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Biological Assessment

For Consultation with the U.S. Fish and Wildlife Service

Taylor Park Vegetation Management

Gunnison Ranger District, Grand Mesa, Uncompahgre and Gunnison National Forests
Gunnison County, Colorado

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Updated by Matt Vasquez on June 15, 2020
Updated per the Regional Administrative Review Team Response to Objections

- Updates add clarity to the effects analysis for lynx
- The updates are highlighted in gray, with footnotes

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Introduction

The purpose of this Biological Assessment (BA) is to address the effect of the Taylor Park Vegetation Management Project on ESA-listed species, listed as endangered or threatened under the Endangered Species Act (ESA), or their designated critical habitat. The Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests, Gunnison Ranger District intends to authorize the project through an Environmental Assessment (EA) and Finding of No Significant Impact. The Environmental Assessment for the project is available online at: https://www.fs.usda.gov/project/?project=53662

The project involves actively and adaptively managing vegetation to improve forest health and resiliency in the Upper Taylor River and Spring Creek drainages. It has the potential to impact the following ESA-listed species that occur in the area: Canada lynx (*Lynx Canadensis*) and North American wolverine (*Gulo gulo luscus*).

This BA submitted by the Gunnison Ranger District conforms to legal requirements set forth under section 7 of the Endangered Species Act (ESA) (19 U.S.C. 1536 (c), 50 CFR 402.12 (f) and 402.14). Section 7(a) (1) of the ESA requires federal agencies to use their authorities to further the conservation of listed species. Section 7(a) (2) requires that federal agencies ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of federally-listed species, or destroy or adversely modify designated critical habitat.

This document also includes types of information specific to analyzing projects under the Southern Rockies Lynx Management Direction (SRLA, USDA 2009). This helps ensure that the appropriate information is used in the effects analysis and provided to the U.S. Fish and Wildlife Service that leads to streamlined consultations on SRLA projects.

The purpose of the proposed action is to increase the forest's ability to respond to multiple and interactive stressors including climate change, drought, insect attack, or disease while promoting safety and reducing fuel loading in the Wildland-Urban Interface (WUI) and surrounding areas. The objectives are as follows:

1. Protect young healthy stands of lodgepole pine from infestation by dwarf mistletoe;
2. Remove dwarf mistletoe-infested stands;
3. Maintain tree growth rates in existing treatment areas through the use of pre-commercial thinning;
4. Produce lodgepole pine and Engelmann Spruce saw timber from suited timber in the watersheds;
5. Salvage of spruce bark beetle, mountain pine beetle and Douglas-fir bark beetle killed trees for commercial wood products;
6. Thinning of stands adjacent to private property to improve forest health and reduce fuels in WUI areas.
7. Use prescribed fire in lodgepole pine dominated forest where commercial timber harvest is not currently appropriate or practical due to poor access, rocky terrain, and steep slopes.

Description of the Proposed Action

Proposed treatments preliminarily identified for suitable sites within the project area are listed in table 1 and described in detail below. Ultimate acreage of each treatment may change over the course of the project. Treatments will be refined during implementation as additional inventory is completed or conditions change.

Table 1. Proposed treatments and estimated acres in the Taylor Park project.

Current Anticipated Treatment	Acres
Prescribed Burn	4,180
Hand Treatment of Dwarf Mistletoe in Wet Area	101
Clearcut / Dwarf Mistletoe Edge Clearcut	2,699

Clearcut POL[1]	135
Fuel Treatment (To Be Determined)	3,153
Group Selection	1,257
Group Shelterwood	424
Uniform Shelterwood	68
Non-Commercial DM Edge Clearcut	137
Overstory Removal	445
Precommercial Thinning and Sanitation	3,322
Survey and Sanitize	1,792
Total	17,714
Potential Treatment Areas Treatments (Infestation/Mortality)	29,095

Prescribed Burn

Forest Type: Lodgepole pine dominated.

In lodgepole pine dominated forest where commercial timber harvest is not currently appropriate or practical due to poor access, rocky terrain, and steep slopes.

It is desirable that the resulting forest condition be a mosaic of full canopy mortality mixed with areas of partial overstory mortality and areas with no overstory mortality. The management goal is for 1/3 to ½ the prescribed burn area to have near-full to full canopy mortality. The tool is to use stand-replacing prescribed burning to create short-range and short-duration crown fires which mimic presettlement forest fires.

In some individual stands, a target of 75% of the overstory trees are to be killed by fire in areas averaging 60 to 80 acres. The range of overstory mortality area can be from ¼-acre (for group torching) to 100 acres size. The range of mortality of overstory trees can be from 0% (no underburn or light underburn not causing overstory mortality) to 100% (full canopy mortality). In other stands the form of burning will be more of a “mosaic burn” with burning intensely in some areas, and totally avoiding other areas. There will be individual-tree and group torching of trees, particularly in badly dwarf mistletoe-infested centers. Mortality of understory trees is acceptable and reduction of pre-existing fuel loadings is desirable.

It is desired that young lodgepole pine stands embedded in the prescribed burn unit which are relatively free of dwarf mistletoe infestation be avoided by fire. Young stands can be partly shielded by non-commercial strip clearcuts around them, precommercial thinning of the young trees with hand piling and burning of slash.

Hand Treatment of Dwarf Mistletoe in Wet Areas

Forest Type: Lodgepole pine dominated.

In edge strips adjacent to young, healthy lodgepole pine with dwarf mistletoe infested lodgepole pine which are in or near riparian areas where mechanized harvest or mechanical treatment is not allowed.

Hand fell or girdle all live lodgepole pine which are or potentially infested with dwarf mistletoe within 100 feet of the young, healthy lodgepole pine. Slash is to be lopped and scattered to lay within two-feet of the ground. Retain other trees species including Engelmann spruce, subalpine fir, Douglas-fir, aspen, and limber pine.

[1] *In stands of lodgepole pine where tree diameter is generally less than sawlog standard (seven-inch DBH), stands are excessively dense, and the pine is infested with dwarf mistletoe, use a Clearcut of Products Other Than Logs (POL). The lodgepole pine is of a size class suitable for utilizations as fence posts, corral poles, and other roundwood products.*

Clearcut /Dwarf Mistletoe Edge Clearcut and Clearcut of POL

Forest Type: Lodgepole pine dominated.

Use this prescription in stands where lodgepole pine is the dominant tree species, disease and/or insects are present, overstory trees are mature to over mature, overstory decadence is making trees vulnerable to mortality or insect attack, where windthrow risk is moderate to very high restricting partial cut options, or where the merchantable volume per acre is too low for multiple regeneration harvest entries.

In lodgepole pine dominated stands adjacent to young healthy lodgepole pine, consider the application of a Dwarf Mistletoe Edge Clearcut where dwarf mistletoe is present.

In stands of lodgepole pine where tree diameter is generally less than sawlog standard (seven-inch DBH), stands are excessively dense, and the pine is infested with dwarf mistletoe, use a Clearcut of Products Other Than Logs (POL). The lodgepole pine is of a size class suitable for utilizations as fence posts, corral poles, and other roundwood products.

Remove all merchantable live and dead conifer greater than seven-inch DBH for lodgepole pine and eight-inch DBH for other live tree species, except those required to meet wildlife snag requirements.

In the **dwarf mistletoe edge clearcut** scenario (those areas surrounding young lodgepole pine stands) the area will be surveyed for presence of dwarf mistletoe, and if present, the edge generally within 100 to 300 feet of healthy, young trees would be harvested or non-commercially felled. Where edges are healthy lodgepole pine or other non-host tree species, harvest or treatment could be deferred. Where young stands are close to one another and edge cuts between would leave only a narrow strip of trees that would be vulnerable to windthrow, the entire strip would be removed.

In the **clearcut of products other than logs (POL)** scenario, the lower merchantable diameter limit could be down to one-inch DBH depending on product type.

Retain between 90 and 180 wildlife trees per 100-acres of all condition classes. Where insufficient dead trees are present to meet snag retention requirements (i.e., retention of standing dead trees to retain wildlife habitat), live lodgepole pine wildlife trees would be girdled to create wildlife snags. This would also reduce the spread of dwarf mistletoe, which requires a live host tree. Maintain a sufficient amount of downed logs (50 linear feet) for wildlife habitat and soil resource maintenance.

No individual clearcut would exceed the 40-acre limitation identified in the Forest Plan (III-43).

Fuel Treatment (To Be Determined)

Forest Type: All cover types.

In areas surrounding developed private land and high-use recreation areas.

Different tools may be appropriate for each element on site-specific basis. The intention is to set up an open ended mix-and-match approach. Treatments may include commercial harvest removal of a portion or all of trees, or non-commercial treatments conducted on site to reduce fuel loading and continuity, or a mixture of both commercial and non-commercial. Treatment units may range in size from ¼-acre to 100 acres depending on site-conditions and objectives in the unique area. Many of the other Prescriptions in this document articulate how then maybe implemented in the wildland-urban interface.

Approach fuel treatment in three elements:
- Surface fuel treatment
- Mid-canopy treatment
- Overstory canopy treatment

Surface Fuel Treatment

The goals at the surface are to reduce the volume of woody debris on site in terms of tons per acre, break up the continuity of that woody debris, reduce woody debris particle size down, compact or reduce fuel depths, and provide conditions favorable for woody debris decomposition. For the Taylor Park analysis, the target for ground fuel loadings in the wildland-urban interface is 3 to 10 tons per acre in all diameter classes, and 1 to 8 tons per acre of coarse woody debris in 3-inch plus diameter class. Where commercial timber harvest is utilized, whole-tree logging is encouraged to reduce fuel loadings.

Mid-canopy Treatment

The goal is to reduce ability of surface fire to climb upwards via "ladder fuels" into the crown of trees, where increased wind speed can cause fire intensification, spotting of embers, and spread via crown-to-crown fire.

Overstory canopy treatment

The goal is to break-up canopy continuity and create openings which will reduce the ability of crown fire to spread from crown-to-crown. Tree arrangements may vary as uniform, clumpy up to 33-feet across, groupy in areas from ¼-acre to 2-acres area, to individual trees left in an opening, to larger open areas. Since overstory tree sizes are larger, there are more opportunities for commercial harvest.

Group Selection

Forest Type: Engelmann spruce/subalpine fir and mixed spruce/fir/lodgepole pine (minor component).

Develop over time an uneven-aged stand with an irregularly-balanced diameter distribution and four age classes/stories present. Harvest between 20 and 30% of the spatial area of the stand in groups from ¼-acre to two-acres in size. If bark beetle mortality is present, up to 40% of the spatial area maybe harvested. Target for removal concentrations of live and dead Engelmann spruce, a portion of the Engelmann spruce over 16" DBH that are proportionately more prone to spruce beetle attack, dead lodgepole pine, decadent, insect-infested and diseased trees. If concentrations of spruce bark beetle mortality are encountered during sale preparation that are larger than two-acres, shift the prescription for that area to Salvage Clearcut/Overstory Removal. The mortality area could be integrated in the larger group selection unit as an extra-large group(s). Protect existing conifer regeneration within the stand, usually by not including young tree concentrations in cut groups. Do not harvest limber pine, Douglas-fir, or aspen if present. Obtain additional regeneration in open areas.

Retain between 90 and 225 wildlife trees per 100-acres of all condition classes. Where insufficient dead trees are present to meet snag retention requirements (i.e., retention of standing dead trees to retain wildlife habitat), live lodgepole pine wildlife trees would be girdled to create wildlife snags. This would also reduce the spread of dwarf mistletoe, which requires a live host tree. Maintain a sufficient amount of downed logs (50 linear feet) for wildlife habitat and soil resource maintenance.

Groups or Uniform Shelterwood

Forest Type: Lodgepole pine-dominated and mixed lodgepole pine/spruce/fir (minor components).

Use these prescriptions in stands of lodgepole pine dominance, and lodgepole pine with other tree species mixed in. Dwarf mistletoe is not present or at low enough levels that disease centers can be sanitized (stand dwarf mistletoe rating of 2 or less). Overstory is near or at rotation. There are four scenarios where shelterwood harvest is applicable:

1. A first entry to a three-step shelterwood is suitable where the basal area exceeds 140 to 160 square feet per basal area, the stand has not been previously shelterwood cut, or where the size of trees which could be removed falls more into the products other than logs class. This is referred to a shelterwood preparatory cut.

2. A second entry to three-step shelterwood, or a first entry to a two-step shelterwood, is applicable to stands with between 100 and 160 square feet per basal area, the stand has been previously shelterwood preparatory cut, or

merchantable volume is too low to justify more than two harvest entries. This type of treatment is referred to a shelterwood seed cut or establishment cut.

3. Uniform shelterwood may be used where forest product sales to smaller sized operators is anticipated, and windthrow risk is low or moderate.

4. Otherwise group shelterwood is recommended to accommodate mechanized felling operations, for mutual residual tree protection in higher windthrow risk situations, and provide sunnier site conditions favorable to lodgepole pine establishment.

For a preparatory cut, remove 30 to 35% of the basal area or spatial area, reducing overstory density to an average of 100 to 140 square feet basal area (considering groupy arrangement of residual trees). In uniform preparatory cuts, generally thin stands from below, allowing for development of more vigorous seed-producing trees for the future.

For seed cuts, remove 40 to 45% of the basal area or spatial area, reducing overstory density to an average of 60 to 100 square feet basal area, retaining the taller and healthier seed trees of all species. Trees maybe removed uniformly, or in groups of ¼-acre to 2-acres in size, across the stand to promote regeneration by allowing sunlight and nutrients to reach the forest floor. Seeds from the remaining overstory trees would germinate to foster regeneration. The neighboring residual trees would provide for partial shading of seed beds and protection of young trees from drying winds.

Retain between 90 and 180 wildlife trees in lodgepole pine and 90 and 225 wildlife trees in spruce-fir and Douglas-fir per 100-acres of all condition classes. Where insufficient dead trees are present to meet snag retention requirements (i.e., retention of standing dead trees to retain wildlife habitat), live lodgepole pine wildlife trees would be girdled to create wildlife snags. This would also reduce the spread of dwarf mistletoe, which requires a live host tree. Maintain a sufficient amount of downed logs (50 linear feet) for wildlife habitat and soil resource maintenance.

Schedule shelterwood reentries at 20-year intervals, with the removal of the remaining overstory trees in either in either 20 or 40-years.

Non-commercial Dwarf Mistletoe Edge Clearcut

Forest Type: Lodgepole pine dominated.

This prescription is intended for use in areas of Texas Creek which are currently poorly accessed by vehicle. In lodgepole pine dominated stands adjacent to young healthy lodgepole pine, where dwarf mistletoe is present, non-commercially fell and pile infested trees within 100-feet of young trees. This treatment is intended to protect young lodgepole pine, and to prepare for and compliment prescribed burning of the surrounding area.

Fell or girdle all live lodgepole pine which are or potentially infested with dwarf mistletoe within 100 feet of the young, healthy lodgepole pine. Felling maybe by hand, mechanical felling, or by mastication. Slash is to be hand or machine piled for burning. Where windthrow risk is low, retain other trees species including Engelmann spruce, Douglas-fir, aspen, and limber pine as individuals or in clumps.

Overstory Removal

Forest Type: Lodgepole pine and Engelmann spruce-subalpine fir.

In most applications, overstory removal is the final harvest of merchantable trees left from previous treatments (e.g., shelterwood seed cut). The stand is two-storied and two-aged, with an adequately stocked understory of healthy, young trees, overstory trees are mature to over mature, overstory decadence is making trees vulnerable to mortality or insect attack, dwarf mistletoe is less than DMR = 1, other diseases and/or insects are present, or where the merchantable volume per acre is too low for multiple harvest entries.

It should be expected that 50% of the advanced regeneration will be damaged or destroyed during the harvest. Thus an adequately stocked understory should have between 300 and 1,200 non-cull seedlings/saplings per acre prior to harvest.

Remove all merchantable live and dead conifer greater than eight inches DBH (seven-inches DBH for live lodgepole pine), except those required to meet wildlife snag requirements. Where windthrow risk is low, retain other trees species including Douglas-fir, aspen, and limber pine as individuals or in clumps. Protect existing healthy conifer advanced regeneration within the stand. Obtain additional regeneration in open areas.

Retain between 90 and 180 wildlife trees in lodgepole pine and 90 and 225 wildlife trees in spruce-fir per 100-acres of all condition classes. Where insufficient dead trees are present to meet snag retention requirements (i.e., retention of standing dead trees to retain wildlife habitat), live lodgepole pine wildlife trees would be girdled to create wildlife snags. This would also reduce the spread of dwarf mistletoe, which requires a live host tree. Maintain a sufficient amount of downed logs (50 linear feet) for wildlife habitat and soil resource maintenance.

No individual overstory removal unit would exceed the 40-acre limitation identified in the Forest Plan (III-43 to 48) unless the following standards can be met after harvest and post-harvest treatments:

> A minimum of 150 to 200 trees per acre (TPA) non-cull trees remain, preferable 300 to 540 TPA, with minimum stocking present on 75% of the harvested area, crown closure exceeds 30%, and average tree height is 25% of adjacent mature stands for areas of visual quality objective (VQO) retention or partial retention, or six-feet tall for VQO of modification and maximum modification.

Young Stand Precommercial Thinning and Sanitation or Survey and Sanitize

Forest Type: Lodgepole pine and mixed lodgepole pine/spruce/fir.

In dense, smaller-diameter lodgepole pine dominated areas (with a component of spruce and fir less than 5% of the stems) that are considered to be in a “dry lodgepole pine habitat”, where average tree age is between 30 and 70 years old (except younger in extremely dense sapling/pole stands), and the average crown base has risen to at least four to six feet above the ground due to self-pruning. Other tree species would be retained to enhance diversity. Dwarf mistletoe survey and sanitation would occur concurrent with the thinning.

If young Engelmann spruce and subalpine fir exceed 5% of the tree species composition, the site is considered habitat for snowshoe hare and Canada lynx, so no precommercial thinning would take place.

In young lodgepole pine stands that are not so dense and/or between 10 and 50 years age, a survey for dwarf mistletoe presence would be conducted at ten-year intervals, and if detected, diseased trees would be treated. If dwarf mistletoe is found to be present on more than 35% of the young lodgepole pine scattered throughout the stand, or in scattered disease centers throughout the stand, then the stand is considered “compromised” and no sanitation or precommercial thinning would be conducted. If diseased trees are grouped together in a small enough part of the stand and the rest of the young trees are clean, the diseased patches could be treated.

The intent of this treatment is the maintenance of desirable growth rates and promotion of tree vigor. Generally thin from below leaving the more dominant, healthy trees at a spacing of 8 to 12 feet between stems, depending on the size of the trees. Residual tree spacing is guided more by “crown spacing” of two to six feet between trees. Leave tree arrangement maybe more uniform in some areas, and more clumpy in others. Open areas are counterbalanced by denser areas. Where hand piling of slash and burning is indicated, slash bay openings up to 50-feet across will be created to accommodate the burning.

Not all of the stands identified as “Young Stand – Precommercial Thin and/or Dwarf Mistletoe Survey/Sanitation” will be thinned or sanitized during the next 10 years. During implementation surveys, stands not ready for thinning would be identified and slated for deferred treatment. Consideration of snowshoe hare and Canada lynx habitat needs may determine whether a thinning of a particular site would occur, or whether the treatment would be modified to maintain or

improve habitat conditions for the term. Stands will not be treated if they are found to be "compromised" by dwarf mistletoe, or if the condition of the trees is found to be too poor to respond to thinning release.

Table 2. Estimated miles of road for project implementation.

Road Type	Approximate Miles
Open Public Roads (to be used for commercial and non-commercial operations)	181
Open Public Roads (to be used for non-commercial operations)	74
Administrative Roads	34
Temporary Roads: Existing Foot Print	24
Temporary Roads: New Construction	23

Access

The existing road network would be used to the maximum extent possible to access the proposed treatments and to remove forest products. For commercial or mechanical treatments, existing roads may be supplemented by using existing footprints of closed roads or past temporary roads and constructing new temporary roads only when necessary; criteria are indicated below. Per Forest Direction there would be no increase in road density open to the public.

We would not develop any new permanent roads for this project. Any currently closed administrative roads that would be opened for project implementation would be closed upon project completion. At no time would temporary or administrative roads be open to public use. We would retain the open road and trail system, as defined by the 2010 Gunnison Travel Management Plan Decision and displayed on the current Motor Vehicle Use Map for the Gunnison Ranger District.

Road Maintenance

National Forest System roads being used for the project that are in functioning condition would be maintained during project implementation. Maintenance preserves the function of the road but generally does not include improvements. Maintenance activities generally include: blading; brushing; removal of roadside hazard trees; repair and/or replacement of road surfaces; cleaning, repair, or installation of drainage structures such as culverts, ditches, and dips; dust abatement; removal and installation of closure barriers, and installation or repair of signs. Maintenance activities generally do not disturb ground outside the existing roadway (toe of fill to top of cut) other than removal of material around culvert inlets and cleaning of outlet ditches.

Road Reconstruction

Reconstruction generally includes work to improve and restore roads, or to bring them back up to the original design standard. Improvements would provide for serviceability for project haul vehicles, as well as for proper hydrologic function and stream protection in accordance with applicable Best Management Practices. Actions can include surface improvement; construction of drainage dips, culverts, riprap fills or other drainage or stabilization features with potential disturbance outside the established roadway (toe of fill to top of cut); realignment; and widening of curves as needed for log trucks and chip van passage. Reconstruction also includes the actions included in the Maintenance category, including removal of roadside hazard trees. Reconstruction includes the replacement of unsustainable existing roads with new, designed roads, as well as decommissioning of the prior unsustainable road.

Temporary Road Construction/Reconstruction

A temporary road network for access to treatment areas has been estimated for the purpose of analysis. Final temporary road alignments would be determined during implementation. Temporary roads have been distinguished between new construction and use of existing footprint. Expected actions for temporary road construction/reconstruction include vegetation clearing, excavation and/or embankment, blading and shaping, out-sloping, drainage dips, and water-spreading ditches, and may include importing of armoring and surfacing rock material, as needed. More embankment and drainage structures would be utilized when there are adjacent resource concerns (perennial and intermittent stream crossings, high soil erosion hazard, steeper side slopes, etc.).

Road Decommissioning

All roads constructed for this project would be decommissioned within five years of the close of the associated commercial sale. Retention of any project road in the National Forest System would require an additional, separate project level NEPA analysis and decision, and must be informed by a travel analysis process.

Furthermore, existing roads used for the project implementation that are not identified as National Forest System roads would also be decommissioned within five years of the close of the associated commercial sale.

Adaptive Implementation

The Taylor Park Vegetation Management Project will be using Adaptive Implementation similar to that which was developed for the Spruce Beetle Epidemic and Aspen Decline Management Response (SBEADMR) Project. The prescriptions and design features will depend upon on-the-ground conditions at the time of implementation. Lessons and information learned since implementation of SBEADMR will be incorporated into this project. The following tools will be used to determine actual treatments:

- Silvicultural Prescription Matrix – would be used to identify which and how various stands will be treated to achieve management objectives, see Appendix A. Detailed silvicultural prescriptions will be completed by a certified silviculturist by comparing current versus desired vegetative conditions.

- Design Features – would be applied to treatments to minimize or avoid undesirable impacts to resources including, but not limited to, vegetation, soils, water, wildlife and cultural resources. Design Features are incorporated into both action alternatives and their effects analyses. The appropriate design features would be applied when surveys or management activities indicate a need to do so. It is also assumed that design features will be implemented as designed and in a readily visibly effective way. Analysis completed in this document assumes implementation of the appropriate design features, see Appendix B.

- Pre-Treatment Checklist – tracking tool would document that all required surveys and compliance checks for an individual treatment have been completed. The checklist will also identify design features that would be applied to a particular treatment. For example, the presence of a Northern goshawk nest in a treatment area would trigger the avoidance/protective measures as specified in the design features of the EA. As such, the checklist would assure treatments are implemented consistent with the EA. The checklist will also be used to confirm compliance with the Forest Plan.

- Annual Interdisciplinary and Management Review – a monitoring method that provides documentation that treatments are implemented as planned.

Species and Critical Habitat Considered and Analyzed

The following list includes threatened, endangered, and proposed species, and/or designated critical habitat that are located on the GMUG National Forest, or are located adjacent to or downstream of the project and could potentially be affected. This list of species was obtained from U.S. Fish and Wildlife Service (IPaC site https://ecos.fws.gov/ipac/). A

pre-field review will be conducted prior to projects being planned. Data generated from the surveys will be used to plan treatments both to benefit various wildlife species and to avoid or minimize potential impacts. The Treatment Design Checklist will be used to document that required surveys have been completed as well as identifying which design features will be applied to a specific treatment. Required monitoring and annual reporting to Fish and Wildlife Service is discussed in the monitoring section of this BA.

No further analysis is needed for species that are not known or suspected to occur in the project area, and for which no suitable habitat is present. Table 3 documents the rationale for excluding a species. If suitable but unoccupied habitat is present, then additional survey is needed, or presence can be assumed and potential effects evaluated.

Table 3. Federal Threatened, Endangered or Proposed Species That May Occur in the Action Area.

Common Name	Scientific Name	Status	Known/ Suspected to be Present	Suitable Habitat Present	Designated Critical Habitat Present	Status and Rationale *if Not* Carried Forward for Analysis
Canada lynx	*Lynx canadensis*	Threatened	Yes	Yes	No	Present
North American wolverine	*Gulo gulo luscus*	Proposed Threatened	No	Yes	No	Not known to occupy in the State of Colorado, however suitable habitat is present, brief analysis is below.
Gunnison sage-grouse	*Centrocercus minimus*	Threatened	No	No	No	No suitable sage-brush habitat is present in the project area
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	No	No	No	No suitable canyon or dense mix-conifer habitat is present in the project area
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	No	No	No	No suitable old-growth riparian (cottonwood/willow) woodlands with dense understories is present in the project area.
Uncompahgre Fritillary Butterfly	*Boloria acrocnema*	Endangered	No	No	No	No suitable alpine habitat is present in project area.

Consultation to Date

Clay Speas, Renewable Resource Staff Officer with the GMUG NF met with Kurt Broderdorp and Allison Jehly from FWS, Grand Junction Office on June 14, 2018 to discuss the Taylor project and the adaptive approach proposed. GMUG NF initiated consultation on Alternative 1 on November 26, 2018, and received a concurrence letter on December 3, 2018 (Tails: 06E24100-2018-I-0619). On October 24, 2019 Mathew Vasquez contacted Allison Vendramel with FWS via email, disclosing that a new alternative was developed (Alternative 2 Collaborative Developed Alternative) and provided the Draft Purpose and Need and Proposed Action and Alternatives Document.

Species Evaluated in Detail

North American wolverine

On October 18, 2016 (81 CFR 71670), the U.S. Fish and Wildlife Service reopened the comment period of the February 4, 2013 proposed rule to list the distinct population segment of wolverine occurring in the contiguous United States as threatened, under the Endangered Species Act of 1973 (Act), as amended. The District Court for the District of Montana vacated the August 13, 2014, withdrawal of the proposed rule to list the distinct population segment of the North American wolverine as threatened under the Act, which effectively returns the process to the stage of the proposed listing rule published in 2013. This initiates a new status review of the North American wolverine, to determine whether this distinct population segment meets the definition of an endangered or threatened species under the Act.

The wolverine is included in this analysis because proposed management activities involve suitable habitat that may be occupied. There once was a viable population of wolverine in the state, however the last confirmed record was from 1919. Twelve survey efforts from 1979-1996 yielded no confirmed sightings. Colorado’s high elevation and rugged terrain are good wolverine habitat, but because the species naturally exists in extremely low numbers wherever it is found, the species was never numerous here. In 2009, researchers from Grand Teton National Park tracked a wolverine into north central Colorado. In addition, a wolverine was documented as a traffic-related mortality on Interstate 70 in 2012 within Region 3 of the Colorado Department of Transportation (CDOT 2012). It is estimated that Colorado has the potential to support approximately 100 animals at full carrying capacity.

Given that all potential habitat associated with the proposed action is currently unoccupied there will be no direct effect to the species. However, if the species is eventually reintroduced to or recolonizes Colorado, activities such as vegetation management and fuels reduction are not expected to have measureable influences on wolverine habitat because changes in vegetative characteristics has little affect to the species. According to the Fish and Wildlife Service the primary threat to the North American wolverine is from habitat and range loss due to climate warming. Wolverines inhabit habitats with near-arctic conditions wherever they occur. In the contiguous United States, wolverine habitat is restricted to high-elevation areas in the West. Other threats are minor in comparison to the driving primary threat of climate change; secondary threats include harvest, i.e., trapping; inadequate regulatory mechanisms to protect against human recreational disturbance, infrastructure developments, and transportation corridors; and demographic stochasticity and loss of genetic diversity due to small effective population sizes.

Canada lynx

The Canada lynx was listed as threatened by the U.S. Fish and Wildlife Service on March 24, 2000. Lynx are broadly distributed across most of Canada and Alaska, which combined encompass about 98% of the species breeding range. The contiguous U.S. distinct population segment (DPS) accounts for the other 2% and includes resident breeding populations in the boreal forests of northern Maine, northeastern Minnesota, northwestern Montana/northern Idaho, and north-central Washington. An introduced population also occurs in western Colorado, and several other areas may have historically supported small resident populations. Lynx also have occurred temporarily in many other states, typically during irruptions (mass dispersal events) from Canada when northern hare populations underwent dramatic cyclic declines roughly every 10 years.

By the late 1970’s the Canada lynx was thought to be extirpated in Colorado. Because of Colorado's isolation to the nearest lynx populations in Montana and northern Wyoming, reintroduction seemed to be the only viable option to return lynx to Colorado. So in 1999, The Colorado Lynx Reintroduction Program, (CPW) was started. In a seven-year period, 218 lynx were introduced into Colorado.

Based on breeding surveys, monitoring results, and completion of the program's original goals, CPW declared the lynx reintroduction a success in 2010. Today, an estimated 150-250 Canada lynx are in Colorado. Lynx have been confirmed to be present on the GMUG National Forest by Colorado Parks and Wildlife researches. Researches used radio-telemetry to

also confirm reproduction on the GMUG. In addition, the SRLA identifies all lynx habitat for the National Forests in the Southern Rocky Mountains as occupied.

Management Direction for Canada Lynx

The Canada lynx was listed as threatened largely due to a lack of regulatory mechanisms on federal public lands, which is where a majority of the habitat for Canada lynx was believed to be located in the lower 48 states. Since receiving ESA protection, federal land managers throughout the lynx's range have formally amended their management plans and implemented conservation measures to conserve the species. In 2008, the Southern Rockies Lynx Management Direction Record of Decision on the SRLA was published, which integrated the Canada Lynx Conservation Assessment and Strategy (LCAS, Ruediger et al. 2000, Interagency Lynx Biology Team 2013) and Ecology and Conservation of Lynx in the United States Science Report (Ruggiero et al. 2000) into standards and guidelines and amended the Forest Plan (USDA 2008). The purpose and need for the amendment was to establish management direction that conserves and promotes the recovery of lynx, and reduces or eliminates potential adverse effects from land management activities and practices on National Forests in the southern Rocky Mountains, while preserving the overall multiple-use direction in existing Forest Plans. In May 2009, the Forest Service published an Implementation Guide for the SRLA (USDA 2009). The Implementation Guide provided the basis for much of the interpretation of the SRLA used in this analysis.

Most recently, in January of 2018 the U.S. Fish and Wildlife Service announced the availability of the Final Species Status Assessment (SSA, USDI 2017) Report for the Contiguous U.S. DPS of the Canada lynx. The SSA compiles the best available scientific information regarding the historical, current, and potential future conditions for lynx in the lower 48 states. It evaluates the DPS's viability considering climate change, forest management and related regulations, wildland fire management, and other potential sources of habitat loss and fragmentation. The report incorporates the formally-elicited opinions of recognized lynx experts from throughout the DPS range regarding the current and future status of, potential threats to, and likely viability of resident lynx populations in the DPS. Although this document will be referenced in this analysis, current Forest Service direction applies and the analysis will meet the intent of the SRLA.

Objectives, Standards and Guidelines Applicable to the Tayler Park Project

The following objectives, standards and guidelines are applicable to the Taylor Park Project:

- Objective ALL O1: Maintain or restore lynx habitat connectivity in and between Lynx Analysis Units (LAUs), and in linkage areas.
- Objective VEG O1: Manage vegetation to mimic or approximate natural succession and disturbance processes while maintaining habitat components necessary for the conservation of lynx.
- Objective VEG O2: Provide a mosaic of habitat conditions through time that support dense horizontal cover, and high densities of snowshoe hare. Provide winter snowshoe hare habitat in both the stand initiation structural stage and in mature, multi-story conifer vegetation.
- Objective VEG O3: Conduct fire use activities to restore ecological processes maintain or improve lynx habitat
- Objective VEG O4: Focus vegetation management in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover.
- Standard VEG S1: If more than 30% of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects.
- Standard VEG S2: Timber management projects shall not regenerate more than 15% of lynx habitat on NFS lands within an LAU in a ten-year period. Salvage harvest within stands killed by insect epidemics does not add to the 15%, unless the harvest treatment changes the habitat to unsuitable.

- Standard VEG S5: Pre-commercial thinning may occur only: 1) within 200 feet of administrative sites, dwellings, outbuildings, etc.; 2) for research studies; 3) where aspen is in decline; 4) where based on peer reviewed and accepted information that the project is not likely to adversely affect lynx or that a project is likely to have short term adverse effects but would result in long-term benefits to lynx and its habitat; and 5) may occur where pre-commercial thinning does not exceed 1% of the lynx habitat in any LAU for the life of the amendment; and pre-commercial thinning in LAUs with more than 30% of the lynx habitat currently in the stand initiation structural stage is limited to areas that do not yet provide winter snowshoe hare habitat; and projects are designed to maintain lynx habitat connectivity and provide snow shoe hare habitat over the long term; and monitoring is used to determine snowshoe hare response.

- Standard VEG S6: Vegetation management projects that reduce winter snowshoe hare habitats in multi-story mature or late successional conifer forests may occur only: 1) within 200 feet of administrative sites, dwellings, outbuildings, etc.; 2) for research studies; 3) incidental removal during salvage harvest and 4) when uneven-aged management (resiliency – single tree and small group selection) are employed to maintain and encourage multi-story attributes as part of gap dynamics.

- Guideline VEG G1: Vegetation management projects should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority for treatment should be given to stem-exclusion, closed-canopy structural stage stands to enhance habitat conditions for lynx or their prey (e.g. mesic, monotypic lodgepole stands). Winter snowshoe hare habitat should be near denning habitat.

- Guideline VEG G4: Prescribed fire activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.

- Guideline VEG G5: Habitat for alternate prey species, primarily red squirrel, should be provided in each LAU.

- Guideline VEG G10: Fuel treatment projects within the WUI as defined by HFRA should be designed considering Standards VEG S1, S2, S5, and S6 to promote lynx conservation.

- Guideline VEG G11: Denning habitat should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris, piles, or residual trees to provide denning habitat in the future.

Environmental Baseline

Canada Lynx

Forest Condition

The Gunnison Ranger District has approximately 285,000 acres of lodgepole pine-dominated forest with an additional 162,000 acres of lodgepole pine mixed with other dominant tree species. Extensive surveying estimates that 52 percent of those lodgepole forests, or approximately 232,000 acres, have some level of dwarf mistletoe infestation.

Dwarf mistletoe is a parasitic plant exclusively hosted by conifers primarily impacting trees by disrupting nutrient cycling that can strongly influence forest structure and dynamics. Lodgepole pine dwarf mistletoe (*Arceuthobium americanum*) is considered especially lethal. It spreads primarily through explosive ejection of its seeds from hydrostatic pressure in the fruits allowing a spread distance of 50 to 75 feet, although most seeds fall within 33 feet of the host tree or on other parts of the same tree. Dwarf mistletoe weakens host trees, making them more susceptible to mountain pine beetle and pine engraver mortality, increases risk of wildfire mortality, increases surface fuel loadings, and mistletoe brooms act as fuel ladders which can carry surface fire higher up into the tree canopy. Heavily infested stands lose approximately eight

percent of their trees each decade. In stands that have been impacted for more than 80 years, up to 15 percent of the trees may die each decade.

Of the acres of proposed treatment in the Taylor Park Project, the primary goals for 17,714 acres is to reduce the amount of ladder fuels, regenerate lodgepole pine stands to create a mosaic of age-classes across the landscape and reduce incidence of dwarf mistletoe using mechanical methods and prescribed fire. Although there are a few positive aspects of dwarf mistletoe on wildlife including:

- Shoots of the dwarf mistletoe plant, which may be used as a food source
- Witches' brooms, which may be used by some animals for nesting, denning, hiding, caching, or foraging.

There are considerably more negatives (Worrall 2018):

- Decrease in number and size of seeds produced by the host tree, which reduces food for animals that use the seeds for food.
- An increase in mortality of host trees, which may influence animals through a change in the dynamics or size of snags.
- Through growth inhibition and mortality of the host species, the vegetation type may gradually change, influencing animals in various ways.

Since the early 1960s, the GMUG has made progress on regenerating diseased lodgepole pine stands and ensuring that those regenerating stands are free of dwarf mistletoe, or "sanitized". In the Taylor Park EA analysis area, 6,363 acres of lodgepole pine has been previously regenerated and sanitized on suited lands. There is a need to expand upon that progress and continue to increase the size and extent of lodgepole pine forest that is relatively free of dwarf mistletoe infestations. The key tool for achieving the primary project purpose of sanitizing dwarf mistletoe infested tree stands is to identify then remove infected trees stands within 150 feet of healthy tree stands. The best tool for removing the infected trees is through commercial timber harvest. The desired outcome from proposed harvest activities is regenerated healthy stands of lodgepole pine free from dwarf mistletoe while reducing fuel loads concurrently.

Areas of spruce-fir and quaking aspen forest across the National Forest have been the focus of commercial and noncommercial mechanical treatments, prescribed fire and other treatments to restore ecosystem resiliency under the SBEADMR project since 2016. The Taylor Park project would complement the SBEADMR project by regenerating lodgepole pine to create a diversity of age classes, reducing incidence of mistletoe, improving spruce resiliency, and managing wildland/urban interface fuel loading in forest types outside of, but adjacent to, those addressed by SBEADMR.

Lynx Habitat Details

Specific details of environmental baseline for lynx include current condition and trend of affected Geographic Areas (GA), Lynx Analysis Units (LAU) and Lynx Linkage Areas (LLA), assessment of snowshoe hare and red squirrel habitat, influence of roads, and existing snow compaction levels in affected LAU and LLA. Cumulative effects are assessed at the LAU scale.

Table 4 discloses baseline statistics for objectives, standards and guidelines from the SRLA. The SRLA established forest-wide caps and LAU caps that are tracked annually and reported to Fish and Wildlife Service. All caps are considered maximum acres of impact that can occur over the life of the Amendment.

Table 4. Management direction and standards and associated habitat impact caps under VEG S1, S5 and S6, SRLA (USDA 2008).

Management Objectives	Standard	Standard - Forest- wide or LAU acre limitation (2008)	Standard - Forest-wide or LAU acres remaining as of 2018. Data includes maximum acres affected from SBEADMR	Comments
All Management Practices and Activities - Objective O1: Maintain or restore lynx habitat connectivity in and between LAUs and in linkage areas. Objective VEG O2 – Provide for a mosaic of habitat conditions through time to support dense horizontal cover, and high densities of snowshoe hare. Provide winter snowshoe habitat in both the stand initiation structural stage and in mature, multi-story conifer vegetation. Objective VEG O3 – Conduct fire use activities to restore ecological processes and maintain or improve	All S1 Standard– New or expanded permanent developments and vegetation management projects must maintain habitat connectivity in an LAU and/or linkage area. Influence of roads and Highways Seasonal Average Daily Traffic counts (SADT) range from a high 851 at Taylor Canyon Road near Spring Creek Road to a low of 113 at Cumberlin Pass Rd near Town of Tincup.	None	None	Attainment occurs at the project-level through project layout and implementation of Design Features. There are no linkage areas included in the project area.
	Standard VEG S1 – If more than 30 percent of the lynx habitat in an LAU is currently in the stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects	LAU level standard – cannot exceed 30 percent of an LAU in an unsuitable condition.	Acres remaining for affected LAU: Rocky Brook: 8,117 Grizzly Peak: 4,948 Fossil Ridge: 9,647 Tincup: 10,182 Upper Taylor: 8,379	
	Standard VEG S2 – Timber Management shall not regenerate more than 15 percent of lynx habitat on NFS lands within the LAU over a 10-year period.	LAU level standard – cannot exceed 15 percent of an LAU in an unsuitable condition from management actions.	Acres remaining for affected LAU: Rocky Brook: 8,117 Grizzly Peak: 4,948 Fossil Ridge: 9,647	

			Tincup: 10,182 Upper Taylor: 8,379	
	VEG S5 Standard – Pre-commercial thinning practices and similar activities intended to reduce seedling/sapling density are subject to within 200 feet of administrative sites, dwellings, or out- buildings or conifer removal in aspen where aspen is in decline.	Exemption-Pre-commercial thinning in WUI is limited to 3% of the total lynx habitat on the Forest. Total acres available = **42,424**	**42,293**	A total of **131** acres of WUI treatment has been completed or 0.3% of the total CAP.
		Exceptions 1-4 (VEG S5) and exceptions 1-3 (VEG S6) allow combined treatment up to 0.5% of the lynx habitat on the Forest. Total acres available = **7,071**	**2,978**	A total of **4,093** acres under exceptions 1-4 in VEG S5 and Exception 1-3 in VEG S6 is affected or 30% of the CAP.
	Standard VEG S6 – Vegetation management treatments that reduce snowshoe hare habitat in multi-story spruce-fir mature or late successional conifer forest may only occur: 1) within 200 feet of administrative sites, outbuildings, recreation sites, etc; 2) for research studies; 3) for incidental removal during salvage harvest; or 4) when uneven aged management (single tree or group selection) are employed to maintain or encourage multi-story attributes.			

Geographic Areas (GA)

Geographic Area Assessments were completed on the GMUG in 2005 (USDA 2005). Assessments were completed for 5 Geographic Areas (GA) on the Forest – Uncompahgre Plateau, Grand Mesa, San Juan Mountains, North Fork and Gunnison Basin. These GAs provide a way of linking broad-scale forest assessment and project-level analysis. The GA describes current vegetation conditions, wildlife structural stages, Potential Natural Vegetation (PNV) and how the proposed actions influence these factors. The Taylor Park project is wholly within the Gunnison Basin GA. This assessments will be used throughout this analysis to describe current vegetative conditions and target vegetation conditions (PNV) at the GA and LAU scales.

Lynx Analysis Units (LAU)

Lynx Analysis Units (LAUs) are intended to facilitate analysis and monitoring of the effects of management actions on lynx habitat. Table 5 shows the existing condition of lynx habitat in the project area and the amount of Forest Service land (Table 6) within the LAU. Baseline began in 2008 when the SRLA was signed.

There have been resident lynx documented in Taylor Park, based on Theobald and Shenk (2011), lynx high use areas were documented in both Rocky Brook and Upper Tayor LAUs during the 1999 – 2010 time period.

Based on lynx location information and den site information (1999 – 2011, Dr. Jake Ivan, Wildlife Researcher, personal communication, 11/9/18), there are lynx locations in each of the LAUs listed below. Based on the raw location data and home range estimators used to analyze raw data, only Rocky Brook and Upper Taylor actually held resident lynx that had established home ranges. There are fewer locations from a variety of individuals in Fossil Ridge, and Tincup LAUs, which suggests that use of those LAUs was largely by animals moving through them, rather than residents.

Grizzly Peak LAU looks to have less use than Rocky Brook and Upper Taylor, but more than Fossil Ridge and Tincup. Also, there is a lot of resident lynx use just over the divide from Grizzly Peak LAU to the north, including a couple of den sites approximately 1 mile N of the Grizzly Peak LAU boundary.

There is one known den site each in Rocky Brook (2005) and Upper Taylor Park (2009), both from the same female.

Table 5. Environmental Baseline Statistics of Lynx Habitat within the proposed affected environment.

Lynx Habitat Description	Acres of Lynx Habitat (% of Total Lynx Habitat in LAU)				
	Rocky Brook	Grizzly Peak	Fossil Ridge	Tin Cup	Upper Taylor
Total Acres in LAU	63,228	35,969	55,251	66,591	53,197
Primary Suitable	35,621	13,949	25,718	29,682	20,613
Secondary Suitable	6,212	3,052	10,853	7,646	10,041
Primary Unsuitable	60	360	0	115	379
Secondary Unsuitable	0	<1	0	0	0
Total Lynx Habitat	41,833 (66%)	17,001 (47%)	36,571 (66%)	37,328 (56%)	30,654 (58%)
Combined Unsuitable	60	360	0	115	379

Table 6. Lynx Habitat by Ownership

Lynx Habitat Description	Rocky Brook		Grizzly Peak		Fossil Ridge		Tin Cup		Upper Taylor	
	FS	Non-FS	FS	Non-FS	FS	Non-FS	FS	Non-FS	FS	Non-FS
Primary Suitable	35,187	434	13,857	92	24,960	757	28,362	1,319	20,433	179
Secondary Suitable	6,073	138	2,738	322	10,046	806	6,839	807	9,958	82
Total Lynx Habitat	41,260	572	16,595	414	35,006	1,563	35,201	2,126	30,391	261
Primary Unsuitable	60	0	35	317	0	0	115	0	379	0
Secondary Unsuitable	0	0	0	0	0	0	0	0	0	0

Lynx Linkage Area (LLA)

There is only one LLA in the project area, the Cottonwood/Tin Cup LLA which is 26,173 acres, of that 14,773 acres or 56% is lynx habitat. None of the treatments occur within the LLA.

Snowshoe Hare and Red Squirrel Habitat Conditions

Acres of mature multi-story spruce-fir and late successional lodgepole pine stands were identified from FS Veg spatial for affected LAU (Table 7 and 8). Habitat structural condition 4A, 4B and 4C (mid-late and late-seral) with an understory provide habitat characteristics needed to support snowshoe hare. At the GA scale, the Gunnison Basin North supports 34% of mature multi-story stands with 28% of suitable lynx habitat.

Multi-storied and late successional stands have the greatest potential to support high quality habitat for hares. High quality hare habitat is defined as having a dense horizontal cover of greater than 35% (USDA 2008). Late seral multi-storied spruce-fir and lodgepole pine with dense horizontal structure provides the best overall habitat for hares (Squires et al. 2010, Berg et al. 2012). Berg (2010) also found hares to occupy sites with horizontal cover as low 20% in Wyoming. Multi-storied spruce-fir stands also provide suitable habitat for red squirrels (*Tamiasciurus hudsonicus*) and grouse (*Bonasa umbellus* and *Dendragapus obscurus*) which are also utilized by lynx as prey (Berg 2010).

Dense horizontal cover (DHC) surveys on the Gunnison Ranger District completed in the South Gunnison GA document 54% of the mature multi-story stands support high quality hare habitat. Based upon these past surveys it is estimated that 50% of the multi-story stands across all of the GA provide high quality habitat for hares. Acres of multi-story stands for each LAU are provided in Table 5. Of the 158,453 acres of suitable lynx habitat in the project area, 25% is of high quality spruce-fir and spruce fir/aspen and 8% is late successional lodgepole. During treatment planning DHC surveys will be completed and will be used to design treatments to avoid or minimize effects (Vasquez et al. 2013).

Red squirrels are a secondary but important food source for lynx and also utilize multi-story spruce stands as habitat. However recent mortality in the overstory of spruce stands has affected squirrels populations. Large beetle outbreaks destroy most spruce trees found within infested stands, leaving little chance for red squirrel population success. Not only does decreased spruce density threaten red squirrel success rates, but spruce trees are unpredictable when it comes to seed crop produced each year (Gurnell et al. 1984), which means that infested spruce stands may also yield low seed density, leaving little for the squirrels to forage upon. Field studies in central-Alaska found that areas experiencing high spruce beetle severity tended to result in low red squirrel densities, compared to regions experiencing lower levels of beetle severity (Matsuoka et al. 2001).

Table 7. Acres of Mature Multi-story Spruce-Fir Lynx Habitat in Project Area.

LAU	Acres of Suitable Lynx Habitat	Acres of Multi-story Mature Spruce Stands	Percent of Multi-story Lynx Habitat
Rocky Brook	41,260	12,330	30
Grizzly Peak	16,595	1,020	6
Fossil Ridge	35,006	12,204	35
Tin Cup	35,201	7,879	22
Upper Taylor	30,391	6,495	21

Table 8. Acres of Late Successional Lodgepole Lynx Habitat in Project Area.

LAU	Acres of Suitable Lynx Habitat	Acres of Late Successional Lodgepole Stands	Percent of Late Successional Lynx Habitat
Rocky Brook	41,260	4,813	12
Grizzly Peak	16,595	448	3
Fossil Ridge	35,006	2,797	8
Tin Cup	35,201	3,841	11
Upper Taylor	30,391	1,424	5

Roads

Table 9 lists the number of acres by LAU and vegetation type of lynx habitat currently affected by roads. An average clearing width of 40 feet (20 feet each side of the road) was used and it is assumed all lynx habitat within this corridor have been permanently converted to stand initiation structure stage and included in the totals for VEG S1.

Table 9. Acres of Lynx Habitat Affected by Existing Forest Service System Roads by LAU.

LAU	Miles of Roads in LAU	Total Acres lynx habitat converted to unsuitable (existing)	Acres within Mature Multi-story Spruce-Fir	Acres within Late Successional Lodgepole
Rocky Brook	115	343	180	74
Grizzly Peak	30	55	6	32
Fossil Ridge	76	160	6	25
Tin Cup	110	314	67	84
Upper Taylor	98	187	61	29

Snow Compaction

Packed trails created by snowmobiles, cross-country skiers, snowshoe hares, and other predators might serve as travel routes for potential competitors and predators of lynx, especially coyotes (Interagency Lynx Biology Team 2013). Morphological differences (ratio of body mass to foot area) between coyotes and lynx appear to spatially segregate these species by snow conditions with coyotes at a disadvantage in deep, soft snow due to their high foot-load. Acres of existing snow compaction in affected LAU are provided in Table 10. Acres of snow compaction include designated groomed trails and roads, plowed roads designed play areas and areas of concentrated snowmobile use.

Table 10. Environmental Baseline for Snow Compaction by LAU.

LAU	Snow Compaction Acres	Percent of LAU Compacted
Rocky Brook	30	<1
Grizzly Peak	4	<.01
Fossil Ridge	17.9	<.01
Tin Cup	97	<.01
Upper Taylor	51	<.01

Connectivity of Lynx Populations and Habitat

Lynx are highly mobile and able to disperse long distances. Because of this mobility it is important to maintain connectivity between blocks of habitat. The SRLA requires maintaining habitat within and between LAU and linkage areas. LAUs were developed on the GMUG because they represent the home range of a single female lynx (25-50 square miles) and therefore is the most appropriate scale for project-level analysis (USDA 2008). Connectivity at the LAU-scale is best achieved by minimizing influences of highways that accommodate high volumes of traffic at high speeds and providing for a mosaic of habitat conditions across the landscape (USDA 2008 and Interagency Lynx Biology Team 2013). Mosaics of habitat conditions include dense early seral coniferous and mixed- coniferous-deciduous stands and mature multi-story stands. Habitat connectivity is defined as “cover vegetation” in sufficient quantity and arrangement to allow for the movement of lynx.

Narrow forested mountain ridges or shrub-steppe plateaus may serve as linkage between more extensive areas of lynx habitat; wooded riparian communities may provide cover across valley floors. Active management using fire and mechanical vegetation treatments to maintain a mosaic of lynx habitat, in varying successional stages, distributed across the LAU in a landscape pattern that is consistent with historical disturbance processes is a lynx conservation goal. Within the Taylor Park treatment-level design features will be implemented to help maintain connectivity.

For the purposes of Taylor Park project, connectivity at the LAU scale will be defined as movement toward PNV as described in comprehensive assessment for the GA (USDA 2005). The area where a given climax plant community can grow is classified as PNV type, and is named for the climax plant community.

For example, spruce-fir forests in the Gunnison Basin GA are the climax plant community at elevations from 10,000 to 12,000 feet, in the subalpine climatic zone (30-40 inches of precipitation annually, 50-70 frost free days, 30-40ºF mean annual air temperature) (Johnston et al. 2001). The historic fire regime for the spruce-fir PNV type was long return interval (> 200 years), stand replacing fires, which could cover areas from 1,000 to 10,000 acres mixed with infrequent low-intensity surface fires that affected much smaller areas. Recent fires have been very infrequent and very small in this PNV type. Spruce beetle outbreaks have also occurred several times in the past century, affecting portions of this PNV type.

The PNV for the LAUs in the project area based on VDDT modeling[2] for Spruce-fir/Spruce-fir Aspen is in Table 11.

Table 11. Succession (Seral Stages) in Spruce-fir and Spruce-fir Aspen PNV Types by LAU.

[2] Vegetation Dynamic Development Tool (VDDT) is applied to Potential Vegetation Types (PVT), PVT is defined by a cover type and structural stage and succession does not take into account outside impacts; VDDT is used to introduce natural or man-caused disturbances (i.e. fire, vegetation treatments), to more accurately predict the future successional stage.

	Early Seral	Early-Mid Seral	Late-Mid-Seral	Late Seral
Desired Condition (%)				
VDDT Model Spruce- fir PNV	27-32%	20-24%	12-40%	
VDDT Model Spruce- fir-aspen PNV	13-19%	22-29%	13-49%	
Existing Vegetation Condition (%)				
LAU			**(Limited age data makes it difficult to differentiate between late-mid and late seral conditions.)**	
Rocky Brook	0	38	62	
Grizzly Peak	<1	87	13	
Fossil Ridge	0	38	62	
Tin Cup	0	53	47	
Upper Taylor	<1	51	48	

Existing Condition was derived from FS Veg special data (GMUG_FSVegSpatial_JointedData_03262016) using predominately the "Cover Type" field as described below:

- *Spruce-fir = TSF (spruce-fir) cover type*
- *Spruce-fir-aspen = TAA (aspen) cover type. However for this Spruce-fir-aspen the data was further filtered by DLF_Species (dominate life form species) to only include aspen (PORT5) with some component of Englemann spruce (PIEN) and/or subalpine fir (ABLA).*

The Gunnison RD has found that lodgepole pine in a PNV and VDDT modeling discussion is problematic because it commonly is in a fire "disclimax" scenario. In the natural system, fire would disturb the setting repeatedly over time. Being able to reach a utopian climax condition, which would likely be Engelmann spruce *(Abies lasiocarpa*), is highly unlikely in the repeated fire areas (i.e. lodgepole pine area). However higher elevation sites on cooler and more northerly aspects have a longer fire return interval and do make it to climax making the PNV model more appropriate (i.e. spruce-fir and spruce-fir-aspen areas). In Taylor Park there are large expanses of pure lodgepole pine which is in fire disclimax, where there is no seed source for spruce or fir to make a "seral shift" in dominant species (Art Haines, District Silviculturist, personal communication 08/24/2018 and 09/06/2018).

Most of the data presented in FS Veg spatial is derived from photo and aerial interpretation. Lodgepole pine physiologically has a narrower crown than most other tree species. As such, lodgepole pine tend to be under estimated on it habitat structural stage. Current FS Veg spatial data depicts a predominately early-mid seral state for all the LAUs lodgepole pine stands. However, the project area's lodgepole pine stands are predominately in the late-mid or late seral stages and not what is depicted in FS Veg spatial (Art Haines, District Silviculturist, personal communication 08/24/2018 and 09/06/2018).

Affected Environment

Analysis Approach

Analysis of the Taylor Park project to Canada lynx and their habitat is based on the framework and incidental take statement established by SRLA and supporting documents (USDA 2008) and the Biological Opinion (BO) issued by Fish and Wildlife Service (USDI 2008). Most of the impacts associated with the Taylor Park project were addressed by these documents and therefore is included by reference. Analysis completed under Taylor Park builds on this analysis by

examining potential effects of completing commercial mechanical and non-commercial or prescribed burning at the LAU scale. The analysis also assesses the use of the silvicultural prescription matrix (Appendix A), design features (Appendix B) and LAU and Forest scale caps to minimize impacts to lynx and to ensure Taylor Park stays within the original incidental take statement issued by Fish and Wildlife Service in 2008. Tracking and reporting to FWS has been conducted annually to ensure cumulative impacts and SRLA management objectives are in-line with Forest Plan and BO requirements. Annual reporting will occur in February each year to FWS.

Annual reporting includes:

1. Status of VEG S1 in affected LAU. A trigger of 25% has been established to ensure no more than 30% of lynx habitat in an LAU will be converted to unsuitable. This includes both management caused and from natural disturbances (e.g wildfire).

2. Status of VEG S2 in affected LAU. A trigger of 10% has been established to ensure no more than 15% of lynx habitat in the LAU will be converted to unsuitable as a result of management actions.

3. Status of VEG S5 Forest-wide. Currently the Forest has a cap of 42,293 acres of pre-commercial thinning. In addition, no more than 1 percent of lynx habitat in an affected LAU will also be pre-commercially thinned.

4. Status of VEG S6 Forest-wide. Currently the Forest has 7,071 acre cap of high quality habitat that could be affected due to incidental loss from salvage, within 200 feet of dwellings. Sites, etc, or to complete uneven-aged management in spruce-fir.

Direct and Indirect Effects

Overview

This assessment notes that implementation of the proposed action would result in a reduction of stand initiation hare habitat. However, these effects would be short term and are within the allowable exemptions outlined in the Southern Rockies Lynx Management Direction. All proposed treatments comply with Southern Rocky Mountain Lynx Management Direction. Table 12 below gives an overview of suitable lynx habitat to be effected by each treatment type. Less than 1% of each LAU will be treated.

Table 12. Acres Spruce-Fir and Spruce-Fir-Aspen (SF) and Lodgepole (L) by Proposed Action Treatment Types and LAU in Lynx Habitat on the Gunnison Basin GA.

Treatment	Total Acres Treated	Rocky Brook		Grizzly Peak		Fossil Ridge		Tin Cup		Upper Taylor	
		SF	L	SF	L	SF	L	SF	L	SF	L
Prescribed Burn	4,180	0	0	0	0	0	0	285	294	0	0
Hand Treatment of Dwarf Mistletoe in Wet Area	101	0	3	0	0	0	0	6	15	6	19
Clearcut / Dwarf Mistletoe Edge Clearcut	2,699	95	69	0	23	0	0	0	0	50	268
Clearcut POL[3]	135	0	0	0	0	0	0	3	11	0	2

[3] *In stands of lodgepole pine where tree diameter is generally less than sawlog standard (seven-inch DBH), stands are excessively dense, and the pine is infested with dwarf mistletoe, use a Clearcut of Products Other Than Logs (POL). The lodgepole pine is of a size class suitable for utilizations as fence posts, corral poles, and other roundwood products.*

Fuel Treatment (To Be Determined)	3,153	3	121	0	25	0	104	8	245	0	0
Group Selection	1,257	121	191	0	0	0	0	0	0	48	1
Treatments	**Total Acres Treated**	**Rocky Brook**		**Grizzley Peak**		**Fossil Ridge**		**Tin Cup**		**Upper Taylor**	
		SF	**L**	**SF**	**L**	**SF**	**L**	**SF**	**L**	**SF**	**L**
Group Shelterwood	424	211	91	0	0	0	0	1	0	41	30
Uniform Shelterwood	68	0	0	0	0	0	0	0	0	0	0
Non-Commercial DM Edge Clearcut	137	0	0	0	0	0	0	0	0	0	0
Overstory Removal	445	32	86	0	0	0	0	25	6	0	0
Precommercial Thinning and Sanitation	3,322	9	34	0	2	0	0	0	35	17	161
Survey and Sanitize	1,792	83	0	18	51	0	0	21	70	12	0
Total suitable habitat treated by LAU (%)	17,714	554 (0.8)	594 (0.9)	18 (<0.1)	101 (<0.1)	0 0	104 (<0.1)	356 (<0.1)	676 (1)	168 (<0.1)	481 (0.9)

**Data for Dwarf Mistletoe Edge Strip Cuts or Clearcut comes from the professional judgement, extensive experience, stand exams (1985-2018), and reforestation surveys (1985-2018) (Art Haines, District Silviculturist, personal communication 09/07/2018). This data is in conflict with FS Veg spatial data (which was used to generate the rest of the table). The FS Veg spatial data was derived from photo and aerial interpretation and not field verified.*

***The acres noted as SF are more accurately described as mixed spruce-fir and lodgepole. The spruce-fir in these treatments will be retained to enhance species diversity.*

The Taylor Park project is designed to be adaptive, the analysis was completed under current stand conditions against future adaptive stand conditions. The analysis assumes all stands would be managed and all roads proposed would be constructed. Of the 1,107 acres of suitable lynx spruce fir/spruce fir aspen habitat to be treated, 422 acres are group selection or shelterwood seed cuts, these treatments would be completed in accordance with the SRLA, and they are considered a conservation measure for lynx (USDA Forest Service 2008). Cuts typically cover only 20-40% of a given treatment unit. It is assumed that the remaining 685 acres would experience 25% incidental loss or 171 acres of suitable habitat converting to SISS[4].

Prescribed Fire

As reflected in Table 12, lynx habitat in only one LAU (Tin Cup) will be treated by approximately 579 acres of prescribed fire (285 acres of spruce-fir dominated habitat and 294 acres of lodgepole pine dominated habitat). Prescribed fires result in increased amounts of coarse woody debris important to forest carnivores, including lynx (Block et al. 2016). Lynx in particular are associated with early post-fire conditions (Koeler and Aubry 1994). Varbianchi et al. (2017) modeled lynx usage after wildfire and also found lynx using burned areas within a year but also that heterogeneity was important in large burn areas. The proposed action uses a variety of treatments to maintain a mosaic on the landscape. Lynx will likely be temporarily displaced due to the increase in human presence and smoke associated with prescribed fire activities.

The prescribed burn prescription includes stand replacement fire with up to 100% mortality of overstory on patches from 0.25 to 100 acres. Habitat effects will be variable depending on fire severity. The desired condition is to mimic fire as a natural disturbance process in lodgepole pine systems, and create a landscape mosaic of habitat heterogeneity that maintains suitable habitat conditions for lynx. The amount of suitable lynx habitat that could be converted to SISS will depend on the burn severity, particularly the amount of stand replacement fire that occurs. Where the prescribed fire

[4] June 15, 2020 update: the 171 acres of estimated incidental loss of suitable habitat is now reflected in the conclusion section below, clarifying the total amount of habitat that may be converted to SISS.

prescription occurs in lynx habitat, there is the potential for the habitat to be converted to SISS. No more than 579 acres would be temporarily converted to SISS in the event of stand replacement burning.

Commercial Timber Harvest

Commercial timber harvest would reduce the spatial arrangement, amount, and density of vegetation that provides dense horizontal cover above six feet, or the average snow depth for snowshoe hare. Such practices would convert primary and secondary lynx habitat to a stand initiation stage. Additionally, timber harvest activities include removal of woody debris and have a salvage component, so there would be less lynx denning habitat available (Ruediger et al. 2000). Lastly, overstory removal would reduce canopy cover, and lynx select areas of high canopy cover on a broad scale (Vanbianchi et al. 2017).

Treatments occurring in lynx habitat may reduce security cover and alter the preferred winter habitat of snowshoe hares. There may be a short term decline in snowshoe hares because of the increased likelihood of predation. Lynx may abandon cutting units because of the lack of security cover and reduction in prey availability, or instead select areas in cutting units that maintain cover, such as pockets of dense regeneration on a fine scale (Koehler and Brittell 1990, Vanbianchi et al. 2017).

Lynx in the southern Rockies are sensitive to changes in forest structure (Squires et al. 2013, Koehler 1990, Squires 2010). Because proposed treatments would reduce overstory and understory vegetation and remove down wood, snowshoe hare habitat and the quality of lynx denning and foraging habitat would be reduced over the short and long term (greater than 10 years) (Squires et al. 2013, Squires 2010). Thinning could also affect lynx movement across the landscape and can alter lynx distribution within their home range (Squires et al. 2006, Squires et al. 2010).

In the long term, there would be an increase in understory vegetation density due to clear-cuts, coppice cuts, patch cuts, and overstory removal (as openings in the overstory allow for pockets of regen to establish). This would increase winter cover available for snowshoe hares and thus increase prey availability for lynx. Additionally, once matured, seed-bearing lodgepole and spruce-fir would bring more seed-eating red squirrels and signal a return of security habitat.

Holbrook et al. 2018 found that Canada lynx clearly use silviculture treatments, but there is a temporal lag depending on the treatment types. More importantly the adjacent habitat to treatment sites had a stronger influence on post-treatment use. Within the Taylor Park project adjacent habitat to treatment sites vary considerably.

Pre-commercial thinning

The amount and quality of snowshoe hare forage and escape cover would likely decrease as a result of pre-commercial thinning activities.

The amount and density of horizontal cover determine snowshoe hare abundance. Snowshoe hares avoid pre-commercially-thinned areas due to the decline in security cover (Ellsworth and Reynolds 2006 and Interagency Lynx Biology Team 2013). However, snowshoe hare may use the stands for forage if dense cover/refugia are nearby. With refugia, there may be a minimal reduction in snowshoe hare and as a result, a minimal effect to lynx (Ellsworth and Reynolds 2006).

Regeneration Harvest

Regeneration harvest would result in conversion from any type of structural stage to early stand initiation. Regeneration harvest can also reduce potential denning habitat and red squirrel habitat by removing large trees and down logs on the site.

From SBEADMR monitoring post seedling density averaged 1228 trees per acre, mostly dominated by Engelmann spruce. In the roadside hazard treatments, where there is complete removal, the seedlings trees per acre averaged 105 trees per acre. Tree basal area was 8 to 10 ft^2/acre and about 152 to 165 trees per acre (Mike Battaglia, PhD, personal communication, August 29, 2018).

Salvage Harvest, Incidental Damage, and Landings

Trees that are damaged or dying due to insects and disease would be removed from the stand. Advanced regeneration would be left intact. There could be a reduction in coarse woody debris, current and future, and thus denning habitat for lynx in these units. Landing areas may result in the clearing of regenerating spruce-fir to accommodate landing areas.

With the implementation of project design features and Southern Rockies Lynx Amendment standards, incidental damage from temporary roads, landings, salvage harvest, and trees damaged/killed from felling other trees represent 15-20% of a reduction in the understory. This means there would be a reduction in winter forage and escape cover for snowshoe hare, but there would be dense pockets of advance regeneration left in place. Thus, there may be a decline in prey availability, and thus feeding success for the lynx. There would be a reduction in denning habitat in treatment units, however there would be some coarse woody debris retention. Existing coarse woody debris would be retained outside of treatment units.

Trees within stands that currently provide excellent horizontal cover at less than 6 feet from the forest floor would not be cut. Over the long term (10-40 years) a slight increase in the amount and speed of regeneration is expected due to the Proposed Action. This increase would improve snowshoe hare habitat over what is expected to occur under natural situations, and thus could mean there would be more prey available and an increase in feeding success for lynx.

Prior to the spruce beetle outbreak there was no difference in forest structure between unmanaged and managed forests however, the unmanaged stands had slightly lower seedling density. In SBEADMR, managed stands that have been salvaged maintain high seedling density and although there are fewer seedlings in unmanaged stands stocking guidelines are still met (Battaglia et al. 2017). And although there is high overstory mortality in unmanaged and managed stands, there is an abundant small diameter trees and regeneration, providing suitable lynx habitat in the understory.

Roads

Fragmentation of lynx habitat can affect lynx by reducing their prey base and increasing the energetic costs of using habitat within their home ranges. Highways and roads typically follow natural features such as rivers, valleys, and mountain passes that are important to lynx as habitat or connectivity. Roads and in particular highways can be an impediment to lynx movement and source of direct mortality particularly on 4-lane highways with high traffic volume and speed.

Alexander et al. (2005) suggested traffic volumes between 3,000 and 5,000 vehicles per day may be the threshold above which successful crossings by carnivores are impeded. Since lynx reintroduction in Colorado, 13 lynx mortalities have occurred were vehicular traffic volume ranged from 2,300 to >25,000 vehicles per day (Interagency Lynx Biology Team 2013).

Based on probable harvest volumes, we estimate that there will be 8,600 log truck loads generated by the proposed action. A maximum capacity of 50 loads can be hauled a day. Truck traffic associated with timber sale activities would increase traffic levels above existing conditions, by 100 per day. These loads would occur on different road segments depending on the location of the timber sale units, and would be dispersed throughout the planning area spatially and temporarily. When added to the existing baseline for traffic levels, all routes would stay well-below the 2,000 vehicles per day that is considered a potential impairment to lynx

Approximately 9.3 miles of temporary road in lynx habitat would be constructed then obliterated at project completion. Approximately 7.8 miles of existing roads closed to the public in lynx habitat would be used for hauling and would be re-closed after project completion. An additional 68 miles of existing road in lynx habitat open to the public would be used for hauling.

Lynx generally do not appear to be impacted by forest roads with low vehicular traffic (Squires et al. 2010) and may actually use the road for travel (Koehler and Brittell 1990). However, because lynx appear to den father away from roads than would be randomly expected (Squires et al. 2008), the temporary roads and use of closed roads may displace lynx from otherwise available denning habitat. Some researchers have noted that adult female lynx may move kittens to new

den sites in order to avoid nearby vehicle traffic that escalates as summer comes on (Ruggiero et al. 1999). In some cases, lynx may alter normal travel and hunting patterns to avoid open roads, but they are also likely to travel along roadways less than 50 feet wide with good cover along both edges (Koehler and Brittell 1990). Field research and observation have shown that in normal circumstances lynx do not avoid habitat near roads except for those with high traffic volume (Aubry et al. 2000, Ruggiero et al. 1999).

Forest roads do provide greater human access, including to fur trappers who may incidentally trap a lynx when targeting other species. The likelihood of this occurring, however, is extremely low considering lynx presence is transient at best in the project area. Restricting temporary roads to project activities only would help offset the potential for incidental trapping and other activities that may disrupt lynx habitat use.

None of the temporary roads constructed for the project or the use of closed roads would yield high traffic volume since these roads would be closed to the public. Road speeds are already low since all Forest roads in the action area require speed limits of 35 mph.

Linkage Habitat

As noted there is only one LLA in the project area, the Cottonwood/Tin Cup LLA, 14,773 acres (56%) of it is considered lynx habitat. No treatments are proposed within the LLA and therefore no effect would occur.

While the linkage area will not be affected, maintaining connectivity within and between harvest areas could be affected. Timber harvest and prescribed fire in the short term would remove conifers that may provide screening cover that facilitates travel. Regeneration harvest can alter lynx movement through a stand, although this varies seasonally and temporally (Squires et al 2010 and Squires et al. 2013). Lynx will move across extensive non-forested areas as needed during dispersal or other long-range excursions (Koehler and Aubry 1994, Ruediger et al. 2000, Aubry et al. 2000), although they prefer to travel through forested habitats or along forest edges (Squires et al. 2013, Ruediger et al. 2000, Mowat et al. 1999).

Areas of high human use can also interrupt habitat connectivity and further fragment lynx habitat (Ruediger et al. 2000). The construction of temporary roads and the use of closed roads for hauling can have some influence on the ability of lynx to disperse through the area or move about freely within their home range. Road construction may reduce lynx habitat by removing forest cover and winter road use may provide access for lynx competitors. Conversely lynx have been documented using less traveled roads where the adjacent vegetation provides good hare habitat and Squires et al. (2010) concluded that forest roads with low vehicular or over-snow vehicle traffic had little effect on lynx seasonal resource-selection patterns in Montana. While preliminary information suggests lynx do not avoid roads, potential impacts are reduced when access, traffic volume, and road speed are reduced. Access would be kept to the minimum required to accomplish project activities by closing all temporary roads to the public. Traffic volume would be high in active logging and burning units although this use would be locally concentrated (e.g. logging activities would be confined to a single drainage at a time).

Connectivity across larger landscapes would not be compromised by this project since most of the action area would not be affected by the project and the units are mostly outside of suitable habitat; although, lynx may have to temporarily adjust movement patterns during project implementation. Harvest and burning treatments juxtaposed with untreated area would result in patterns of habitat that are desirable to lynx – i.e. early successional habitats that provide year-round snowshoe hare habitat interspersed with older multistory stands (Squires et al. 2010).

Schwartz et al. (2002) conclude that lynx throughout western North America are closely related indicating populations have been well enough connected to maintain close kinship. The proposed action would not compromise the ability of lynx to remain connected.

Noise impacts from timber harvest practices

Noise impacts from cutting, hauling, and snowmobile use could impact lynx by causing lynx to avoid the action area. Lynx are primarily active at night, and since the majority of logging activities would occur during the day, this is expected to be a minor effect and a short-term impact. Moreover, lynx are likely to avoid the area because of short-term noise or commotion by proposed vegetation management operations. Lynx would likely return after the associated noises are abated.

Adaptive Implementation

The Taylor Park project as noted is to have adaptive implementation allowing management to change on any given acre as needed and described in the silvicultural prescription matrix (Appendix A). This analysis considers the complete removal of habitat due to stand mortality. However, as has been monitored and seen in the implementation of SBEADMR, treatments in dead stands may reduce hare habitat, design features protects the understory. In addition these treatments are limited by the Forest Plan and not more than 40 acres can be cleared.

Conclusions

Based on this analysis, the Taylor project **may affect, but is not likely to adversely affect** Canada lynx. The rationale for this conclusion is based on:

- Planned treatments in the proposed action affect 3,063 acres of suitable lynx habitat (1.9% of suitable habitat in the project area).
- Dense horizontal cover in the understory will continue to exceed 20-22% within treated stands and thus keeping lynx habitat suitable but at a lower quality for the short-term on all acres except 373 acres of clearcut treatment in lodgepole pine, and an estimated 171 acres of incidental loss resulting from group selection and shelterwood seed cuts.
- Of the suitable lynx habitat that could be treated a maximum of ~~373~~ 544 acres will be converted to SISS as a result of incidental loss (171 acres) and from clearcut treatments in lodgepole pine lynx habitat (373 acres); and there is the potential for up to an additional 579 acres to be converted to SISS where prescribed burn treatments are in mapped suitable lynx habitat in the Tincup LAU.
- Of the 3,322 acres of pre-commercial thinning, GIS identified 26 acres of it as spruce-fir habitat in LAUs (Table 12 above), however, pre-commercial thinning will occur in lodge-pole stands and spruce-fir will be maintained.
- The percent of early stand initiation habitat in any of the LAUs that touch the action area do not exceed 30%, even under the adapted implementation scenario.
- The project area is in the Cottonwood/Tincup LLA which has been identified as a linkage area in the SRLA. The project maintains the general forested nature of the action area as well as landscape connectivity permitting broader lynx movements. No treatments are proposed in the LLA.
- Connectivity across larger landscapes would not be compromised by this project since 97% of the lynx habitat would remain untreated in the action area although the lynx may have to temporarily adjust movement patterns during project implementation.
- Prescribed fire would only be applied in timber harvest units and would not create permanent travel routes because these harvest units are expected to regenerate into forested condition. No permanent firebreaks on ridges or saddles would be built as a part of this project.

- Of the approximately 3,153 acres identified for fuel treatments, some acres meet WUI fuels exemptions, and would not exceed the Forests 3% cap.

- Red squirrels are common small mammals who use a variety of habitats. Although conifer seeds are their primary food source, red squirrels are true omnivores. Red squirrel habitat is found throughout the project area.

- Overall, the project is designed protect young healthy stands of lodgepole pine from infestation by dwarf mistletoe in the area, promote desirable regeneration, and improve forest resiliency. These goals are compatible with conservation of lynx habitat. The proposed action has been designed with SRLA Standards and Guidelines in mind. Field validation will be done prior to implementation.

- Denning habitat is not lacking in the project area. There is an abundance of down logs and the Design Feature WFRP-2 - snag retention would maintain denning habitat in the project area.

- As described in the analysis approach on pages 23 – 24, all proposed treatments comply with Southern Rockies Lynx Amendment Management Direction by ensuring these effects do not exceed the allowable exemptions and LAU and Forest-scale caps outlined in the Southern Rockies Lynx Management Direction for the GMUG National Forests. Tracking and reporting to U.S. Fish and Wildlife Service is conducted annually to ensure cumulative impacts are in-line with Forest Plan and SRLA Biological Opinion requirements. Annual reporting occurs in February each year to U.S. Fish and Wildlife Service. To ensure we continue to meet the SRLA Standards, triggers are established to track our acres as treatments occur, as described on page 24.

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Appendix A - Silvicultural Prescription Matrix

Stand Description	Stand Condition	Prescribed Treatment
In the wildland urban interface, near developed private land or high-use recreation areas	N/A	Fuels Treatment *(follow nuances in other prescriptions for applications in the WUI)*
Dominated by Engelmann spruce and subalpine fir	Overstory is mature and overmature with areas of reduced vigor, health, or elevated mortality.	Group Selection
	Overstory is healthy and in good condition.	– Group Selection – Defer Treatment
	Overstory is immature, with a high stand density, trees are of a size suitable for posts, poles, and small diameter sawlogs, and windthrow risk is low to moderate.	Commercial Thinning
Dominated by lodgepole pine	Lodgepole pine stand is mature or overmature sawlog-sized, has a Dwarf Mistletoe Rating of 3 or greater (Mistletoe ratings range from 0 – 6, with a rating of 3 meaning that over half of the branches in a tree crown have mistletoe), or windthrow risk is moderate to very high.	Clearcut
	Lodgepole pine stand is dense, in a less than sawlog-size class, and has a Dwarf Mistletoe Rating of 3 or greater.	Clearcut of POL
	Lodgepole pine stand has a Dwarf Mistletoe Rating of 1 or less, is two-storied with a mature overstory and has an adequately stocked understory of between 300 and 1,200 (or more) healthy seedlings or saplings per acre.	Overstory Removal
	Lodgepole pine stand is mature sawlog-sized, has a Dwarf Mistletoe Rating of 2 or less, windthrow risk is low to moderate, and with little advanced regeneration is found in the understory. Site suitable for small Purchasers and/or is in the wildland-urban interface.	Uniform Shelterwood
	Lodgepole pine stand is mature sawlog-sized, has a Dwarf Mistletoe Rating of 2 or less, windthrow risk is low to high, and with little advanced regeneration is found in the understory.	Group Shelterwood
	Overstory is immature to mature, with a high stand density, trees are of a size suitable for posts, poles, and small-diameter sawlogs, and Dwarf Mistletoe Rating is 2 or less.	Commercial Thinning
	Stand is immature, dense, with crowns self-pruning and crown bases elevated with Dwarf Mistletoe Rating of 2 or less. Site is “Dry” lodgepole pine. Average stand age is between 30 and 70 years.	Precommercial Thinning
	Stand is immature, with Dwarf Mistletoe Rating of 2 or less, and stand density is not high enough to warrant Precommercial Thinning.	Dwarf Mistletoe Survey and Sanitation
	Stand is adjacent to young, healthy lodgepole pine which has only limited dwarf mistletoe presence. The edge stand is lodgepole pine with dwarf mistletoe. Site is accessible for commercial harvest of sawlogs or products other than logs (POL).	Dwarf Mistletoe Edge Clearcut or Clearcut of POL

Stand Description	Stand Condition	Prescribed Treatment
	Stand is adjacent to young, healthy lodgepole pine which has only limited dwarf mistletoe presence. The edge stand is lodgepole pine with dwarf mistletoe. Site is not current accessible for commercial harvest of sawlogs or products other than logs (POL).	Non-commercial Dwarf Mistletoe Edge Clearcut
	Stand is adjacent to young, healthy lodgepole pine which has only limited dwarf mistletoe presence. The edge stand is lodgepole pine with dwarf mistletoe. The edge stand is in or near riparian areas where mechanized operations are not allowed.	Hand Treatment of Dwarf Mistletoe in Wet Areas
	Stand is immature to mature, dwarf mistletoe is not present, bark beetles are not present, the stand is healthy, and stand density is not excessive.	Defer Treatment
Engelmann spruce, lodgepole pine, or Douglas-fir with: • Bark beetle activity and tree mortality present • Fire mortality, or • A large area of windthrow	Less than 40% of basal area 5”+ is dead or dying, and windthrow risk is low to moderate. Can still work within <u>most</u> selection, shelterwood, or thinning scenarios, with a focus on merchantable salvage.	– Individual tree salvage – Clump salvage – up to ¼-acre size – Group salvage – ¼ to 2-acres size – Species removal – merchantable-sized trees of the affected species, live and dead – Salvage Clearcut – Salvage Overstory removal
	Between 40 and 65% of basal area is dead or dying, and windthrow risk is low. Can still work within <u>some</u> selection, shelterwood, or thinning scenarios, just with a focus on the removing dead.	– Individual tree salvage – Clump salvage – up to ¼-acre size – Group salvage – ¼ to 2-acres size – Species removal – merchantable-sized trees of the affected species, live and dead – Salvage Clearcut – Salvage Overstory Removal
	Over 40 to 65% of basal area is dead or dying, and/or windthrow risk moderate to high.	– Salvage Clearcut – Salvage Overstory Removal

Appendix B - Design Features

Table A-16 of the Taylor Park Vegetation Management Environmental Assessment. Wildlife, fish, and rare plants

Objectives:

1. **Design treatments to meet applicable objectives and standards with the Southern Rockies Lynx Amendment (SRLA). Consider guidelines outlined in the SRLA in treatment planning. When guidelines cannot be met, provide rationale to Fish and Wildlife Service (FWS) in year-end reporting.**
2. **Design treatments to meet applicable Forest Plan standards and guidelines related to wildlife.**
3. **Complete annual reporting to FWS as required by the SRLA.**
4. **Seek opportunities to integrate wildlife habitat management objectives as part of treatment activities.**

Identifier	Design Feature	Source / Citation	Applicable to Treatment (Yes, No, As Modified)	If no, provide justification (i.e., resource not present). If modified, identify modification and rationale for how the resource is equally/better protected
WFRP-1	All applicable management Objectives, Standards and Guidelines contained in the Southern Rockies Lynx Amendment will be applied during treatment planning and implementation.	USDA Forest Service, Rocky Mountain Region, 2008 (SRLA)		
WRFP-2i	At a minimum, in spruce-fir forest types maintain 90 to 225 snags per 100 acres, 10 inches DBH or greater (where biologically feasible). In lodgepole pine stands, maintain 90 to 180 snags (8 inches DBH or greater) per 100 acres. Snags would be maintained away from structures, roads and trails so that they do not create safety hazards to the public. Where possible, utilize natural sinuosity or drainages for linking groups. Protect standing wildlife trees from damage during site preparation and post-sale activities.	GMUG Forest Plan Standards and Guidelines		
WFRP-3	Where feasible, maintain a minimum of 10 to 20 tons per acre of coarse woody debris (≥ 3 inches diameter) within harvest units. Where possible in regeneration units, create piles of logs, stumps, or other woody debris to minimize the effects of larger openings.	GMUG Forest Plan Standards and Guidelines		
WFRP-4	Maintain large diameter downed logs in various stages of decomposition within harvest units (at least 50 linear feet per acre of 10 inches diameter or larger at the large end of lodgepole pine and aspen logs and/or 12 inches diameter or larger for Engelmann spruce, subalpine fir and Douglas-fir logs, where this material exists).	GMUG Forest Plan Standards and Guidelines		

Identifier	Design Feature	Source / Citation	Applicable to Treatment (Yes, No, As Modified)	If no, provide justification (i.e., resource not present). If modified, identify modification and rationale for how the resource is equally/better protected
WFRP-5	Strive to maintain forested cover on 60 percent or more of the perimeter of all natural and created openings, and along at least 60 percent of each National Forest System road (level 5 and below) that has high levels of human use during the time deer and elk would be expected to inhabit an area. Roads with restricted use could provide for less cover. Except where natural openings or parks exist along roads and when applying hazard tree removal activities along roads to meet public safety goals, gaps along roads should not exceed ¼ mile. Cover should be well-distributed across the landscape. Minimum sizes for hiding and thermal cover patches are 2 to 5 acres for mule deer, and 30 to 60 acres for elk. Hiding and thermal cover may be the same in many cases. The intent is to maintain or improve habitat diversity and make or keep the area in a condition where deer and elk can effectively use the area by managing the vegetation and human activity. *This design feature provides an opportunity to implement the proposed commercial and noncommercial activities in a way that accomplishes these wildlife habitat objectives while also meeting the purpose and need of the project. District wildlife, timber and fire programs will coordinate closely during the planning and design phase of projects to accomplish these objectives.*	Direction for maintaining habitat connectivity at the landscape scale, and to retain hiding and thermal cover for big game; GMUG Forest Plan (Page III-28, General Direction 01, Standard and Guideline a and b)		
WFRP-6	Provide hiding cover within 1,000 feet of any known elk calving areas. The District wildlife biologist will be responsible for coordinating with Colorado Parks and Wildlife to identify calving areas and informing timber and fire staff on locations. When calving areas are identified, a 1,000 foot buffer will be applied and existing vegetation conditions within the buffer will be assessed by the District biologist to determine cover needs, identify areas to avoid with treatments, or coordinate with timber and fire staff to determine how treatments could be designed to maintain or enhance cover. • To minimize disturbance to elk during the calving season, apply a seasonal timing restriction to treatment activities in areas identified by Colorado Parks and Wildlife (CPW) as elk production areas, as supported by best available scientific information (CPW Species Activity Mapping or GPS radio telemetry monitoring). • From May 15 to June 30, do not implement treatment activities in harvest units identified to occur within elk production areas.	GMUG Forest Plan (Page III-24, General Direction 01, Standard and Guideline a)		

Identifier	Design Feature	Source / Citation	Applicable to Treatment (Yes, No, As Modified)	If no, provide justification (i.e., resource not present). If modified, identify modification and rationale for how the resource is equally/better protected
WFRP-7	Northern goshawk - No activities will be allowed within ½ mile of active nests from March 1 to August 31, with the exception that on roads open to other traffic, log hauling will be allowed. The timing restriction buffer could be reduced to ¼ mile if topographic features and/or adequate screening cover are present that would protect the nest site from disturbance. No harvest activities will be allowed within a 30-acre buffer of nest sites. Outside of a 30-acre area around goshawk nest sites, timing restrictions are not needed for treatment layout, marking, and any other activities that are non-disturbing (i.e., activities not involving the use of heavy equipment or chainsaws). Timing restrictions will only apply to active nests, as confirmed by the GMUG National Forests' wildlife biologist. The District wildlife biologist will keep the timber and fire staff informed on nest status and locations.	Colorado Parks and Wildlife Raptor Buffer and Timing Restriction Recommendations; GMUG Forest Plan Standards and Guidelines		
WFRP-8	Northern goshawk – provide or leave 20 percent of pole or mature tree stands adjacent to nesting sites with at least 150 square feet of basal area. Provide or leave at least one class 1 log adjacent to nest sites. The District wildlife biologist will be responsible for coordinating with timber and fire staff on nest locations and assessing vegetation conditions adjacent to nest sites.	GMUG Forest Plan (Page III-24, General Direction 01, Standard and Guideline e)		
WFRP-9	On-going surveys for raptors would be conducted to determine locations of individuals or populations of these species and allow for the implementation of protection measures using the appropriate buffer or timing restriction.	Treatment- specific design; Migratory Bird Treaty Act		
WFRP-10	Retain live trees in salvage units, except for trees that need to be removed for operational/safety or silvicultural purposes. Operational/safety or silvicultural purposes include the need to remove live trees if necessary to access dead trees for salvage or to address safety concerns.	Treatment-specific design		
WFRP-11	Skid trails and landings will be located to minimize impacts to advanced regeneration. Skid trails should be placed at least 100 feet apart, except where they converge at landings.	Treatment-specific design		
WFRP-12	Areas in Lynx Analysis Units supporting live advanced regeneration with over 35 percent Dense Horizontal Cover in blocks greater than 0.3 acre will be avoided to the extent possible during layout [and during harvest operations], while allowing feasible operations.	SRLA – VEG S6 Standard		

Identifier	Design Feature	Source / Citation	Applicable to Treatment (Yes, No, As Modified)	If no, provide justification (i.e., resource not present). If modified, identify modification and rationale for how the resource is equally/better protected
WFRP-13 and WQSP-5A.	Landings and main skid trails should be evaluated to determine if detrimental soil compaction has occurred. Based on review by a specialist, when detrimental compaction is found, subsoil ripping may be applied to reduce soil impacts. When a site prep contract is necessary, this provides the opportunity to rip skid trails and landings in the area and potentially in nearby adjacent areas. This would provide for a more suitable seedbed for future regeneration, thus preventing permanent impacts of skid trails that when left in a compacted state, often do not regenerate as well as adjacent un-compacted areas. Importantly, all operations will conform to the direction in Chapter 10 of the Water Conservation Practices Handbook including managing treatments to limit the sum of severely burned soil and detrimentally compacted, eroded, and displaced soil to no more than 15 percent of any activity area.	Treatment-specific design to address impacts and recovery of snowshoe hare and lynx habitat (SRLA); Water Conservation Practices Handbook, FSH 2509.25, Chapter 10		
WFRP - 14	During treatment planning appropriate Threatened, Endangered, and Sensitive (TES) species inventories will be completed as determined by the District Wildlife Biologist. Once a treatment is in the implementation phase, if TES species are confirmed the District wildlife biologist will be consulted and the appropriate standards for the Forest Plan will be applied (timing restrictions, buffer of nest sites, identify no cut area around nest sites, etc.). For example, if a new goshawk nest is found during operations, operations will stop; the District biologist will be informed and will evaluate the situation to determine if adverse impacts are occurring. This may include establishing an avoidance area around the occupied habitat or nest site consistent with Forest Plan direction and best available science to avoid impacts that could lead to nest abandonment and/or mortality.	Treatment-specific design; Endangered Species Act; Forest Service Sensitive Species Policy; Migratory Bird Treaty Act.		

Identifier	Design Feature	Source / Citation	Applicable to Treatment (Yes, No, As Modified)	If no, provide justification (i.e., resource not present). If modified, identify modification and rationale for how the resource is equally/better protected
WFRP-15	Winter logging is encouraged to limit direct disturbance to the fewest number of wildlife species as possible. When possible, avoid treatment activities in areas where big game (elk, deer, pronghorn and moose) are known to occur. When big-game winter range is bisected by proposed haul routes and there are concentrations of animals along these routes minimize stress to wintering animals to the extent practicable by applying one of the following: --Re-routing along another acceptable route. --From December 1 to April 15, restrict haul times to between 9 am and 4 pm, unless otherwise agreed to in writing by the Forest Service. Exception: to minimize damage to road surfaces, hauling may be restricted to early morning prior to 10 am when thawing occurs during the day, so that hauling occurs when the road surface is still frozen. --Avoid winter logging from December 1 to April 15 in places where wintering big game would be impacted. --The district biologist will coordinate with Colorado Parks and Wildlife to asses big game use and identify areas where animals concentrate during winter, and determine if there is a need to implement one of these conservation measures. This would be a coordinated effort with the GMUG, Colorado Parks and Wildlife, timber purchaser, and contracting officer. When the need arises to protect concentrations of wintering big game, the District wildlife biologist will be responsible for providing the timber staff with maps of these areas.	GMUG Forest Plan General Direction 04, 05c.and 05f. (page III-76 – III-77)		

Identifier	Design Feature	Source / Citation	Applicable to Treatment (Yes, No, As Modified)	If no, provide justification (i.e., resource not present). If modified, identify modification and rationale for how the resource is equally/better protected
WFRP-17	Habitat connectivity will be maintained at the landscape scale (Lynx Analysis Unit and Linkage zones for lynx) through various methods depending on treatment type, location and overall condition of each Lynx Analysis Unit. Methods may include a combination of variable retention regeneration harvest methods through resiliency treatment types; tree retention areas of various sizes and shapes to retain snag groups and protect live understory trees across the landscape, with emphasis on multi-storied forest stands and areas typically used by wildlife as travel corridors (ridges, saddles, stream corridors); protection of water influence zones and stringers of timber; and maintaining areas of high quality snowshoe hare habitat as determined from dense horizontal cover field surveys using an established scientific protocol (cover board protocol). In terms of habitat connectivity considerations and to meet the Southern Rockies Lynx Amendment direction, there will be a lot of focus on protecting areas with high quality dense horizontal cover in multi-storied stands and managing vegetation at the landscape scale toward Potential Natural Vegetation (PNV). On a timber sale by timber sale basis, coordination will occur between the District wildlife biologist and the timber staff to determine the appropriate method for accomplishing habitat connectivity goals, including determining the appropriate size, shape, and location of tree retention areas.”	Treatment-specific design intended to support consistency with SRLA direction for lynx habitat connectivity. Interagency Lynx Biology Team, 2013.		
WFRP - 18	To maintain the amount and distribution of lynx foraging habitat over time capable of supporting lynx at the LAU scale, manage so that no more than 30 percent of the lynx habitat in an LAU is in an early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (i.e., does not provide winter snowshoe hare habitat). Emphasize sustaining snowshoe hare habitat in an LAU. If more than 30 percent of the lynx habitat in an LAU is in early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (e.g., clear-cuts, seed tree harvest, pre-commercial thinning, or understory removal), no further increase as a result of vegetation management treatments should occur on Federal lands. As management occur in the affected LAU over the life of the treatment, acres affected will be tracked by the District wildlife biologist and Forest wildlife program lead to ensure consistency with this conservation measure.	SRLA; Interagency Lynx Biology Team. 2013		

Identifier	Design Feature	Source / Citation	Applicable to Treatment (Yes, No, As Modified)	If no, provide justification (i.e., resource not present). If modified, identify modification and rationale for how the resource is equally/better protected
WFRP-19	American (Pine) Marten – Research has shown that martens avoid openings created from vegetation management activities that completely remove all trees (structural stand initiation stage) if the openings are larger than 300 feet in width. In areas identified as multi-storied spruce-fir, openings created should be less than 300 feet in width unless suitable marten habitat is maintained within cutting units through snag, advanced regeneration, and course woody debris retention as described in the above design features. Cutting units of this size will only occur when salvage prescription are applied and will be subject to WFRP-12. **Exception**: areas where public safety is a concern (road corridors, around structures, etc.). Commercial treatments will target dead trees larger than eight inches in diameter so some residual cover will remain within cutting units. Irregular-shaped harvest units are desirable.	GMUG Forest Plan (Page III-24, General Direction 01, Standard and Guideline b)		
WFRP-20	Within secondary habitat for lynx (300 foot buffer from primary habitat) retain spruce and fir in aspen-spruce mix stands. Primary habitat is defined as having a dominance of spruce-fir cover type. Most of the secondary habitat includes either pure aspen or aspen-spruce mixed stands.	USDA Forest Service, 2008 -Southern Rockies Lynx Amendment		
WFRP-23	In LAU with extensive mortality of mid-late and late seral spruce (Habitat Structural Stages 4A, 4B and 4C), retain these live stands to the greatest extent practicable during treatment design.	SRLA		
WFRP - 24	To minimize spread of Amphibian Chytrid Fungus, at least one member of the Aquatics Team will participate in the planning and implementation of project-level operations. See also IW-2 for equipment washing requirements.	Johnson and Spear, 2003; Johnson et al. 2003		
WFRP – 25i	To prevent incidental mortality and deleterious effects to rearing habitat, within a 0.5 mile radius of documented boreal toad breeding sites, operating ground-based equipment off of existing roads (temporary or permanent), should only take place outside of breeding times and juvenile development (<10,000 ft. between May 1 – Sep 30; ≥10,000 ft between May 15 – Sep 15).	Bartelt et al. 2004		

Identifier	Design Feature	Source / Citation	Applicable to Treatment (Yes, No, As Modified)	If no, provide justification (i.e., resource not present). If modified, identify modification and rationale for how the resource is equally/better protected
WFRP – 26i	To protect winter hibernacula for boreal toad (overwintering habitat such as small animal burrows), within a 1.6-mile radius of documented boreal toad breeding sites, operating ground-based equipment off of existing roads (temporary or permanent) during winter months (November – March), should only take place when there is at least 1 foot of packed snow or 4 inches of frozen soil. In these areas near known breeding populations, when safe and practical to do so, fuel reduction through pile burning, should only be conducted outside of times for winter hibernation (conduct pile burning from May – August).	Bartelt et al. 2004		
WFRP-27i	Coordinate with wildlife biologist and fuels specialist to determine potential for pile retention where appropriate. The intent of this design feature is to retain piles where they will benefit wildlife species dependent on course woody debris as a habitat component (Canada lynx, American marten, snowshoe hare, and other small mammals). Retention should be considered for piles in locations that do not conflict with fuels reduction objectives. *This design feature provides an opportunity to implement the proposed commercial and noncommercial activities in a way that accomplishes wildlife habitat objectives while also meeting the purpose and need of the project. District wildlife, timber and fire programs will coordinate closely during the planning and design phase of projects to implement this design feature.*			