

CHAPTER 2. ALTERNATIVES

2.1 Introduction

This chapter describes and compares the alternatives considered for the Big Creek Vegetation Treatment project. It includes a description and Appendix A includes a map of each alternative considered (see Maps 2 and 3). This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social and economic effects of implementing each alternative.

2.2 Alternatives Considered in Detail

The Forest Service developed three alternatives, including: Alternative 1 – Proposed Action, Alternative 2 - No Action, and Alternative 3 - Reduced Treatment and Wildlife Emphasis. Alternatives were developed by the interdisciplinary team to address the various concerns brought up both internally and externally during the scoping and preliminary analysis phases. In addition, the treatment units have been designed to eliminate most of the slopes over 40%. While some units still have minor amounts of these steep slopes, these would not be treated mechanically during implementation. The two primary drivers to the development of the treatment alternatives are road construction and the presence of Northern Goshawk nesting sites and territories within the watershed.

Alternative 1 – Proposed Action

The action proposed by the Forest Service to meet the purpose and need is treatment over approximately **4,800** acres of aspen, conifer, and sagebrush communities within the Big Creek project area. See Table 2.2.1 for a description of acres in each prescription type. The Proposed Action moves towards properly functioning condition while ensuring the Revised Forest Plan standards are fully met as well as reducing roads and treatment acres to a level that addresses most of the concerns and issues brought up during the preliminary analysis.

Table 2.2.1. Alternative 1 - approximate acres to be treated by prescription type.

Prescription	Alt. 1 Acres
Clearcut	206
Conifer Removal with Patches	27
Conifer Removal Followed by Fire	556
Group Selection	256
Groups and Patches	150
Irregular Shelterwood (IRSW)	71
IRSW with Groups / Patches	140
Overstory Removals	130
Prescribed Fire / Herbicide / Mechanical	2,513*
Prescribed Fire Mosaic	681
Shelterwood Prep	32
Thin with Groups	38
Total Treated Acres	4,800

* The 2,513 acres proposed in the prescribed fire / herbicide / mechanical prescription are gross acres, not net acres. Within any treatment type, the actual acres burned, sprayed, or harrowed would be less than the gross acres. The preferred course of action is to burn the proposed acres, however if that is not feasible because of weather conditions, or steep slopes, or other conditions then herbicide or mechanical treatment will be used. All potential acres of each treatment type have been analyzed. Within the 2,513 total acres, up to 2,513 acres are proposed for burning, up to 1,005 acres are proposed for herbicide, and up to 1,470 acres are proposed for mechanical treatment see Table 2.2.1a.

Table 2.2.1a. Alternative 1 – Prescribed Fire / Herbicide / Mechanical treatment by Unit.

General Location	Alt. 1 Unit #	Acres	Burn Acres	Herbicide Acres	Mechanical Acres
Monument Peak	59	139	0-139	0-35	0-70
Bowery Fork	61	314	0-314	0-80	0-160
Pole Hollow	62	651	0-651	0-130	0-100
The Valley	35	913	0-913	0-500	0-800
S of Six Bit Hollow	42	14	0-14	0	0
N of Big Crawford Ck	44	6	0-6	0	0
Big Crawford Ck	46	16	0-16	0	0
S of Big Crawford Ck	51	8	0-8	0	0
SW of Crawford	52	227	0-227	0-100	0-150
W of Valley Spring	63	225	0-225	0-160	0-190
Totals:		2,513	0-2,513	0-1,005	0-1,470

Source: Corbin 2008.

See Appendix A, Map 2 for general treatment areas. Not all acres would be treated within the general treatment areas.

This alternative would produce approximately 21,300 CCF (Hundred Cubic Feet) in timber volume output.

Proposed Treatments

Based on the Big Creek Watershed Assessment (USDA Forest Service 2006d) there are several major vegetation groups within the watershed, all of which are weighted heavily towards the older age classes. The following is a discussion of these groups and the type of treatments that would be applied to change the distribution of species based on the project objectives. These Proposed Treatments would occur in both Alternatives 1 and 3 with differences in the amount of acres treated (see Tables 2.2.1 and 2.2.2).

Sagebrush: Prescribed fire, herbicide application, and/or mechanical treatments in the sagebrush type are proposed to achieve a mosaic of treated and untreated patches. In general, these areas are those where older sagebrush is the predominant cover. Approximately 30 to 40% of the area in a unit would be targeted for treatment. Herbicide application or mechanical methods such as a dixie harrow or disking would be used primarily where more precise targeting of vegetation is desired, where rabbit brush is present, or adjacent to private lands where fire is not appropriate.

Herbicide treatment would involve using tebuthiuron (Spike®), 2,4D (2,4-dichlorophenoxy acetic acid), and/or picloram (Tordon K®) to kill some of the sagebrush (and other shrubs) and create a mosaic of younger shrub patches within the older sagebrush stands. Herbicide treatment units would generally be less than 40 acres in size, and about 30-40% of the area within the unit would be treated. Herbicide would be applied by ground-based (rather than aerial) methods, and strictly applied according to label specifications. Identified sensitive area (such as riparian areas, Brewer’s sparrow blocks, rare plant locations, shallow soil areas, etc.) will be avoided. Methods to increase efficacy to treat woody

vegetation and reduce impacts to non-target species will be applied; for example, Spike® would be applied during the dormant season to minimize effects on perennial grasses¹ (Dow 2007).

Aspen and Conifer Mix: The three treatments being considered in the aspen and conifer mix type are: fire alone, conifer removal followed by fire, and harvesting in patches.

Fire alone would be used in areas where conifer fuels accumulations are enough fuel to carry fire through portions of the stands and cause 60 to 80% mortality in the overstory to regenerate the aspen. Typically these are stands with only scattered conifer or an understory of smaller subalpine fir where fire would not be expected to cause severe burning conditions.

Merchantable conifer would be removed with a timber sale, followed by burning in areas where there is a lot of conifer present, and conditions (e.g., slopes, access, soils, etc.) are appropriate for timber harvest. Slash from the timber harvest would be scattered within the stand to create a fuel bed to carry the fire throughout the stand at an appropriate intensity to regenerate the aspen without damaging the aspen clone's root system or causing soil damage.

Timber harvest in patches would be used in areas where burning is not desired (such as areas adjacent to private land) or where the aspen is patchy and mixed in with other timber types. Patches (generally under 20 acres) would be clearcut and all stems either removed or felled to stimulate regeneration of the aspen clone. Some slash would be left on site to provide protection for the regenerating aspen and nutrient cycling back into the soil. Where excessive, the slash would be piled and burned.

Lodgepole Pine: Several harvesting systems are being considered in the lodgepole pine type, depending on any past treatments and on resource concerns. Past harvests were less than 40 acres and created an unnatural patchwork effect. The lodgepole pine type is being treated to create young stands and also to congeal the older harvest patches into a size and pattern that would more closely resemble what would occur under natural fire conditions. Harvesting of this type provides a substantial portion of the commercial timber being produced from this project.

Where a partial harvest (such as seed tree or shelterwood) was done in the past to create a new age class, the older overstory would be removed, and if appropriate the younger stand thinned to improve its vigor and achieve target future densities based on stand objectives. In some cases these are adjacent to older clearcut units and will contribute to the patch size changes.

Where the stand is adjacent to or between older clearcut units, similar clearcut treatments will be applied in order to achieve the increased patch size objective. Lodgepole pine naturally regenerates well following this type of harvest. Slash in excess of what is needed for site protection would be piled and burned.

In some cases, shelterwood preparatory cuts will be used to reduce density and improve wind firmness within the stand to prepare for future regeneration harvests, while maintaining a mature cover type in the present. In some cases an 'irregular' application of the shelterwood method will be applied which allows for longer time periods before the next entry, than would be specified with the traditional form of the method.

¹ The Spike® 20P Specimen label states: "Spike 20P may cause temporary herbicidal symptoms to appear on perennial grasses. Dormant season application is recommended to minimize herbicidal effects on desirable forage grasses." (Dow 2007, p 3)

One important consideration within the northern goshawk post fledgling area (PFA) is maintaining 40% to 70% of the area in mature and old stands. Where it is acceptable within the goshawk's PFA some groups and patches will be created within the matrix of irregular shelterwood to create pockets of young trees. Approximately 20% of a given stand's total area will be included in these small openings. Groups will average ¼ to 1 acre in size where Douglas-fir or spruce predominate the species mix. Where aspen or lodgepole pine predominate, patches would be up to 10 acres depending on the acreage of that species patch.

Some small stands that are within larger burn units and not on slopes greater than 40% would be burned along with the sagebrush to regenerate the stand.

Spruce/fir, Douglas-fir, and Mixed Conifer: Treatments in these types would focus on maintaining and enhancing uneven aged stand structures. In general, fire is not appropriate in this type.

Small group selection harvest (patches generally ¼ to 1 acre) would be used over approximately 20% of a stand's area to regenerate a new age class. Future similar entries over time would further develop and maintain the uneven aged characteristics. Patch size would depend on several factors including the species mix, tree heights (for shade), slope position and aspect, and any existing natural variations in stand structure.

Uneven aged thinning (both commercial and non commercial) would be utilized in between the groups where stand density is high and the stand structure includes trees in multiple size classes. Trees would be removed in each of the size classes to maintain appropriate densities in each and to represent an uneven aged stand structure. This treatment can also be used to manipulate future species composition by favoring some tree species over others in the smaller size classes.

Roads

The Big Creek project area has a fairly extensive road system in place and most of the general treatment areas are accessible (see Bullock and Vallejos 2008 for a description of roads in the Big Creek analysis area). However, both action alternatives will require some road construction and road improvement to access the treatment units. Existing system roads will be improved primarily by the addition of gravel, grading and shaping, cleaning ditches and drainage structures and possibly some culvert replacement. Existing roads will not need to be realigned or widened. Improvement needs on existing system roads does not change significantly with changes in the alternatives. All of the created roads will be gated and/or otherwise closed to public access during the harvesting operations. There are two types of new roads that will be constructed.

Approximately **9 miles of temporary roads** are proposed to be constructed to access specific treatment units. Temporary roads will be constructed only to the level need to access the units for treatment and remove products. These will be native surface, with temporary drainage structures or culverts. Following treatment and any follow-up needs such as tree planting or pre commercial thinning, these will be obliterated, the road prism put back to the original slope contour and revegetated. These will be used where no treatment will be needed in the reasonably near future such as clearcut units or irregular shelterwood where the next entry will be several decades in the future.

Approximately **1.5 miles of roads** are proposed to be constructed to access partial cut units in the spruce-fir cover type. Referred to as "intermittent service roads," they will be constructed where needs are anticipated in the reasonably near future, such as in the group selection or shelterwood prescriptions where reentry will be within a few decades. Following treatment and follow up these will be closed to traffic using gates or other physical barriers, drainage improved and revegetated to prevent erosion. The

road prism will stay in place so that future access can be accomplished with relatively little site and soil disturbance.

Fireline

There are five basic techniques that will be used to contain prescribed fire in the treatment units. Fire will be used alone or in conjunction with commercial timber harvest, mechanical treatments including Dixie harrow, and/or herbicide treatments to achieve a mosaic of burned and unburned patches within each of the units. Specific methods of line control will be specified in the burn plan for each unit or group of units likely to be burned at a time. The following estimates of miles of each kind of fire line are approximate, but represent the upper end (most line construction) for control lines. It is likely that firing techniques will be utilized more and constructed lines less than the estimates given.

1) Firing Techniques – Many of the units are quite large and cover a variety of terrain and aspects. Timing and placement of ignitions within this will allow fire to burn only in portions that are ready. For example in the spring northerly slopes will be moist and with snow cover while the southern slopes will be dry for burning. Ignitions along the ridge will only move down the dry south slopes. Other terrain features can be used in conjunction with the firing patterns to selectively burn portions of the units. Natural features such as rock outcrops, openings, and wet riparian / stream corridors, can also serve as anchors for utilizing firing techniques. Created features such as sagebrush patches recently treated with herbicides or Dixie harrow thinning may also be appropriate for control lines, depending on fuel conditions. At least 25 miles of unit perimeter will utilize this technique.

2) Handline – Where vegetation is short and light, such as in sage and grass, fireline constructed by hand will be used to anchor the burning. Primarily this is adjacent to private land and/or goshawk nest stands where fire would not be acceptable. Handline will average 24 to 36 inches wide and be clear to mineral soil. Line will be appropriately rehabilitated (by mulching, seeding, and/or water barring, as needed) following completion of the burning to prevent erosion. Up to about 14.3 miles of handline will be built and rehabilitated.

3) Machine line – Where equipment is being used in conjunction with timber operations and fuels are larger than feasible for handline, fireline will be built using heavy equipment. Line will average 72 to 96 inches in width and be clear to mineral soil. These are primarily smaller units in the more heavily forested portions of the project area. Following burning, the lines will be rehabilitated (seeded and water barred as needed, and where available woody debris may be scattered along for microsite protection). Possible equipment includes (but is not limited to) bulldozers, rubber tired skidders, trail cats, and tracked excavators. Approximately 0.8 miles of machine line is expected to be used.

4) Skid Trails – In timber sale units that have burning as secondary treatments skid trails for log removal will be placed along the perimeter and used also for containment of the fire. Skid trails are generally about 96 inches in width and have mineral soil exposed throughout much of their surface. As in the machine line, these will be rehabilitated following burning to prevent erosion. In small portions where it is not feasible to skid along the boundary then machine line will be built. Approximately 5.2 miles of skid trails (including incidental machine line) will be used as fire containment lines.

5) Forest System Roads – Where existing roads coincide with burn unit boundaries these will be used as fire lines. Approximately 2.0 miles of road will be used for fire containment.

Design Elements and Mitigation Measures Common to Alternatives 1 and 3

Table 2.2.1b. Description of required design elements and mitigation measures.

Design Elements and Mitigation Measures
Aquatic Resources (FEIS, Section 3.2) and Water Resources (FEIS, Section 3.11):
A 300 foot buffer will be established around known boreal toad sites.
Harvest and treatment related activities would be limited to high-risk, individual tree cutting that will be left on site for woody debris recruitment. There will be no lighting of prescribed fire within the Riparian Habitat Conservation Areas (RHCAs). Burning within RHCAs is not expected, however, there may be minimal backing in some areas. The following is a description of RHCAs by category and stream type: <ul style="list-style-type: none"> • <u>Category 1. Fish-Bearing Stream</u>: RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to 300 feet slope distance (600 feet, including both sides of the stream channel). • <u>Category 2. Permanently Flowing Non-Fish-Bearing Streams</u>: RHCAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to 150 feet slope distance (300 feet, including both sides of the stream channel). • <u>Category 3. Ponds, Lakes, Reservoirs, and Wetlands Greater Than 1 Acre</u>: RHCAs consist of the body of water or wetland and the area to 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond, or lake. • <u>Category 4. Seasonally Flowing or Intermittent Streams, Wetlands Less Than 1 Acre, Landslides, and Landslide-Prone Areas</u>: This category includes features with high variability in size and site-specific characteristics. At a minimum the interim RHCAs must include, landslides and landslide-prone areas, 100 feet slope distance in watersheds containing Bonneville or Colorado River cutthroat trout, and 50 feet slope distance for watersheds not containing Bonneville or Colorado River cutthroat trout (<i>Oncorhynchus clarki pleuriticus</i>).
Fire, Air Quality, and Herbicides (FEIS, Section 3.3):
In the prescribed burn, do not target low sagebrush areas, but incidental fire within or on the edge of these stands is acceptable (but is unlikely to carry far due to the low fuel loading).
In the northern three sagebrush units where the big sagebrush is patchier (between more low sagebrush openings), the burn prescription should result in a very patchy burn pattern that will create relatively small openings within the (already patchy) big sagebrush. Ideally, burn patches would be in the range of 0.1 to about 2 acres in size, and preferably with lots of edge remaining adjacent to unburned big sagebrush. (That is, without large burned blocks where the interior is a long way from a sagebrush seed sources.) Within the northern sagebrush burn units; desired "black" will be a fairly low percentage of the whole, about 10 to 40%, since the units have a relatively large proportion of low sagebrush.
Within the sagebrush units are several aspen (and perhaps aspen/conifer) stringers. Target burning the big sagebrush adjacent to these stringers, and let the fire carry within and through the stringers to the extent possible as well.
In the Crawford Bottom area, target the older mountain big sagebrush stands, rather than previously burned (mid-seral) sagebrush, or low sagebrush stands. Incidental burning within low sagebrush or mid-seral big sage is acceptable, but not preferred. Concentrate on burning big sagebrush stands adjacent to aspen or aspen/conifer, and incorporate the mosaic burn into those stands. In the Crawford Bottom area, desired "black" will be about 15 to 50% of the area within each sagebrush unit.
For sagebrush stands treated with herbicides, the burning recommendation is similar to burning big sagebrush; burn patch sizes could be larger (since there is no concern about seeding sagebrush into the stand), but since the treated sagebrush stands within this particular area are fairly small anyway, that will not be a consideration.
Specific sagebrush areas have been identified and analyzed for treatment. During project implementation, the Forest will determine which sagebrush areas will be targeted for herbicide, mechanical, and prescribed fire treatments. For example, sagebrush stands adjacent to conifer areas that we don't want to burn may be good candidates for herbicide rather than burning. In addition, putting in at least a few small areas of herbicide treatment in the larger sagebrush matrix to compare the response to adjacent burned (and unburned) areas would give the forest some good management option information for future projects.
In general, burning sagebrush will be the preferred tool over herbicide use or mechanical treatment, due to cost considerations.
Aspen/conifer stands (generally identified for mosaic burning) with high concentrations of standing conifer may need

Design Elements and Mitigation Measures
to be logged (like the conifer/aspen stands) before burning to minimize the potential for undesirably hot burns pockets which may kill underground aspen stems. Similarly, areas with high concentrations of heavy dead and down fuels (logs) may need to be pre-treated or burned first under particularly moist conditions to avoid undesirable fire severity.
Aspen/conifer areas with few conifers and/or very low fuel loadings may need to have conifers felled to provide surface fuels to assist in generating the desired heat to kill remaining conifers and above-ground aspen stems.
Conifer/aspen areas with heavy fuel loads will need to be carefully evaluated before burning. In many areas, logging alone may be the preferred treatment. Particularly, removing conifers from small aspen clones within a conifer stand is a priority for maintaining aspen across the landscape.
Range (FEIS, Section 3.5):
Schedule treatments in conjunction with the livestock operations on the grazing allotments. In areas where prescribed fire isn't occurring, use livestock to reduce fine fuels.
Protect range structures such as fences and water developments during the prescribed burns.
Scenery (FEIS, Section 3.7):
Use a local genotype of native seed species for seeding disturbed areas.
Stockpile topsoil to one side of the construction activity until the desired track is constructed.
During construction of intermittent service roads use slope rounding and landscape contouring in cut slopes to reduce geometric effect of the road alignment.
Soil (FEIS, Section 3.8):
For all harvest blocks, restrict ground based mechanical harvest and skidding to the normal dry or frozen ground operating season to mitigate the potential for detrimental compaction to occur when soils are moist or wet.
For all temporary roads and harvest blocks, restore soil productivity on main haul trails, log landings, and temporary roads by mitigation practices such as light tilling or ripping of the compacted soils and revegetating with native forbs and grasses.
For system, intermittent, and temporary service roads used to implement the treatments under this alternative on Sambrito, Mult, Baird Hollow, Bullnell and Richens soil types, install drainage dips at a frequency/spacing of no more than 250 feet.
For native surface roads constructed under this alternative on Sambrito, Mult, Baird Hollow, Bullnell and Richens soil types, limit the gradient to no more than 8%. Obliterate temporary roads using equipment to push and/or lift back in the fill and put the prism back to slope, and then seeded with an appropriate mix. Intermittent roads will be gated or closed with some other means, drained and seeded.
Proposed use of herbicides on this project will be conducted under a decision tree methodology used in the Forest Noxious Weed Treatment Program and using rationale that minimizes the use of known persistent herbicides. The decision tree and other rationale allows for the use of relatively more persistent agents only when less toxic and persistent agents are ineffective in controlling the target species.
All herbicides will be applied at concentrations no greater than specified in their label, which further reduces the potential for impacts to soil productivity to occur as a result of these applications.
Vegetation – Plants and Noxious Weeds (FEIS, Section 3.10):
Develop a plan for treatment of known infestations of noxious weeds according to Wasatch-Cache Noxious Weed EIS 2006. Treat infestations prior to project implementation. Wash equipment prior to entering the forest to begin implementation. If equipment is removed from the Forest to work at another job site – it should be washed again prior to returning to the Forest.
Water Resources (FEIS, Section 3.11): In addition to RHCA previously described under the Aquatic Resources, several best management practices are part of the proposal so that adverse effects to soil and water resources from soil disturbance, reduced ground cover, and road construction can be minimized. Specifically, the BMPs are:
Minimize soil disturbance through use of designated skid trails roads.
Minimize the introduction to water bodies of organic and inorganic chemicals from harvesting and pesticide applications by using pesticides or herbicides in accordance with manufacturer's specifications and allowing Riparian Habitat Conservation Areas (RHCAs) that act as buffer zones to streams and springs.
Wildlife (FEIS, Section 3.12):
New temporary and roads for "administrative use only" will be constructed, but these roads will not be considered for public use (during or after harvest activities). Open road density will not change as part of this project.

Design Elements and Mitigation Measures	
Newly created temporary roads will be closed and rehabilitated, directly after completion of harvest activities to reduce impacts to wildlife.	
Newly created administrative use only roads will be gated (or closed by other means) directly after completion of harvest activities to reduce impacts to wildlife.	
Roads designated for “administrative use only” will have very limited motorized use after harvest activities are completed; thus little or no affect on wildlife species after project implementation. Some existing administrative use only roads will be opened temporarily to complete the harvest/treatment activities. Use of these roads for project implementation will be temporary (approximately two seasons within a specific area).	
The sale administer and road engineer will closely coordinate sale activities and road construction prior to each season’s operational period with a wildlife biologist to have updated location nest site data in order to avoid disturbance to goshawk nest areas and post fledgling areas.	
To minimize effects to neotropical birds, mechanical and herbicide vegetation treatment of shrublands <u>will</u> occur prior to May 1 or in late summer or fall. Treatment of shrublands and forested stands with the use of prescribed fire, <u>should</u> occur prior to May 1 or in late summer or fall, but may occur later (no later than May 31) due to weather, snowpack, and other conditions to provide a window of opportunity to conduct burn activities. Road construction and timber harvest activities <u>should</u> be planned when possible to occur within the late summer, fall, or winter to minimize effects to neotropical birds.	
Vegetation treatment <u>should</u> occur prior to May 1 or in late summer or fall to avoid affecting nests, eggs, and nestlings.	
Patches of mountain big sagebrush larger than 1.2 acres in size (average territory size), distributed within the treatment areas, should be retained to provide Brewer’s sparrow habitat. Retained areas should be selected to have taller and denser sagebrush and have greater amounts of bare ground or less herbaceous understory vegetation than surrounding habitat. The areas should also have a greater percent of live shrub growth and less rock covered ground.	
Appendix X of the Forest Plan (USDA Forest Service 2003) provides implementation guidance for northern goshawk. The most applicable guidance for this project are: <ul style="list-style-type: none"> • Identify two alternate and three replacement nest areas per active territory. Each nest area should be 30 acres in size. • Alternate nest areas should be located in suitable habitat with similar vegetation structure as the active nest area. • Replacement nest areas should be located in habitat which will develop similar vegetative structures as the active nest area at the time when the active and alternate nest areas are projected to no longer provide adequate nesting habitat. • Within PFAs, management activities <u>should</u> be restricted during the active nesting period (March 1 to 30 September). • Plan the transportation system to minimize disturbance to PFAs. 	
Following a site-specific analysis of the project area, the following additional conservation guidance has been recommended for this project area: <ul style="list-style-type: none"> • Vegetation treatments designed to maintain or promote a VSS 4, 5, and/or 6 group (mature and old age classes) should typically range from 40-70% in the foraging area and within the post-fledging area. • Planned vegetative management treatments in mature and/or old structural groups in a landscape that is at or below the desired percentage of land area in mature and old structural stages (40% conifer, 30% aspen), should be designed to maintain or enhance the characteristics of these structural stages and treatments should not move them out of the mature and old structural stage. • Forest manipulation within active, alternate, and replacement nest areas should be designed to maintain or improve desired nest area habitat. 	

Table 2.2.1a. Unit specific mitigation measure description.

Unit Number	Site Specific Mitigation Measure
22	Avoid potential severe soil burning effects in Unit 22 by treating with prescribed fire in the spring when soil moisture content is at least 20% by volume.

Monitoring Common to Alternatives 1 and 3

- Post-burn Monitoring: After project implementation, fuels plots (established in 2006) in units that were burned will be monitored at one, three, and five years after the burn. The same information as was collected pre-burn will be measured (i.e., plot description, tree data, fuel loading, and photographs). Some of the unburned plots may also be remeasured (depending on time and resource availability), to provide a control comparison for changes due to factors besides the fire. Analysis of these data will allow us to see whether specific fuels and vegetation objectives have been met, at least on the plot-level scale.
- Monitoring locations should not be placed too close to established range water developments, trails, or fences as described in the Revised Forest Plan monitoring guide.
- Post harvest effectiveness monitoring in regeneration treatment units will include third and fifth year stocking surveys to determine compliance with the Revised Forest Plan minimum stocking standards as well as certification of adequate stocking for NFMA requirements. In planted areas, stake rows will be established following FSH guidelines and be used to determine first and third year plantation survival. Post harvest stand exams will be done in thinned units to determine the composition and density of the residual stand.
- In addition to the annual Aerial Detection Survey, the sale prep personnel, sale administrator, and Silviculturist will observe/monitor active areas of insect activity throughout the life of the project and anticipating where additional populations could develop, explore these areas with walkthrough exams. Any increases in, or new activity will be considered for treatment or longer-term monitoring.
- Annual monitoring will occur to determine occupancy and location of active nest sites/nest areas in all goshawk territories in which the proposed project could affect the nest areas or post fledgling area. In the event that a goshawk selects a new nest site not within the identified nest areas or outside of the post fledgling area (PFA), the new nest site will be incorporated into the existing PFA or changes will be made to modify the PFA to incorporate the new site. If this situation occurs, standards and guidelines will be met to prevent impacts to the active nest area and PFA.

Alternative 2 – No Action

Under the No Action Alternative, current management plans would continue to guide management of the project area. No vegetation treatment activities would be implemented to accomplish project goals.

Alternative 3 – Reduced Treatment and Wildlife Emphasis

The action proposed by the Forest Service to meet the purpose and need is treatment over approximately **4,190** acres of aspen, conifer, and sagebrush communities within the Big Creek project area. See Table 2.2.2 for a description of acres in each prescription type. When compared to the Proposed Action, Alternative 3 is a reduced level of treatment and a significantly reduced level of road construction to minimize effects to goshawk habitat and other soil and water while still providing movement towards PFC and timber output, and ensuring Revised Forest Plan standards are met.

Table 2.2.2. Alternative 3 – approximate acres to be treated by prescription type.

Prescription	Alt. 3 Acres
Clearcut	137
Conifer Removal with Patches	27
Conifer Removal Followed by Fire	343
Group Selection	183
Groups and Patches	0

Prescription	Alt. 3 Acres
Irregular Shelterwood (IRSW)	211
IRSW with Groups / Patches	0
Overstory Removals	130
Prescribed Fire / Herbicide / Mechanical	2,469*
Prescribed Fire Mosaic	681
Shelterwood Prep	9
Thin with Groups	0
Total Treated Acres	4,190

* The 2,469 acres proposed in the prescribed fire / herbicide / mechanical prescription are gross acres, not net acres. Within any treatment type, the actual acres burned, sprayed, or harrowed would be less than the gross acres. The preferred course of action is to burn the proposed acres, however if that is not feasible because of weather conditions, or steep slopes, or other conditions then herbicide or mechanical treatment will be used. All potential acres of each treatment type have been analyzed. Within the 2,469 total acres, up to 2,469 acres are proposed for burning, up to 1,005 acres are proposed for herbicide, and up to 1,470 acres are proposed for mechanical treatment see Table 2.2.2a.

Table 2.2.2a. Alternative 3 – Prescribed Fire / Herbicide / Mechanical treatment by Unit.

General Location	Alt. 3 Unit #	Acres	Burn Acres	Herbicide Acres	Mechanical Acres
Monument Peak	59	139	0-139	0-35	0-70
Bowery Fork	61	314	0-314	0-80	0-160
Pole Hollow	62	651	0-651	0-130	0-100
The Valley	35	913	0-913	0-500	0-800
SW of Crawford	52	227	0-227	0-100	0-150
W of Valley Spring	63	225	0-225	0-160	0-190
Totals:		2,513	0-2,469	0-1,005	0-1,470

Source: Corbin 2008.

See Appendix A, Map 3 for general treatment areas. Not all acres would be treated within the general treatment areas.

This alternative would produce approximately 13,700 CCF (Hundred Cubic Feet) in timber volume output.

Proposed Treatments

See proposed treatments listed under Alternative 1 by vegetation type. The types of proposed treatments would be the same in Alternatives 1 and 3 with differences in the amount of acres treated (see Table 2.4.1 for a comparison of acreage).

Roads

The Big Creek project area has a fairly extensive road system in place and most of the general treatment areas are accessible (see Bullock and Vallejos 2008 for a description of roads in the Big Creek analysis area). However, both action alternatives will require some road construction and road improvement to access the treatment units. Existing system roads will be improved primarily by the addition of gravel, grading and shaping, cleaning ditches and drainage structures and possibly some culvert replacement. Existing roads will not need to be realigned or widened. Improvement needs on existing system roads

does not change significantly with changes in the alternatives. All of the created roads will be gated and/or otherwise closed to public access during the harvesting operations. There are two types of new roads that will be constructed.

Approximately **5.6 miles of temporary roads** are proposed to be constructed to access specific treatment units. Temporary roads will be constructed only to the level need to access the units for treatment and remove products. These will be native surface, with temporary drainage structures or culverts. Following treatment and any follow-up needs such as tree planting or pre commercial thinning, these will be obliterated, the road prism put back to the original slope contour and revegetated. These will be used where no treatment will be needed in the reasonably near future such as clearcut units or irregular shelterwood where the next entry will be several decades in the future.

Approximately **0.5 miles of roads** are proposed to be constructed to access partial cut units in the spruce-fir cover type. Referred to as “intermittent service roads,” they will be constructed where needs are anticipated in the reasonably near future, such as in the group selection or shelterwood prescriptions where reentry will be within a few decades. Following treatment and follow up these will be closed to traffic using gates or other physical barriers, drainage improved and revegetated to prevent erosion. The road prism will stay in place so that future access can be accomplished with relatively little site and soil disturbance.

Fireline

See Alternative 1 for a detailed description of proposed firelines and techniques used to contain prescribed fire in the treatment units. The proposed techniques and mileages are the same in Alternatives 1 and 3.

2.3 Alternatives Considered, but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Therefore, four alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

Original Proposed Action

The original action proposed by the Forest Service to meet the purpose and need was treatment over approximately 4,000 acres of aspen, conifer, and sagebrush communities within the Big Creek project area. This would include the following:

- About 700 acres (primarily aspen-conifer communities) treated with prescribed fire in a mosaic pattern.
- Timber harvest would be used over approximately 1,000 acres of the conifer type. This would include partial and selective cutting (scattered over about 850 acres of Engelmann spruce/subalpine fir, Douglas-fir, and mixed conifer forest to regenerate aspen and conifer trees) and about 150 acres of clearcuts in lodgepole pine (to incorporate old, small harvest units into larger patches more resembling historic landscape patterns).
- Approximately 1,000 acres of the conifer-aspen type would have a timber harvest of the conifer trees followed by prescribed burning (to reduce fuels before the burn and facilitate aspen regeneration).
- Approximately 1,300 acres of sagebrush treated by prescribed fire, mechanical means, or application of herbicides, depending on specific site characteristics and desired results.

Approximately 12 miles of temporary roads are proposed to be constructed to access specific treatment units. Following treatments, all temporary roads would be obliterated, the road prism returned to contour, and the surface revegetated.

Approximately 2 miles of roads are proposed to be constructed to access partial cut units in the spruce-fir cover type. Referred to as “intermittent service roads,” following project completion, these roads would be gated closed and seeded, but the road prism would be kept in place for future administrative use.

Resource specialists reviewed this proposed action in the field and after further analysis determined that due to steepness of slopes, wet areas, sensitive soils, and location of goshawk nests, and differences in vegetation on the ground this alternative would have to be modified. Therefore, the proposed action was modified and this alternative was dismissed.

Maximum Properly Functioning Condition Alternative

Another alternative proposed by the Forest Service to meet the purpose and need was treatment over approximately 5,500 acres of aspen, conifer, and sagebrush communities within the Big Creek project area. See Table 2.3.1 for a description of acres by prescription type. This alternative was developed to maximize movement toward properly functioning condition at the landscape scale by improving vegetation structure and pattern for cover types and creating early seral vegetation to move the landscape more quickly towards a more balanced range of structural stages.

Table 2.3.1 shows the total acres treated by prescription type in each of the alternatives. In the prescribed fire treatments the acres displayed are gross unit acres. In reality only a portion of these will be treated in order to create a mosaic pattern of early seral vegetation within each unit. The target is approximately 30% to 40% actually treated.

Table 2.3.1. Maximum properly functioning condition alternative dismissed from further study. Approximate acres treated by prescription type.

Prescription	Alt. Z Acres
Clearcut	156
Conifer Removal with Patches	0
Conifer Removal Followed by Fire	553
Group Selection	394
Groups and Patches	191
Irregular Shelterwood (IRSW)	506
IRSW with Groups / Patches	33
Overstory Removals	102
Prescribed Fire / Herbicide / Mechanical	2,361
Prescribed Fire Mosaic	1,133
Shelterwood Prep	30
Timber Harvest Acres Subtotal	1,965
Total Treated Acres	5,459

Approximately 11.5 miles of temporary roads would be constructed to access specific treatment units. Following treatments, all temporary roads would be obliterated, the road prism returned to contour, and the surface revegetated.

Approximately 2.2 miles of roads would be constructed to access partial cut units in the spruce-fir cover type. Referred to as “intermittent service roads,” following project completion, these roads would be closed using gates or other physical barriers and seeded, but the road prism would be kept in place for future administrative use.

This alternative would produce approximately 29,700 CCF (Hundred Cubic Feet) of timber volume.

Resource specialists reviewed this alternative in the field and determined that due to steepness of slopes, location of goshawk nests, and differences in vegetation on the ground this alternative would be dismissed.

Prescribed Fire Only and No Road Construction or Reconstruction Alternative

An alternative was suggested (See Chapter 5, Response to Comments, Letter 3 Comment 21) that would use prescribed fire only and no road construction or reconstruction of any kind to alleviate short-term trends from broken trophic level relationships. This alternative was dismissed as described.

Prescribed fire only would not meet the purpose and need. Logging achieves one important aspect of the stated purpose and need: to provide commercial timber that contributes to a sustainable level of goods and services.

Further, in some vegetation types, in order to achieve specific components of the purpose and need, timber harvesting (whether commercial or not) in conjunction with prescribed fire is necessary. For example:

- Some aspen/conifer areas may be logged before burning, to reduce the heavy fuel component and reduce the chance of killing the aspen clone roots with too hot of a fire.
- Some aspen/conifer areas have fewer conifers and falling at least some conifers before burning may create surface fuels to help carry the fire. Many of these stands (heavy to the aspen component) will be difficult to get to burn. It is expected that fire activity will occur primarily around the edges adjacent to mountain big sagebrush stands (which are generally more flammable), and in conifer pockets within the aspen/conifer.
- Some aspen/conifer units have too little conifer for commercial timber harvest, and not heavy enough fuel loading to need fuels treatment before burning, but would have enough conifers to carry at least a patchy burn through the stands.
- Some conifer/aspen stands may be commercially harvested followed by mosaic burn. These areas have enough timber to make commercial harvest economically viable, and enough heavy conifer fuels (both dead and standing live) that it may burn so hot as to kill the aspen roots without removing some conifers first. But removing the commercial timber and scattering logging slash will provide enough smaller fuels to help carry a fire, while not creating excessive heavy fuels that would result in an undesirable high severity burn, and the fire would kill many of the non-commercial conifers in the stand.
- Conifer stands in the Big Creek area vary from lodgepole pine, spruce/fir (Engelmann spruce and subalpine fir), mixed conifer (mostly of those three conifers), to Douglas-fir (mostly on drier limestone outcrops; sometimes with white fir). Because of the difficulty of using prescribed burning to safely create a desired mosaic of early (and late) seral conditions in conifer stands, logging, rather than fire, is the proposed tool for creating seral stage diversity in conifer areas.

Restore Top Trophic Level Alternative

An alternative was suggested (See Chapter 5, Response to Comments, Letter 3 Comment 21) to restore the top trophic level (i.e., wolves) so that exotic and native ungulate grazing patterns are natural and good for aspen health.

Wolf reintroduction is beyond the scope of the project and the authority of the US Forest Service. Also refer to Chapter 5, Letter 3 Comments 3 and 4.

2.4 Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2.4.1. Comparison of the treatment types and approximate acreage treated by alternative.

Prescription	Alt. 1 (Acres)	Alt. 2 (Acres)	Alt. 3 (Acres)
Clearcut	206	0	137
Conifer Removal with Patches	27	0	27
Conifer Removal followed by Fire	556	0	343
Group Selection	256	0	183
Groups and Patches	150	0	0
Irregular Shelterwood (IRSW)	71	0	211
IRSW with Groups / Patches	140	0	0
Overstory Removals	130	0	130
Prescribed Fire / Herbicide / Mechanical	2,513	0	2,469
Prescribed Fire Mosaic	681	0	681
Shelterwood Prep	32	0	9
Thin with Groups	38	0	0
Total Treated Acres	4,800	0	4,190

Table 2.4.2. Comparison of estimated timber volume, approximate miles of road construction, and approximate miles of fireline by alternative.

	Alt. 1	Alt. 2	Alt. 3
Timber Volume	21,300 ccf	0 ccf	13,700 ccf
Temporary Roads	9.0 miles	0 miles	5.6 miles
(Intermittent Service) Road Construction	1.5 miles	0 miles	0.5 miles
Machine Fireline *	0.8 miles	0 miles	0.8 miles
Handline *	14.3 miles	0 miles	14.3 miles

* The estimates of miles of each kind of fire line are approximate, but represent the upper end (most line construction) for control lines. It is likely that firing techniques will be utilized more and constructed lines less than the estimates given.

Table 2.4.3. Comparison of the effects of alternatives.

Resource (FEIS Section)	Alternative 1	Alternative 2	Alternative 3
Aquatic Resources (3.2)	General – There will be minor to no effect on aquatic species' stream, wetland, and riparian habitat since RHCAs are being maintained along streams in the analysis area.	General – No impact to aquatic species. Riparian habitat continues to be influenced by natural ecological processes.	General – Similar impacts to Alternative 1.

Resource (FEIS Section)	Alternative 1	Alternative 2	Alternative 3
<p>Threatened or Endangered Aquatic Species</p> <p>Sensitive Aquatic Species</p> <p>Management Indicator Species (Aquatic)</p> <p>Aquatic Forest Service Species at Risk, State Sensitive Species</p>	<p>There are no threatened or endangered aquatic species on the Wasatch-Cache NF, therefore, there are no impacts.</p> <p>No impact to Colorado River cutthroat trout, Columbia spotted frog, and Bonneville cutthroat trout.</p> <p>Bonneville cutthroat trout is also a sensitive species and is discussed above.</p> <p>Minimal impacts to boreal toads in upland areas outside of RHCAs/buffer zone from May to September.</p>	<p>Same as Alternative 1.</p> <p>No impact to aquatic species. Riparian habitat continues to be influenced by natural ecological processes.</p> <p>Same as Alternative 1.</p> <p>No impact to aquatic species. Riparian habitat continues to be influenced by natural ecological processes.</p>	<p>Same as Alternative 1.</p> <p>No impact to Colorado River cutthroat trout, Columbia spotted frog, and Bonneville cutthroat trout.</p> <p>Same as Alternative 1.</p> <p>Minimal impacts (less than Alt. 1) to boreal toads in upland areas outside of RHCAs from May to September.</p>
<p>Fire, Air Quality, and Herbicides (3.3)</p> <p>Air Quality</p> <p>Herbicides</p>	<p>Increase the amount of early seral in most vegetation types. Landscape moves closer to reference condition. Change in stand structure. Decrease in fuel loading and less departure from fire regime. Following treatment, fire behavior will be: mosaic, less severe, and smaller size. Other past, present, or future activities will not significantly affect fire regime or behavior.</p> <p>Short-term, minor effects from smoke and dust. No effect on Class I airsheds because there aren't any.</p> <p>Will kill woody plants as desired. Little or no direct effect from application on grass and herbaceous forbs due to herbicide specificity and timing. Increase in early seral vegetation. No direct effect on wildlife or aquatic species. Improved habitat for species that prefer herbaceous vegetation and reduced habitat for species that prefer older, denser sagebrush.</p>	<p>Out-of-balance seral stages will continue.</p> <p>Uncontrolled wildfires could produce emissions.</p> <p>No impact.</p>	<p>Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres.</p> <p>Similar impacts to Alternative 1.</p> <p>Similar impacts to Alternative 1.</p>
<p>Heritage (3.4)</p>	<p>State Historic Preservation Officer concurred with Forest Archaeologist findings of "no effect" to cultural resources.</p>	<p>No change.</p>	<p>Same as Alt. 1.</p>

Resource (FEIS Section)	Alternative 1	Alternative 2	Alternative 3
Range (3.5)	Long-term benefit of more forage. Short-term, negative economic impacts to permittee if livestock is rested from treated areas. Range structures (fences and water developments) will be protected, therefore no effect. Construction of minimal amounts of fence may be necessary.	Forage continues at current rate.	Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres.
Private Land Inholdings	If agreement is reached, treatment on private land can increase vegetative diversity and reduce brushy fuels and decrease the risk of wildfire.	Ground fuels increase, diversity decreases, and risk of fire increases.	Similar impacts to Alternative 1.
Recreation (3.6)	Will not change Recreation Opportunity Spectrum type or acres. Will temporarily effect recreation, more specifically solitude, smoke, and possible closures during prescribed fire activities. Negative temporary impact to native soil road (base) surfaces. Possible increase in number of hunters and dispersed campsites.	No effect to recreation activities. Possible short-term effects from unplanned fire or insect damage to tree stands, changing natural appearing landscape.	Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.
Roadless Area	No road building or timber harvest will occur in the roadless area. Increase in traffic will cause noise, dust and more evidence of motorized vehicles. Short-term impact from fire to roadless characteristics. Negligible impact to scenic quality near New Canyon Road.	No impact.	Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.
Scenery (3.7)	Evidence of management activities in immediate foreground, until vegetation can reestablish. Depending on treatment type, landscape will eventually appear intact. Middleground and background should appear intact.	No effect to landscape character as seen by the casual visitor. Short-term, less desirable scenery impacts from fire or bug kill within natural appearing landscape.	Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.
Soil (3.8)	Soil compaction will not be detrimental in units with machine fireline and handline and the amount of detrimental soil disturbance in any one unit will not exceed the Forest Plan maximum of	Soil quality will remain unchanged.	Soil compaction will not be detrimental in units with machine fireline and handline and the amount of detrimental soil disturbance in any one unit will not exceed the Forest Plan

Resource (FEIS Section)	Alternative 1	Alternative 2	Alternative 3
	15%. The use of herbicides is very unlikely to result in a reduction in soil quality/productivity. Long-term soil quality and productivity will not be impaired. Compaction from heavy equipment can be avoided by mechanically harvesting and skidding on normal dry or frozen ground. Construction of temporary and intermittent service roads would cause 13 acres of compacted soil.		maximum of 15%. The use of herbicides is very unlikely to result in a reduction in soil quality/productivity. Long-term soil quality and productivity will not be impaired. Compaction from heavy equipment can be avoided by mechanically harvesting and skidding on normal dry or frozen ground. Construction of temporary and intermittent service roads would cause 7.5 acres of compacted soil.
Vegetation (Forested) (3.9)	Of the 1,811 acres treated, 1,193 acres would move to early seral structural stage and closer to PFC. Estimated 21,300 CCF of timber product volume. Early Seral created: Aspen/conifer – 732 acres Lodgepole – 343 ac. Spruce/fir – 38 ac. Mixed conifer – 66 ac. Douglas-fir – 14 ac.	Vegetation would continue to move towards later seral phases of development and move farther from PFC becoming more skewed towards older age classes. No timber supply would be provided. Some stands susceptible to intense fires and mountain pine beetle infestation. Aspen would be at risk clone death from conifer domination.	Of the approximately 1,240 acres treated, 844 acres would move to early seral structural stage and closer to PFC. Estimated 13,700 CCF of timber product volume. Early Seral created (approximate acres): Aspen/conifer – 489 acres Lodgepole – 299 ac. Spruce/fir – 30 ac. Mixed conifer – 26 ac. Douglas-fir – none.
Vegetation (Plants and Noxious Weeds) (3.10)	No effect on rare plants since none were found in project area. Without mitigation, an increase in noxious weeds along roads and following soil disturbing timber harvest activities. More specifically without mitigation, an increase in houndstongue in Units 14, 23, and 59 and Canada thistle in Unit 18.	No effect on rare plants. Noxious weed infestations would continue to increase.	Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction. More specifically without mitigation, an increase in houndstongue in Units 11, 19, and 39 and Canada thistle in Unit 18.
Water Resources (3.11)	RHCA mitigation would minimize the likelihood of herbicides from moving into water features. It is expected that some herbicide will move into the surface water and groundwater but the concentration will be very low and not adversely affect the health of riparian or aquatic vegetation or exceed water quality standards. Buffer strips will slow the movement of herbicide to the point	Water quality (sedimentation and pH) would remain unchanged.	Same as Alternative 1.

Resource (FEIS Section)	Alternative 1	Alternative 2	Alternative 3
	<p>where it will break down before it reaches riparian or aquatic features. The RHCA should serve as a buffer resulting in no sedimentation of streams or springs and no adverse effects to wetlands. There are no floodplains therefore no effects. Very minor, short-term increase in the level of pH in streams from ash. Very minor cumulative effect.</p>		
<p>Wildlife (Terrestrial) (3.12)</p> <p>Big Game Species</p> <p>Terrestrial Management Indicator Species (MIS)</p>	<p>General – Species that prefer early seral vegetation would be more likely to benefit from harvest or prescribed fire. Species that prefer old or mature species will likely have some impact in the short term, but will move vegetation toward PFC in the long term.</p> <p>Mule Deer – Long-term beneficial effect to deer summer habitat from aspen and conifer treatment. Short-term negative effect to forage availability and temporary displacement.</p> <p>Elk – Same as deer, only more benefits to elk summer range due to increases in grasses and forbs. Elk Patch Size - Temporary short-term disturbance effects, but no change from the Ogden Travel Plan in patch size since all routes will be closed after harvest.</p> <p>Moose – Aspen treatments will benefit the same as deer.</p> <p>Gray Wolf – No breeding pairs or a pack identified in Utah to date, only one dispersing animal in 2002. Short-term displacement to prey species such as elk.</p> <p>Northern Goshawk (also a sensitive species) – Vegetation levels move towards PFC. Additional openings and early successional stands improve prey abundance in long-term, but reduce older/mature</p>	<p>General – Diversity in age and structure would be lower and species dependent on early successional stages could decline in abundance and distribution. Aspen decline and conversion to conifer causes further shift in species diversity.</p> <p>Mule Deer, Elk, and Moose – No change in vegetation age-class or structural diversity. No habitat condition improvements.</p> <p>Gray Wolf – No impact.</p> <p>Northern Goshawk (also a sensitive species) – No effect. Vegetation remains in older/mature forest and overstory stand structure.</p>	<p>General – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Mule Deer, Elk, and Moose – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Gray Wolf – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Northern Goshawk (also a sensitive species) – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p>

Resource (FEIS Section)	Alternative 1	Alternative 2	Alternative 3
<p>Threatened Terrestrial Species</p> <p>Endangered Terrestrial Species</p> <p>USFS Intermountain Region Sensitive Species (Terrestrial)</p>	<p>forest and overstory stand structure. May impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.</p> <p>Snowshoe Hare – Data suggests snowshoe hare are increasing. Removing overstory causes short-term negative effect to habitat. Creation of age-class diversity and overall treatments will enhance habitat and support greater numbers in long term within the project area in the future and possibly influencing the trend (increasing the population) in snowshoe hare within a portion of the Wasatch/Bear River Range.</p> <p>Beaver – Beneficial impacts to beaver habitat. Increase in forage and decrease of loss of aspen in stands close to water. No effect to population trend.</p> <p>Canada Lynx – Ogden RD is within a “travel corridor” between two larger habitat areas and is not considered permanent lynx resident habitat. Short-term negative effects directly after implementation, but overall enhancement of prey species’ habitat and numbers in long term. Activities will not likely affect connectivity (i.e., be a barrier to movement). “May effect” finding.</p> <p>Black-footed Ferret – No black-footed ferrets are expected to occur within USFS portion of Big Creek watershed, therefore, “No effect” finding.</p> <p>Northern Goshawk – Discussed under MIS. Sharp-tailed Grouse, Spotted Bat, Bald Eagle, Peregrine Falcon, Great Gray Owl, and Pygmy Rabbit – Not known to occur</p>	<p>Snowshoe Hare – No beneficial improvements to habitat conditions.</p> <p>Beaver – Aspen would continue to decline in acreage.</p> <p>Canada Lynx – No improvement to habitat conditions for lynx prey species.</p> <p>Black-footed Ferret – No Effect.</p>	<p>Snowshoe Hare – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Beaver – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Canada Lynx – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Black-footed Ferret – No Effect</p>

Resource (FEIS Section)	Alternative 1	Alternative 2	Alternative 3
<p>Neotropical Migratory/ Song Birds</p> <p>Species at Risk</p>	<p>in project area. No impact.</p> <p>Boreal Owl – Short-term negative effects to possible habitat with treatments in mature and old forest, but enhances and moves habitat toward PFC in long term.</p> <p>Wolverine – Creation of age-class and structural diversity benefit wolverine and prey species. Short-term displacement effects from roads and harvest to prey species.</p> <p>Townsend’s Big-eared Bat – Short-term negative effects to insect abundance following fire. Beneficial long-term effects to foraging habitat.</p> <p>Flammulated Owl – Similar impacts to Boreal Owl. Beneficial long-term impacts to habitat.</p> <p>Three-toed Woodpecker – Treatment of mature and old forest affects possible habitat in short term, but moves toward PFC in long term. Treatment of mature forest with fire will improve habitat in short term.</p> <p>Greater Sage Grouse – Nearest lek site 5 miles from project area. No effect.</p> <p>Brewer’s Sparrow – Creates age class and structural diversity within shrublands, making habitat less susceptible to catastrophic wildfires. Short-term reduction in nesting habitat. Long-term benefit to population stability and reduction in the risk of catastrophic fire.</p> <p>Broad-tailed Hummingbird – Timber harvest and burns will increase wildflowers and have beneficial impacts in the long term. RHCA buffers protect hummingbird habitat.</p> <p>Fringed Myotis – Not found on Ogden RD. Similar to effects on Townsend’s big-eared bat.</p>	<p>Boreal Owl – No effect.</p> <p>Wolverine – No effect. No improvement to benefit wolverine and its prey species.</p> <p>Townsend’s Big-eared Bat – No effect. No beneficial long-term effect to foraging habitat.</p> <p>Flammulated Owl – No effect. Aspen will continue to decline in acreage and convert to conifer.</p> <p>Three-toed Woodpecker – No effect.</p> <p>Greater Sage Grouse – No effect.</p> <p>Brewer’s Sparrow – No short-term effects to shrublands. If catastrophic fire occurs, reduction in the amount of habitat available for breeding Brewer’s sparrows.</p> <p>Broad-tailed Hummingbird – No effect.</p> <p>Fringed Myotis – No effect.</p>	<p>Boreal Owl – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Wolverine – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Townsend’s Big-eared Bat – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Flammulated Owl – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Three-toed Woodpecker – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.</p> <p>Brewer’s Sparrow – Similar impacts to Alternative 1.</p> <p>Broad-tailed Hummingbird – Similar impacts to Alternative 1.</p> <p>Fringed Myotis – No effect.</p>

Resource (FEIS Section)	Alternative 1	Alternative 2	Alternative 3
	Pine Marten – Selective logging will not reduce marten habitat if removals are kept below 30% of the stem basal area. Removing mature and old forest will effect marten habitat, it will move the forest toward PFC while maintaining a proportion of old and mature forest conditions.	Pine Marten – No effect.	Pine Marten – Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.
Financial Efficiency (3.13)	Timber products provided to the raw materials market would contribute to the continuing operation of local mills. This would add employment and tax revenue to the local economy.	No economic outputs. No return on the cost of the environmental study.	Similar impacts to Alternative 1 although on a smaller scale because of fewer treated acres and miles of road construction.
Environmental Justice (3.14)	No effect on minority or low-income populations, American Indians, women or the civil rights of any U.S. citizen.	Same as Alt. 1.	Same as Alt. 1.

2.5 Forest Service Preferred Alternative _____

The Forest Service’s preferred alternative is Alternative 1, the Proposed Action.

2.6 Environmentally Preferred Alternative _____

Alternative 3 is the environmentally preferred alternative. The objective of this alternative was a reduced level of treatment and a significantly reduced level of road construction to minimize effects to goshawk habitat and other resources while still providing movement towards PFC, maintenance of desired fuel levels with fire operating within historical fire regimes, and timber output, and ensuring Forest Plan standards are met.