspen recruitment.

Campbell and Bartos (2001) state that stands with greater than 50 percent relative conifer cover are at higher risk of succession. It is important to remember that any individual stand having more than 50 percent conifer canopy cover is not a concern, the concern is when most acres in the landscape are in this condition. For the aspen/conifer biophysical setting FRCC reference conditions indicate that the central tendency for the type was to have about 10 percent in this high-risk condition (PNVG).

Desired future conditions developed for this landscape and project area are displayed in Table 13. The DFC is that less than half of the acres classified as "seral aspen" are high risk. The DFC was based on the aspen types present and best available information on the historical composition (Williams 2009 & FRCC). While there can be some debate about what the ideal composition is, it is widely accepted that most "seral aspen" acres should have less than 50% conifer canopy cover. Table 13 clearly shows that there is a lack of aspen dominated stands and a surplus of conifer dominated stands in this landscape.

Table 13 *Aspen stands where less than 50% of the basal area is aspen, can be considered at risk. (Campbell and Bartos 2001). The desired condition for this landscape is to keep most acres at low risk. Relative canopy cover is a reasonable surrogate for basal area and can be estimated from aerial photography, so it was used as the metric. Note: This is the same table as Table 5 from the Existing Condition age class structure assessment in the Forested Vegetation Resource Report (above).*

Aspen Risk	DFC	Current	Trend
Lower Risk (Relative aspen canopy cover is >50%)	50-66%	27%	Underrepresented
High Risk (Relative aspen canopy cover is <50%)	33-50%	73%	Overrepresented

Project Stand Risk

An understanding of ecological departures from historical reference condition and landscape patterns is an important part of modern landscape management. The FRCC assessment process is a useful tool in understanding ecological departures at various scales. Individual stands FRCC ratings are based on the scarcity or overabundance of structural stages (combination of age-class and canopy cover) within each stratum or biophysical setting. Documenting stand FRCC acres helps provide an understanding of the ecological condition of individual stands and helps document effects of management actions (FRCC 2010).

The worksheet method was used to determine the condition class of the landscape as described earlier in this document. After the worksheet effort was completed the "stand" rating from that process was attributed to each setting in GIS. This provides a way to show the pattern of the stand condition classes across the landscape and demonstrates the general condition of stands in the project area. Table 14 below shows the acres and percentage of in each class for forested types in the landscape and project area.

Table 14 *Landscape Area Fire Regime Condition Class (Forested Acre breakdown). This table shows that most forested stands in the landscape and project area are in condition classes 2 and 3. The landscape overall is in a class 2, but at the stand level the departure is much higher. These ratings are because closed canopy late seral condition is overrepresented across the landscape. It is important to remember that FRCC is not a measure of fire hazard but a measure of ecological condition. Stand FRCC is useful for measuring, monitoring, and tracking stand conditions before and after treatments.*

Condition Class	1	2	3
Landscape Forested Acres	1793	4884	5831
Landscape Percent	**14%**	**39%**	**47%**

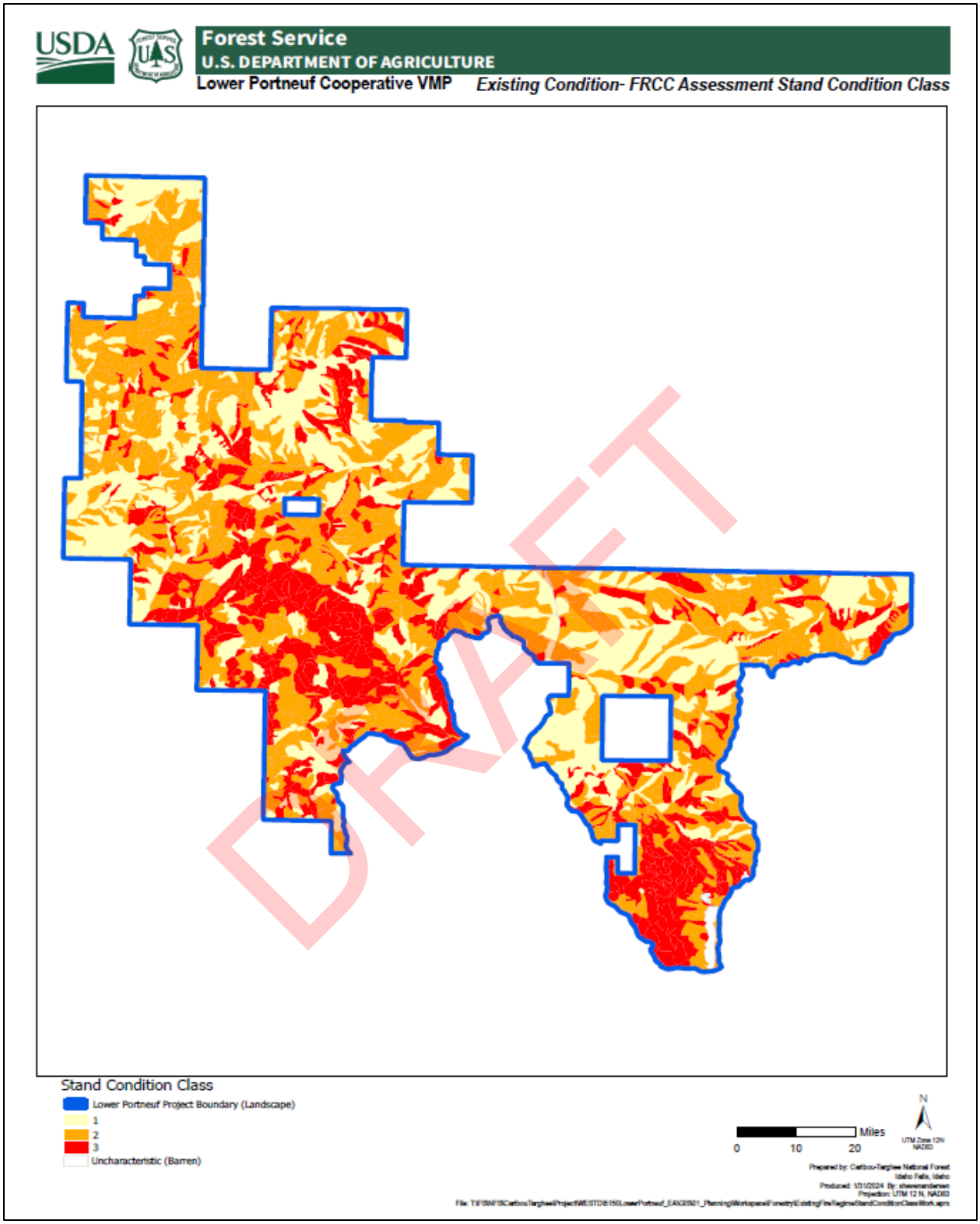

Figure 17 *Stand FRCC. This map displays the stand FRCC rating which is based departure from reference condition for the setting and structure classes. Stand conditions that are like or underrepresented reference conditions for the landscape are in FRCC 1 or low departure, stand conditions that are overrepresented are in FRCC 2 or moderate departure, whiles stand conditions that are abundant compared to reference conditions are classified as FRCC 3 or high departure.*

Summary

The disruption of the natural disturbance regime and succession are the two factors that have had the greatest effect on the current condition of forest vegetation within the project area and landscape. The effects of succession and the lack of a natural disturbance cycle have been building across the landscape since the late 1800s. The ecology of this landscape evolved with a relatively frequent mixed severity fire regime (Barrett 1994). Aspen and a host of other species evolved with the natural disturbance regime and depend on disturbance to sustain them in the landscape. Historically fires burned across the landscape more frequently setting back succession, reducing density, and creating openings where conditions were favorable for early succession plants to successfully regenerate.

The implications of fire exclusion for forests that evolved with mixed severity fire are often more apparent at the landscape scale than the stand level (Long 2003). Without routine disturbance, the landscape has become more homogeneous, and there is a shortage of younger age-classes, seral plants species, and openings in the canopy. As the forest has become more homogeneous, the risk of uncharacteristic fire and insect events has increased. Without the heterogeneity that resulted from the natural fire regime, the landscape is not as resistant or resilient to disturbance as it once was.

The Forest Service mission is to sustain the health, diversity, and productivity of forests and grasslands to meet the needs of present and future generations. In this project area and landscape there is a need to sustain the health, diversity, and productivity of forested ecosystem. The homogeneity of the age-class structure and density is creating conditions where uncharacteristic disturbance events (intensity and scale) are possible. There is a need to manage stands to meet the desired conditions and goals outlined in the RFP and for this project area. As conifer density increases, stands are losing understory diversity and risk to insects and disease is increasing. This puts the large old relic trees left in the area at very high risk. In their present conditions the landscape and most stands, are less resilient to disturbance because of their high density and declining species diversity. There is a need to reduce density, increase early seral species like aspen and reduce accumulated fuels. Doing these things will reduce risk and increase resilience as well as move toward desired conditions and goals outlined in the RFP for the area.

Environmental Consequences

Summary of Environmental Consequences

Table 15 *Summary of Effects by Alternative at the Landscape scale. This table shows the condition of each metric fifteen years after implementation for the proposed action. The numbers in the brackets show the landscape effect of the alternative.*

Resource Element	Resource Indicator	Measure	Existing Condition	No Action	Proposed Action
Landscape Risk	Fire Regime Condition Class (Landscape)	Condition Class & Departure	FRCC 2 46%	FRCC 2 46%	FRCC 2 42% (-4%)
Landscape Forested Structural Diversity	Forest Structure Stage by Canopy Cover Class (Landscape Scale)	% Seedling/Sapling (all densities) % Young/Mid (open canopy) %Young/Mid (closed canopy) % Late Seral/Mature (open canopy) % Late Seral/Mature (closed canopy)	1% 1% 3% 9% 86%	0% (-1%) 1% (+0%) 4% (+1%) 8% (-1%) 87% (+1%)	4% (+3%) 1% (+0%) 3% (+0%) 22% (+13%) 70% (-16%)
Composition	Aspen Health (Seral Aspen f3 strata)	% Landscape Low risk (RCC>50%) % Landscape High Risk (RCC<50%)	27% 73%	22 (-5%) 78 (+5%)	59% (+32%) 41% (-32%)
Project Area Forested Stand Risk	Landscape Area Forested Stand Fire Regime Condition Class	% FRCC 1 % FRCC 2 % FRCC 3	14% 39% 47%	13 (-1%) 39 (+0%) 48 (+1%)	29% (+15%) 36% (-3%) 35% (-12%)
Aspen Improved	Aspen Treated	Seral Aspen Acres Treated	Not Applicable	0	2,308
Fuels	Fuels Treated	Acres Treated	Not Applicable	0	12,185
Forest Products Industry	Forest Product	Estimated Volume (CCF)/ Estimated Volume (MMBF)	Not Applicable	0	~8000 CCF/~4 MMBF

No Action

Under No Action, none of the proposed activities would occur. Without action, the issues that would be addressed with treatments would not be addressed. There would be no reduction of conifer density, no improvement in aspen health, no reductions of accumulated fuels, no improvement in the Fire Regime Condition Class rating for the landscape or treated stands within project area, and the project area would not contribute meeting the desired landscape condition. Aspen would continue to be lost to succession. The resiliency of the ecosystem to future disturbances would continue to decrease as density continues to increase, and species diversity subsequently continues to decrease. There would be no commercial forest products produced. In short, the landscape and forested vegetation would continue to move further away from desired future conditions as outlined in the RFP.

In unmanaged stands, natural succession would continue to increase stand age, increase density, increase risk to uncharacteristic disturbance (fire and insects), and early seral species would continue to be outcompeted by late seral species. The RFP allows for managing wildfires to improve forest condition in part of the project area. Future potential to manage wildfire, under conditions suitable to manage fire, would likely not keep pace with succession. Because of the homogeneity and density of the landscape wildfire under extreme weather cannot be managed and would be suppressed where possible. Burning under extreme condition would likely not move the landscape toward desired

conditions as indicated by the FRCC assessment. Without active management the landscape will continue to move away from desired conditions. The effects to forested vegetation captured in the no effect analysis capture the condition of stands within the landscape that have a high likelihood of transitioning structural stages and canopy cover classes (seedling/sapling to young/mid, mature late open canopy to mature/late closed canopy within the temporal effects timeline of this project.

Current uses, activities (grazing, recreation, weed treatment, firewood gathering, etc.) and processes (growth, succession, decomposition, insects, fire, etc.) would continue. There are no other Forest Service proposed or planned actions that would affect forested vegetation in the foreseeable future in the project boundary (landscape) area. Forested ecosystems would continue to be dominated by mature/late seral vegetation. Past actions were accounted for in the existing condition described in earlier in this document. However, to reaffirm, just because there is no action proposed does not mean there is no effect on the environment.

Table 16 Resource indicators and measures for No-Action are shown below for the Lower Portneuf Project. The condition that will result from No Action for the measure are shown and the landscape effect is shown in brackets.

Resource Element	Resource Indicator	Measure	No Action Condition (Effect)
Landscape Risk	Landscape Fire Regime Condition Class	Fire Regime Condition Class and departure	FRCC 2 46%
Landscape Structural Diversity	Forest Structure Stage by Canopy Cover Class	% seed/sap (all densities) % Young/mid (open canopy) % Young/mid (closed canopy) % late seral/mature (open canopy) % late seral/mature (closed canopy)	0 (-1%) 1 (+0%) 4 (+1%) 8 (-1%) 87 (+1%)
Composition	Aspen Health	% Low Risk (RCC >50%) % High Risk (RCC<50%)	22 (-5%) 78 (+5%)
Project area Forested Stand Risk	Risk to uncharacteristic disturbance	% FRCC 1 %FRCC 2 %FRCC 3	13 (-1%) 39 (+0%) 48 (+1%)
Aspen Improved	Seral Aspen Acres Treated	Approximate Acres	0
Fuels	Fuels Treated	Approximate Acres	0
Forest Product	Volume	CCF (hundred cubic feet)/ MMBF (million board feet) Tons	0

1 FRCC= Fire Regime Condition Class, 2 CCF= Hundred Cubic Feet, 3 MMBF= Million Board Feet

Proposed Action

Landscape Scale Effects

The Proposed Action was developed to promote an ecosystem that displays a higher diversity of species composition and structures as directed by the RFP while also increasing resistance to future disturbances such as wildfire. In forested ecosystems this can be accomplished by increasing structural diversity, reducing density, reducing fuels, and emphasizing aspen health and regeneration in the project area. The Proposed Action is to use a combination of prescribed fire, mechanical treatments (with option to use fire as a supplemental tool), regeneration harvest (with option to use fire as a supplemental tool), and fuel break treatments to move the landscape toward desired conditions. The

proposed treatments have been designed to favor fire adapted and resilient species, while reducing density and fuels that have accumulated in the absence of fire.

The effects of the Lower Portneuf Cooperative Vegetation Management Project's proposed action on forested resources are outlined in this section. All acres are approximate estimates. The Westside Ranger District proposes to:

- **Treat 2,959 acres with prescribed fire** through broadcast burning, pile burning, tree well burning and jackpot burning (i.e. *burning concentrations of fuel*). Pre-treatment actions (slashing, hand thinning/piling and mastication) would be implemented along edges to aid in conducting any prescribed fire portion of this project to ensure success outside of the traditional fire season found in Eastern Idaho.

- **Treat 8,184 acres with combinations of mechanical treatments mixed with prescribed fire techniques**. Actions within these areas could include chainsaw thinning, tracked based mastication, as well as light intensity under burning (where possible), tree well burning, pile burning, and jackpot burning as needed. Some opportunities to generate removable firewood under a personal use fuelwood permit may also be utilized where appropriate along open roads following these treatments. The use of these mechanical and prescribed fire activities could vary across these acres (some areas may not be treated while other areas may receive multiple treatments as needed to accomplish the project objectives).

- **Treat 554 forested acres with harvest and stand tending techniques**, including the use of prescribed fire. This treatment would occur in specifically identified areas, including in and around the Scout Mountain Campground as well as approximately 22 acres identified within the municipal watershed near Elk Meadows. Actions within these treatment areas could include ground-based timber harvest and whole tree skidding methods. These actions could vary across the harvest acres to promote desirable stand conditions (some areas may not be treated while other areas may receive multiple treatments. Work in these areas can also include:

    - Approximately 6-8 miles of temporary roads would be utilized to facilitate this treatment in the identified harvest stands. The location of these temporary roads would be located in non-roadless areas, Special Forest Plan Emphasis Areas compatible with temporary roads, or the General Forest, Rangeland, and Grassland theme of the Idaho Roadless Area within the Scout Mountain and West Mink Inventoried Roadless Area (36 CFR 294.23 (c)).

    - Any crossing or utilization of pre- existing travel corridors impacted by potential temporary roads (permanent roads, ATV routes, trail crossings) would be repaired and restored to previous designations at completion of project. Any temporary roads created with this project and not associated with current travel management designation would be closed and re-habilitated upon harvest and project completion.

- Treat up to 23 miles of motorized and non-motorized trail sides as well as selected roadsides to help limit wildfire spread within and into the Wildland Urban Interface as well as other Forest Service values and infrastructure. This adds approximately 488 acres outside of the

treatments listed above and would consist of shaded fuel breaks (understory fuels limbed, thinned, and removed) in forested, and woodland vegetation (up to 300 feet each side) and trailside mowing/maintenance in brush dominated cover types (mowed 5-6 feet each side) where needed to help limit fire spread potential. Trails and roads where this work would occur is:

- Gibson Jack Motorized Trail #015
- Slate Mountain Motorized Trail #018
- Gibson Jack Non-Motorized Trail #014
- Sterling Justice Non-motorized Trail #505
- Cusick Creek Motorized Trail #010
- Kinney Creek Non-motorized Trail #292
- Lead Draw Motorized Trail #'s 109, 110, 133
- East Wild Horse Mountain Motorized Trail #004
- Midnight Creek Motorized Trail #058
- Elk Meadows Motorized Trail #'s 022 and 044
- Pole Canyon Motorized Trail # 029
- Microwave-Midnight/Outlaw Spring Road #'s 276 and 282
- Clifton Creek Road #006
- Scout Mountain Road #001
- Camp Taylor/Lower Tendoy Loop Road #'s 002 and 890

Several definitions are provided below for more context in an effort to address a common public comment theme received on CTNF vegetation projects regarding created openings and concern over clearcutting. Forest Service Handbook 1909.12 Land Management Planning: Chapter 60-Forest Vegetation Resource Management defines regeneration harvest as: "*Any removal of trees intended to assist in the regeneration of a new age class or to make regeneration of a new age class possible.* ***Regeneration harvest may be through even-aged or uneven-aged methods.***" **FSH defines a two- aged system as: "*A planned sequence of treatments designed to regenerate or maintain a timber stand with two age classes. A two-aged system is a form of even-aged management.***" FSH defines an uneven-aged system as "*A planned sequence of treatments designed to regenerate or maintain a timber stand with three or more age classes. Treatments include single-tree selection, and group selection regeneration methods*." **RFP defines a Created Opening as, "*An opening in the forest cover created by the application of even-aged silvicultural practices*.** (RFP Glossary-6)**."** Caribou RFP defines clearcutting as "A harvest in which all or almost all of the trees are removed in one cutting. Regeneration then occurs from (a) natural seeding from adjacent stands, (b) seed contained in the slash or logging debris, (c) advance growth, or (d) planting or direct seeding. An even- aged forest usually results." (RFP Glossary-5). The *USDA FACTS Definitions and Business Rules-4000 series* defines a stand clearcut as: "An even-aged regeneration or harvest method that removes **all** trees in the stand producing a fully exposed microclimate for the development of a new age class in one entry." and defines a stand clearcut with leave trees as: "An even-aged regeneration or harvest method that removes most trees in the stand producing an exposed microclimate for the development of a new age class in one entry. A minor (less

than approximately 10% of full stocking) live component is retained for reasons other than regeneration." In a clarification letterhead provided to resource managers, District Rangers, and Branch Chiefs by former Caribou Targhee Forest Supervisor Jerry Reese on the interpretation of created openings states "The aim of prescribed and wildland fire use is not to remove commercial timber. The maximum created opening size guidelines in the RFP do not apply to prescribed or wildland fire areas." **Prescribed fire treatments in the Lower Portneuf Cooperative Vegetation Management Project (LPCVMP) are NOT considered created openings** (Reese 2005).

The Regeneration Harvest in the LPCVMP proposed action will be done using a combination of Two-Age and Uneven-Age Silvicultural harvest methods; there is no clearcutting occurring in this project. Units treated with two-age systems would be considered created openings; units treated with uneven-age systems would not be considered created openings. Regarding two aged treatments, silviculture prescriptions and treatments will leave "sufficient residual trees representing **at least** approximately 10% of full stocking". Post treatment, a combination of seed trees, reserve trees, and relics including aspen would remain in the treatment units maintaining this minimum 10% of full stocking to create two-aged stands. There are zero openings greater than 40 acres within this project area (RFP 3-45). An approximate breakdown of harvest acres would be as follows: 85 acres of Two-Age Harvest and 469 acres of Uneven Age Harvest. As analyzed, the 85 acres of Two -Age Harvest are considered a created opening and would change the forest structure stage to seedling/sapling (with residual trees left as designated by silviculture prescription); the 469 acres of uneven age harvest as analyzed are not considered a created opening and would not change the forest structure stage, but provide open canopy conditions that are lacking in the landscape. It is expected that these harvest treatments will regenerate naturally to adequate stocking levels; however, fill in planting may be utilized as post treatment monitoring efforts are completed and unit specific needs are identified. These post monitoring efforts, any needed reforestation, associated tending/burning activities, and other sale area improvements would largely end up being included in Knutson- Vandenburg (KV) trust fund sale area improvement plans. Regarding slash piles generated from the harvest, deposits would likely be collected from purchaser and included in a brush disposal plan to cover the burning of slash piles and rehabilitation of landings specifically generated from the timber harvest.

There is harvest proposed in Scout Mountain Campground and adjacent to the summer home area. Silviculture personnel have coordinated closely with Westside recreation staff throughout the development of the project and will continue to work closely with them in the implementation of the project to ensure the recreational values in this area are treated with care.

The proposed 2,959 acres of prescribed fire (RX) occurs across forested, non-forested, and woodland vegetation areas. The effects of the non-forested and woodland treatments can be found in the Rangeland Specialist Report. There are approximately 1,177 forested acres within the proposed RX areas. Many of these treatments are designed in seral aspen and Douglas fir stands to promote aspen where it is available and promote more open canopy conditions, a feature lacking on the landscape. It is estimated that out of these 1,177 acres, a range from ~20-30% of these acres would change structure and canopy cover condition from mature/late seral closed canopy condition to seedling sapling (early seral) condition, ~30-40% of these acres would not change structure but shift from closed canopy to open canopy condition, and ~20-30% of proposed acres would not change structure or canopy cover condition but rather would experience reductions in understory density or not be effected at the patch scale. This would mimic a mixed severity disturbance in mosaic patterns across the prescribed fire areas and promote heterogeneity, making the landscape more resistant to large scale disturbance in the future.

The proposed 8,184 acres of mechanical treatment (Mechanical + Rx) occurs across forested, non-forested, and woodland vegetation areas. The effects of the non-forested and woodland treatments can be found in the Rangeland Specialist Report (see project record). There are approximately 4,031 forested acres within the proposed mechanical areas. These treatments are not expected to change forest structure, and a minor estimated portion of forested stands these treatments (~5%) would move from closed canopy to open canopy conditions. Most of the benefits derived from these treatments are more closely related to density reduction, hazardous fuels reduction within the wildland urban interface, promoting aspen where possible, promoting safe and effective wildfire response, and promoting fire adapted communities.

The proposed 488 acres of trail fuel break treatments outside of the treatments listed above would consist of understory fuels being limbed, thinned, and removed in forested and woodland vegetation (up to 300 feet each side) and trailside mowing/maintenance in brush dominated cover types (mowed 5-6 feet each side) where needed to help limit fire spread potential. Regarding forested vegetation, these treatments are not expected to change forested structure and are targeted at increasing wildland fire resiliency within the landscape.

The primary effect of the proposed treatments is the reduction in existing standing live trees in the short term and the rearrangement and reduction of fuels. Forest products will be provided to support the local economy as a byproduct of this work. Growing space would be made available for the remaining conifer and aspen through the reduction of density, which would increase growth and vigor. This growing space would result in the development of a new cohort, or age-class, of trees on the site, most of which would be aspen. The open canopy conditions that will be increased from the proposed treatments would ensure that a host of early seral (sun loving) plant species, not just trees, are maintained. The combination of reduced density, increased vigor, and increased species diversity would have the effect of reducing the risk of bark beetle and other native insects, which would reduce the risk that large old relic trees in the project area would be lost. The change in composition, structure and arrangement of fuels would be a reduction of the risk of an uncharacteristic fire disturbance and increasing resilience to potential changes in the climate (Halofsky et al. 2018).

The effects of the proposed activities would increase the resilience of the project area and the landscape to future disturbance and conditions (Halofsky et al. 2018). The proposed treatments would move the forested ecosystem within the project area toward desired condition and would contribute to moving the landscape toward RFP desired future conditions.

The proposed treatments and their effects are compliant with RFP standards and Guidelines related to management of forest vegetation and the RFP prescription areas affected. The resource indicators selected to display the effects are summarized in Table 17 and described in some detail in the paragraphs below.

Table 17 Resource indicators and measures for Proposed Action are shown below for the Lower Portneuf Project. The condition that will result from Proposed Action for the measure are shown and the landscape effect is shown in brackets.

Resource Element	Resource Indicator	Measure	Proposed Action Condition (Effect)
Landscape Risk	Landscape Fire Regime Condition Class	Fire Regime Condition Class and departure	FRCC 2 42% (-4%)
Landscape Structural Diversity	Forest Structure Stage by Canopy Cover Class	% seed/sap (all densities) % Young/mid (open canopy) % Young/mid (closed canopy) % late seral/mature (open canopy) % late seral/mature (closed canopy)	4% (+3%) 1% (+0%) 3% (+0%) 22% (+13%) 70% (-16%)
Composition	Aspen Health	% Low Risk (RCC >50%) % High Risk (RCC<50%)	59% (+32%) 41% (-32%)
Project area Forested Stand Risk	Risk to uncharacteristic disturbance	% FRCC 1 %FRCC 2 %FRCC 3	29% (+15%) 36% (-3%) 35% (-12%)
Aspen Improved	Seral Aspen Acres Treated	Approximate Acres	2,308
Fuels	Fuels Treated	Approximate Acres	12,185
Forest Product	Volume	CCF (hundred cubic feet)/ MMBF (million board feet) Tons	~8000 CCF/~4 MMBF

1 FRCC= Fire Regime Condition Class, 2 CCF= Hundred Cubic Feet, 3 MMBF= Million Board Feet

Landscape Risk

The proposed treatments would not lower the FRCC rating for the landscape. It would remain at a two. However, treatments would reduce the percent departure of the landscape from **46 percent to 42 percent; a 4 percent improvement.** The overall effect on the landscape risk is relatively low due to the relatively lower proportion of treatments that change forested structure versus the relatively higher proportion of intermediate level treatments where structural diversity is not the primary benefit, but rather other benefits such as reducing density, increasing height to crown (wildfire risk), decreasing probability of ignition/rate of spread (wildfire risk), etc. The effect on landscape risk is marginal but moves the landscape closer to desired conditions for vegetation. Much of the reason more action is not proposed at this time has to do with complying with hydrologic disturbance in the RFP. See Hydrology Specialist report in the project record for more information (Higginson, 2025).

Structural Diversity

The Proposed Action would result in an improvement in landscape scale structural diversity. The proposed treatments would redistribute **approximately 16 percent of the forested acres out of the mature/late seral closed canopy group into early development (3 percent), and late open (13 percent) while maintaining mid development in similar levels to existing condition rather than a slight departure away from desired condition when compared to the No Action alternative.** This shift moves the landscape closer to the DFCs. The treatments have been designed to create openings and reduce density which would create space for a new age-class (cohort) to become established and improve the health, vigor, and resilience of the trees that remain. Probability of regeneration in openings in this project area is high based on results of past treatments.

The design feature of retaining relics except for where otherwise specified by a Certified Silviculturist or by RFP direction (trees that survived the last major fire disturbance, i.e., old trees) in harvest units in combination with reducing density would aide in reducing risk of bark beetle and increase the probability that large old trees survive in the project area. The combination of natural succession and management activities would create a landscape that is more structurally diverse and closer to RFP DFC. Moving the landscape toward DFC would increase the resistance and resilience of the landscape to future climate related stresses (RFP, RFP FEIS, Kitchen 2019, Halofsky et al. 2018).

Composition/Aspen Health

The reduction in density and canopy openings created would result in a flush of new growth by early seral species such as aspen. The DFC is to have less than half the seral aspen stand acres at high risk. High risk is defined as stands classified as seral aspen functional type that have more than 50 percent relative canopy cover of conifer. Currently 78 percent of acres in the seral aspen functional type in the landscape are at high risk. The Proposed Action would reduce the acres at risk to 41 percent, a **32 percent reduction in acres at high risk,** at the landscape scale. This will create a more resistant landscape that will be more resilient to future disturbances by promoting and restoring aspen cover, which is also a desirable cover for wildfire resistance objectives.

Experience indicates there is a high probability that the growing space created in stands near aspen would be fully stocked with aspen seedlings in less than five years and they would advance to sapling size trees within fifteen years (i.e., there is a low probability of regeneration failure). Experience has shown that wildlife and domestic ungulate browsing is not a significant problem on this area of the forest. On site observations indicate that browsing is not currently an impediment to aspen regeneration. One of the project design features allows for resting treatment units from livestock use if needed until desired stocking is met to ensure objectives are met.

Condition Class of Project Area Forested Stands

The proposed prescribed fire, mechanical, harvest, and fuel break treatments would reduce density of conifer and create openings. It would create a new age-class by creating openings and reducing density which would move conditions closer to LANDFIRE reference conditions and closer to the desired future conditions of the RFP.

Across all biophysical settings there is a surplus of closed canopy late seral conditions and a shortage of open canopy and earlier age-class conditions. Historically open canopy conditions would have been common in a mixed severity regime where fire routinely burned, thinning conifer and creating small openings. The Proposed Action addresses the current overabundance of closed canopy late seral conditions by reducing density and creating openings for new age-classes to establish.

The proposed treatments were designed to improve condition class by moving acres from overrepresented structural classes to underrepresented classes. They would increase heterogeneity and move the landscape closer to RFP and LANDFIRE reference conditions. The Proposed Action **reduces acres in the project that are in condition class 3 from 47 percent to 35 percent, a 12 percent decrease in class 3.** The reallocation is as follows: stands in condition class 1 from 14 percent to 29 percent (+15 percent) and stands in condition class 2 from 39 percent to 36 percent (-3 percent).

Aspen Acres Treated

The proposed prescribed fire, mechanical, harvest, and fuel break treatments would increase overall aspen health and abundance on approximately **2,308 acres**. Treatments would improve regeneration, growth, and sustainability of aspen, a keystone species, and promote long-term resilience to disturbance within the landscape.

Fuels Acres Treated

The combination of proposed prescribed fire, mechanical, harvest, and fuel break treatments would reduce and or rearrange fuels on approximately **12,185** acres and restore forested ecosystem composition, structure, processes, functions, and promote long-term resilience by creating conditions that more closely resemble the historical environment while balancing the need to address potential for future large disturbance such as insect outbreaks or wildfire given existing conditions.

Forest Product

The Proposed Action would extract timber for forest products use from approximately 554 acres through regeneration harvest. Initial project volume estimates were based on a larger acreage and had an estimated volume per acre of ~14.5 CCF/acre (hundred cubic feet/acre). Current estimates result in approximately **8,000 CCF (4 MMBF)** (million board feet) of volume being offered for sale to support the local economy.

Approximately 283 acres worth of volume harvested (51% of the harvest acres) in this project area would contribute to the allowable sale quantity identified in the RFP, because it is in a timber emphasis prescription area (5.2b prescription area). On all acres treated with harvest, volume production is not a primary purpose of this project, it is a by-product of treatments to restore composition, structure, and function of the forested ecosystem closer to desired conditions. Harvest for these purposes is allowed in all affected RFP prescription areas (3.2 Semi Primitive Motorized, 4.1 Developed Recreation Sites, 4.3b Dispersed Camping Management). There are approximately 22 acres proposed for harvest in prescription area 2.1.3b Municipal Watershed. RFP 4-27 states that Timber harvesting is only allowed in municipal watershed areas on a site-specific basis for such things as public safety, visual quality, and/or long-term maintenance of vegetation to meet the goals of this prescription (Guideline). This harvest accomplishes the safety and long-term maintenance objectives. Treating these 22 acres combined with adjacent treatments will create more resilient vegetation conditions at the top of the watershed in the event a large disturbance is to occur. There is no temporary road construction planned for the harvest that is proposed in the municipal watershed; existing templates outside the municipal watershed will be utilized for the harvest (RFP 4-26, Roads Standard 1). There is no proposed harvest in the Research Natural Areas prescription area.

Vegetation Management Unit (Sub- watershed Encompassing) Scale Effects/Effects to Forested Structure in relation to RFP 3-19 Standards and Guidelines

Past management activities to present time have been accounted for in the existing condition described for this landscape and in Beck 2016b which assessed forest structure stages for VMUs and HUCs on the Forest. Regarding VMU 72 (cumulative effects boundary), there were 103 small fire occurrences (lightning strikes, campfire incidents, equipment/debris fires, firearms, etc.) documented in VMU 72 from 1986 to present (Count 103, Min 0.1 acres, Max 2,150 acres, sum of all fire acres 2,920, Mean 28 acres, Median 0.1 acres). The effects from many of these documented fires were either undetectable or barely detectable at the landscape/VMU scale; the added effect to forested vegetation to present has also been captured in existing condition described. The effects of the Proposed Action have been added to the existing condition for the purpose of analysis.

There are no present or future reasonably foreseeable activities proposed by Forest Service or nearby non-forest service agencies, private entities, or tribal activities that result in a change in forested structure. Any non-FS active vegetation management work currently in progress in close proximity to the VMU is related to thinning for hazardous fuels reduction. The analysis for the Caribou Prescribed Fire Restoration Project was cancelled indefinitely in summer 2024 by forest leadership.

Figure 18 Below shows the effects on the VMU and mature/late seral blocks should the Proposed Action be implemented as designed. Excluding the ~21% of forested acres in the Garden Creek- Marsh Creek HUC5, ~19% of forested acres within the Lower Portneuf River HUC5, and ~19% of forested acres within the Lower Bannock Creek HUC5 (all are part of VMU 72 cumulative effects analysis area) currently delineated as blocks that could tentatively be managed to attain old growth characteristics (TMAOG), and considering the change in forested structure anticipated effects of the proposed action, statistics have been calculated for the acres remaining in mature/late seral status in blocks greater than 200 acres. There are 11 additional blocks in VMU 72 greater than 200 acres (Count 11, Minimum 208, Maximum 5477, Sum 13408, Mean 1219). With approximately 25,473 total forested acres in VMU 72 and 13,408 acres remaining in blocks over 200 acres, this means that 53% of the forested acres will remain in blocks greater than 200 acres not even counting the TMAOG acres, or additional remaining mature/late seral forested acres not in blocks greater than 200 acres, that when combined comprise about 95% of forest structure stage condition in VMU 72. There are proposed treatments within the TMAOG blocks as currently delineated that are not expected to change forest structure but are expected to maintain or improve mature forest conditions. There are replacement block opportunities in all 3-5th code HUCS within VMU 72 as shown by Figure 18 . There are plenty of opportunities to identify acres to take the place of the TMAOG acres in the event replacement acres are needed and the proposed action would not move forested conditions outside compliance with RFP standards and guidelines.

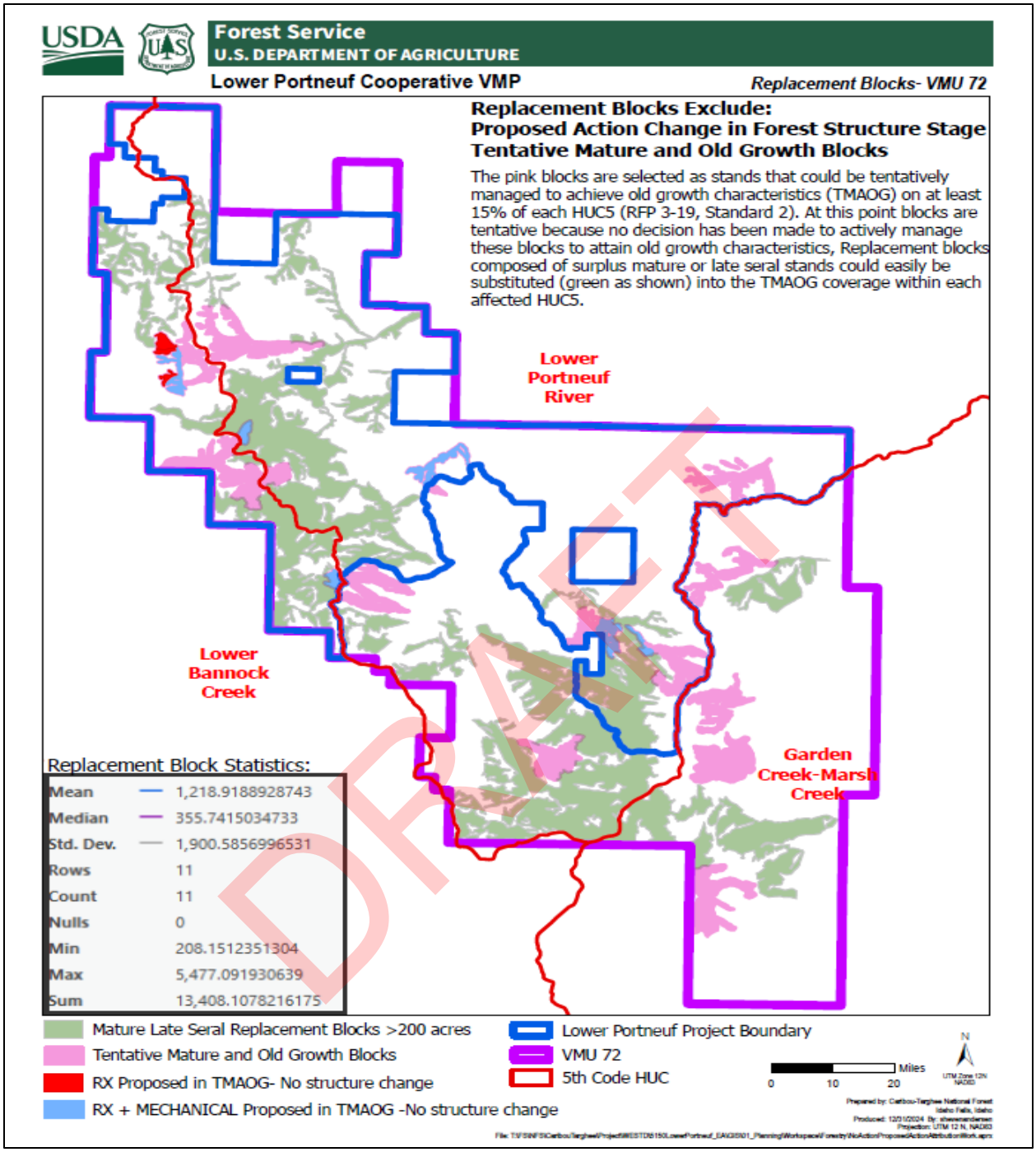

Figure 18 *Map showing the TMAOG forest acres (pink) that compose ~21% of forested acres in the Garden Creek- Marsh Creek HUC5, ~19% of the forested acres in the Lower Portneuf River HUC5, and approximately 19% of the forested acres in the Lower Bannock Creek HUC5 (Beck draft white paper, 2022). Map also shows the 11 replacement blocks greater than 200 acres (green) in mature/late structure classes located within VMU 72 excluding all anticipated change in structure from the proposed action (two age harvest, portions of RX fire stands). There are treatments proposed within portions of the TMAOG coverage as it is delineated but no change in forested structure is anticipated meaning there is not an anticipated need to reallocate these acres with replacement acres. It is anticipated that the prescribed fire and mechanical treatments in these areas would maintain or improve mature forest characteristics. In the event one of these stands were to change structure due to an unforeseen event during treatment (such as prescribed fire), there is ample opportunity to redesignate the TMAOG coverage and replace these acres.*

Compliance with RFP and Other Relevant Laws, Regulations, Policies and Plans

Roadless Rule

The Proposed Action of this project was designed to be compliant with the Idaho Roadless Rule. The Interdisciplinary Team briefed the Idaho Roadless Commission on June 11, 2024, and December 4, 2024. All correspondence from those proceedings can be found in the project record. A detailed breakdown of the 9,742 approximate proposed treatment acres located within roadless areas is included below in Figure 19 with reference to the management direction CFRs. Regarding temporary logging roads, there will be approximately 1 mile of temporary roads that occur in roadless areas to facilitate timber harvest. Most of this mileage will occur in the West Mink General Forest, Rangeland, and Grassland theme. There is also anticipated to be a small amount of temporary road building in the Scout Mountain Forest Plan Special Area theme as well to connect the landings to existing roads. Approximately 488 acres fall outside of proposed areas identified in the treatment areas described in the proposed action. These treatment areas that would be treated in the roadless areas fall along existing roads and trails and are approximately 59 acres of Backcountry Restoration (BCR) and 45 acres Forest Plan Special Area (FPSA) of the Scout Mountain IRA and approximately 167 acres BCR and 17 acres in FPSA of the West Mink IRA. All treatments comply with Idaho Roadless Rule (36 CFR 294.23(C), 36 CFR 294.24(D), 36 CFR 294.24(1)(C)(IV, V)).

Figure 19: *Breakdown of Proposed Activity Acres by Roadless Theme in relation to the 2003 Caribou Revised Forest Plan prescription areas. 36 CFR 294.23(C), 36 CFR 294.24(D), 36 CFR 294.24(1)(C)(IV, V)*

Lower Portneuf IRA Harvest + RX Acre Breakdown by RFP RX-Proposed Action			
RFP RX	Scout Mountain FPSA	West Mink GFRG	Total Acres BY RFPRX
4.3 (b) Dispersed Camping Management	86		86
5.2(b) Forest Vegetation Management		39	39
Grand Total	**86**	**39**	**125**

Lower Portneuf IRA Mechanical + RX Acre Breakdown by RFP RX-Proposed Action						
RFP RX	Scout Mountain BCR	Scout Mountain FPSA	West Mink BCR	West Mink FPSA	West Mink GFRG	Total Acres BY RFPRX
2.1.2(b) Visual Quality Maintenance		84		160		244
2.1.3(b) Municipal Watershed			2523			2523
2.2(a) Research Natural Area				133		133
2.7.2(d) Elk and Deer Winter Range	38		373			410
3.2(b, f) Semi Primitive Motorized	691		2676			3367
4.3 (b) Dispersed Camping Management		217				217
5.2(b) Forest Vegetation Management					177	177
	729	**301**	**5572**	**293**	**177**	**7072**

Lower Portneuf IRA RX Acre Breakdown by RFP RX-Proposed Action				
RFP RX	Scout Mountain BCR	West Mink BCR	West Mink FPSA	Total Acres BY RFPRX
2.1.3(b) Municipal Watershed		677		677
2.2(a) Research Natural Area			533	533
2.7.2(d) Elk and Deer Winter Range	50	634		684
3.2(b) Semi Primitive Motorized	20	631		651
	70	**1942**	**533**	**2545**

Old Growth Requirements RFP 3-19

RFP 3-19 Standard 2 states that: *In each 5th code HUC which has the ecological capability to produce forested vegetation, the combination of mature and old age classes (including old growth) shall be at least 20 percent of the forested acres. At least 15 percent of all the forested acres in the HUC are to meet or be actively managed to attain old growth characteristics.*

After evaluating the proposed activities, there were no stands within the Proposed Action that were confirmed to meet Region 4 old-growth definitions. Tentative blocks (TMAOG) have been identified composed of mature/late seral stands that could be managed to attain old growth characteristics should a formal agency decision be made to do so. That is not happening at this time. The Lower Portneuf landscape sits in a VMU (vegetation management unit) that includes portions of three 5th code HUCs (Garden Creek-Marsh Creek, Lower Portneuf River, and Lower Bannock Creek). The TMAOG blocks total approximately 21% of the forested acres in the Garden Creek-Marsh Creek HUC5, approximately 19% of the forested acres in the Lower Portneuf River HUC5, and approximately 19% of the forested acres in the Lower Bannock Creek, all respectively (Beck draft white paper, 2022). There are still 11 blocks greater than 200 acres in VMU 72 not counting the TMAOG blocks or other mature/late seral stands not in blocks greater than 200 acres (see cumulative effects above for more detail). There are replacement opportunities in all associated 5th code HUCS (see Figure 18 above). There are proposed treatments within the TMAOG blocks as currently delineated that are not expected to change forest structure but are expected to maintain or improve mature forest conditions. (see Figure 18 above). There are plenty of opportunities to identify acres to take the place of the TMAOG acres in the event replacement acres are needed and the proposed action would not move forested conditions outside compliance with RFP standards and guidelines.

Snag Requirements RFP 3-27

Forest wide snag assessments show that all relevant project area prescription areas are meeting or above 100% biological potential for woodpeckers. (see Existing Condition Assessment, Table 7 & Table 8 above). RFP 4-63 outlines direction for managing snags in Developed Recreation sites. Site specific areas may have snags removed for human safety and other resource management needs. Biological potential for woodpeckers is not a management consideration (RFP Standard). Hazard trees shall be removed to provide for public safety (RFP Standard). Snags would not be targeted during harvest operations other than in developed recreation sites as directed. The silviculture prescriptions would include direction to leave snags, except those that are determined to be a safety hazard; those would be removed in incidental amounts. The proposed burning treatments would consume some existing snags but would create way more than would be burnt. This creation of snags would contribute to the biological

potential of prescription areas mentioned above. Revised Forest Plan 3-27 outlines a guideline for live recruitment for snags; all silviculture prescriptions would be designed to meet live snag recruitment requirements.

Other Relevant Mandatory Disclosures

There would be a minor short-term loss of timber and forage production due to proposed temporary roads and related activities. At the Forest scale, this would not have a measurable effect.

Short-term Uses and Long-term Productivity

The Proposed Action would have short-term impacts that result from logging operations, such as temporary roads, skid trails, landings, and damage to residual trees.

These short-term impacts to productivity are far outweighed by the increase in long-term productivity. With reduced density, residual trees would grow quickly capturing growing space made available by the treatments. Aspen would increase in vigor and numbers which would help to maintain the long-term productivity of the forest habitat to all its users.

Irreversible and Irretrievable Commitments of Resources

There would be no irreversible effects to forest vegetation that are associated with the Proposed Action. There would be a minor irretrievable loss of forest vegetation benefits associated with construction of roads and landings. The production of acres affected by these features is lost until they recover. This is a minor irretrievable commitment but not irreversible. The landings and temp roads would be a very short-term loss.

Other Agencies and Individuals Consulted

The Bureau of Land Management- Pocatello Field office and the Shoshone- Bannock Tribes provided insight and history of the land throughout the project field trips as well as general encouragement for the proposed treatments. The Caribou Forest Initiative (CFI) group was briefed on this project at several quarterly meetings and a field trip to the project area. General input received from the CFI was incorporated into the design of the Proposed Action.

Acronyms

AIZ	Aquatic Influence Zone
ASQ	Allowable Sale Quantity
CC	Canopy Cover
CCF	One Hundred Cubic Feet
DBH	Diameter at Breast Height
DFBB	Douglas-fir Bark Beetle
DFC	Desired Future Condition
EIS	Environmental Impact Statement
FRCC	Fire Regime Condition Class
FSM	Forest Service Manual
FSS	Forest Structure Stage
GIS	Geographical Information Systems
HRV	Historic Range of Variability
HUC	Hydrologic Unit Code
IDT	Interdisciplinary Team
MFI	Mean Fire Interval
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NIC	Non-interchangeable Component
NRCS	Natural Resource Conservation Service
PWI	Project Work Inventories
RCC	Relative Canopy Cover
RFP	Revised Forest Plan
VMU	Vegetation Management Unit

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Appendix A- Maps

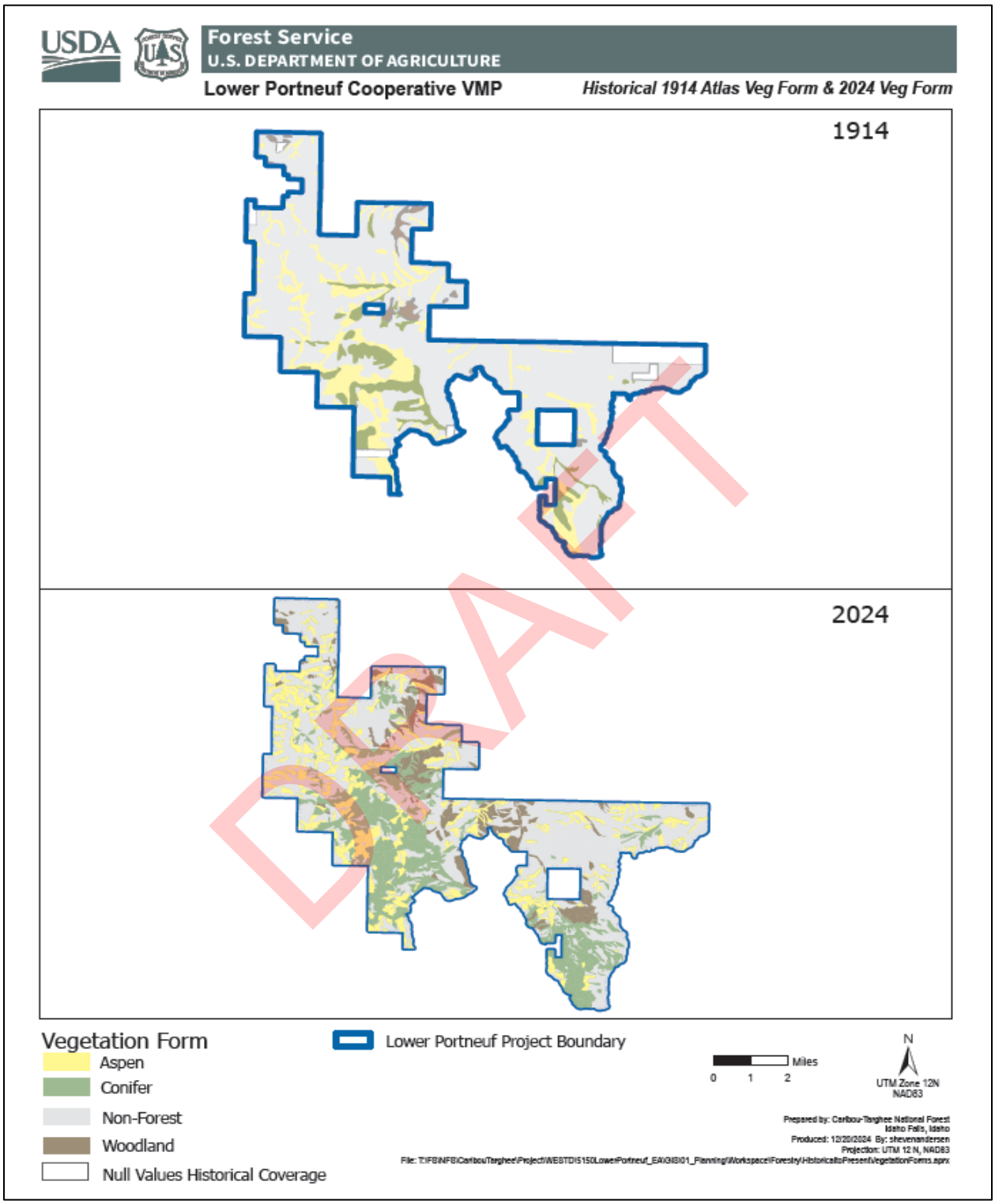

Figure 20: *This map shows the change in Vegetation form over the past ~100 years. Non-forest has decreased, while Forested and Woodland vegetation has increased. This is largely due to the lack of disturbance. Note: while aspen has increased in the dry aspen type, it has experienced notable decrease in the seral aspen type, which is much less resilient to wildfire. See Figure 3 above for more information.*

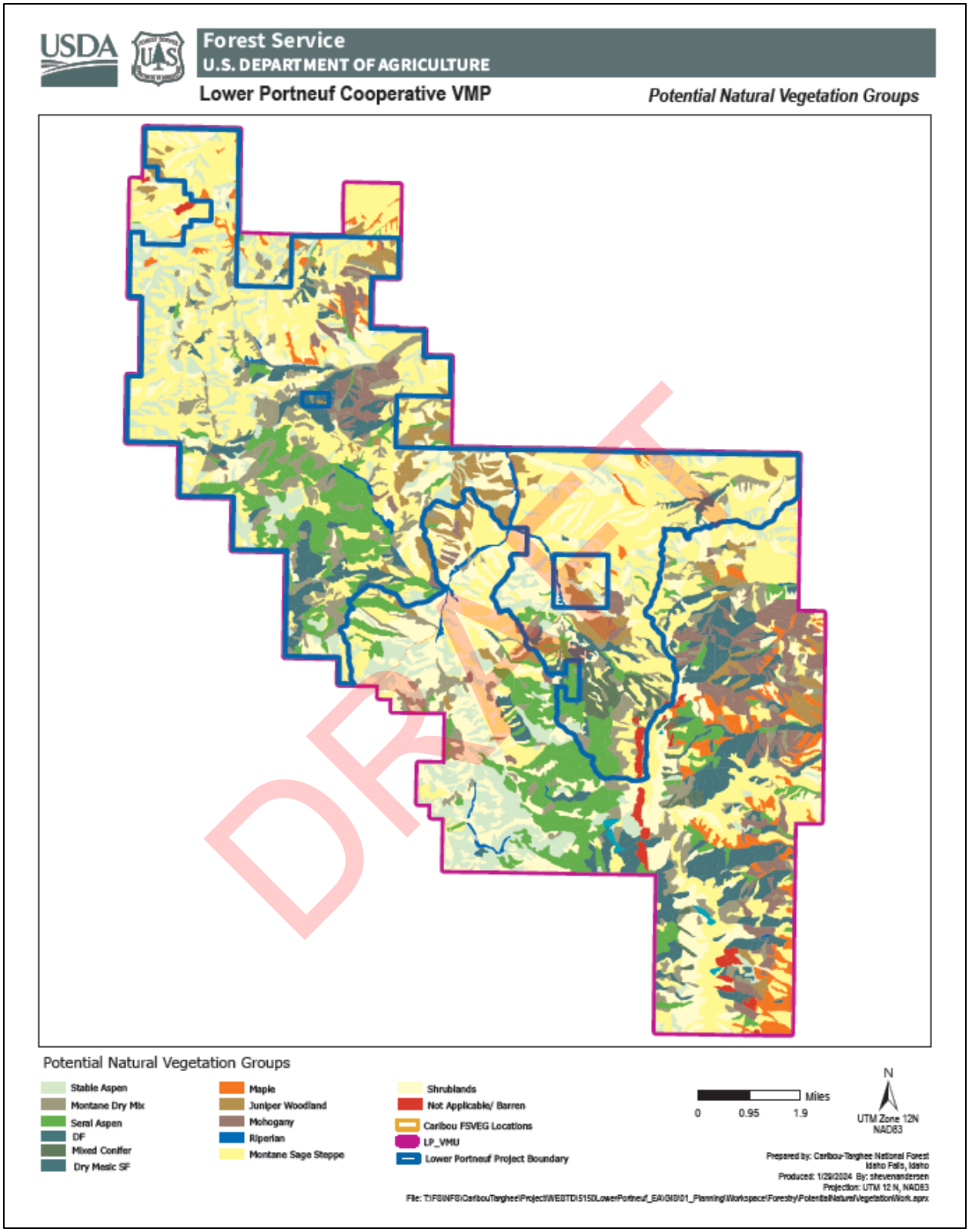

Figure 21: *This map shows the Potential Natural Vegetation groups located within VMU72. These were the strata's used within the landscape boundary to conduct the landscape Fire Regime Condition Class Assessment. See Figure 17 above for more information.*

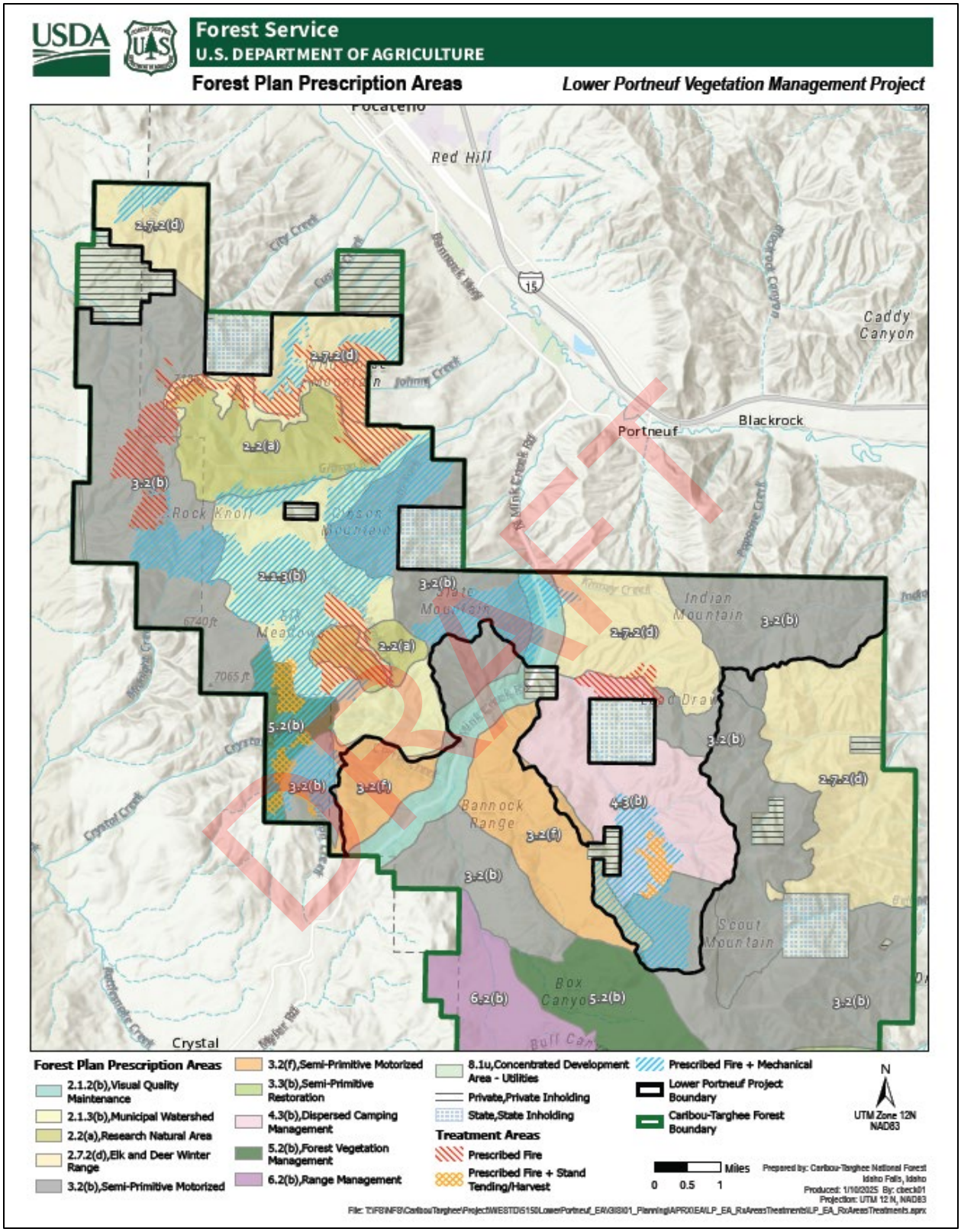

Figure 22: *This map shows the Proposed Action for the Lower Portneuf Cooperative Vegetation Management Project in relation to the forest plan prescription areas found in the 2003 Caribou RFP. Map Credit Cheryl Beck, GIS/Information Program Manager CTNF.*