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Vegetation Report

Little Deer Project

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Siskiyou County, California

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Executive Summary

Methodology

Stand examinations were not available for this project. Pre-cruise plots were taken to determine species composition, tree size, volume, and percent of vegetation mortality. These plots include a fixed and variable plot on a grid within harvest units. Field visits were also completed to verify collected data and begin the process of formulating treatments. Geographic information system layers were used to identify past harvest activities, vegetation types, and stand boundaries.

The Rapid Assessment of Vegetation Condition model (RAVG) was used to estimate vegetation burn severity based on basal area (existing trees) mortality within the project area. The following categories were used to define high, moderate, low and unchanged:

High: 75-100 percent mortality of basal area

Moderate: 50-75 percent mortality of basal area

Low: 25-50 percent mortality of basal area

Unchanged: 0-25 percent mortality of basal area

Analysis Indicators

The indicator used to evaluate the effects of alternatives on vegetation is the number of acres trending toward ecological capability (desired conditions) five and 20 years after treatment. This indicator will be measured by:

1) Number of acres stocked with conifers (commensurate with site capability) evaluated five years after treatment.
2) Number of acres stocked with desirable shrub species and native grass evaluated five years after treatment.
3) Whether or not the project area is on a path to meet desired conditions (as described in chapter 1) 20 years after treatment and, if so, the time frame in which desired conditions will be achieved.

Spatial and Temporal Boundaries

The spatial boundary for effects on vegetation will be limited to stands proposed for treatment because vegetation changes will be measurable in these units. The temporal boundary for short-term effects is immediately after treatment for up to five years. Long-term effects will extend 20 years post-treatment to evaluate whether stands are on a path to meet desired conditions.

Affected Environment

Before the Little Deer fire, vegetation within the project area was generally described as a lower montane forest type. The ponderosa pine series dominated the project area with the ponderosa pine/bitterbrush plant association (Smith 1994) accounting for about 4,000 acres. Ponderosa pine/incense cedar accounted for about 500 acres around Little Deer Mountain and 150 acres of mixed conifer existed in the same vicinity. In addition, there were several isolated clumps of aspen within the project area.

Stand conditions before the fire were affected by selective harvest of mature ponderosa pine during the railroad logging era from the 1900's to the middle 1940's. Stands were mid-seral in development before the fire with a scattering of larger remnant trees (mostly ponderosa pine) not removed during railroad logging. Stand densities were high, due to lack of frequent low intensity fires, making this area susceptible to disturbance factors such as wildfire, insect and disease (Larson and Churchill 2012, North 2012).

Before the fire, the shrub community was dominated by bitterbrush growing under the exiting canopy of conifers. Mountain mahogany generally occupied the rocky portions of the project area. Manzanita and rabbit brush were most prevalent in openings. Idaho fescue appears to have been the most prevalent native grass, also occupying openings.

After the wildfire, a majority of the overstory and understory vegetation was lost. In areas of low fire severity, patches of trees and understory vegetation survived, accounting for a relatively small percentage of the project area.

Based on the "Rapid Assessment of Vegetation Condition after Wildfire" (RAVG), high and moderate severity fire affected 82 percent of the project area (46 percent was high severity and 36 percent was moderate). As a result, the majority of the overstory and understory vegetation was lost. Many of the low severity areas are on the edges of the fire perimeter with a few patches of live trees in the interior, limiting seed availability. Mountain mahogany originally occupying lava extrusions also experienced high mortality, with a relatively small percentage surviving. Several isolated clumps of aspen remain within the project area.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Alternative 1 does not have direct effects but has indirect consequences. For example, additional tree mortality is anticipated in areas burned with high and moderate severity due to fire damage, drought stress, and subsequent insect attack, notably western and mountain pine beetle (Agwin 2013, Wood 2002, Hood and Smith 2007). This further reduces the limited seed source within the project area. Without harvesting dead and dying trees, and not planting vegetation (including shrubs and native grasses), the establishment of desired (browse species and conifers) vegetation will be impeded (Savage and Mast 2005). As a result, the ecological capability and plant diversity will not be fully realized.

Dead and dying trees will be most susceptible to windthrow over the next five years. During this period, it is estimated that 60 percent of standing dead trees will have fallen (based on observations of Mt. Hebron fire).

In general, without planting, conifer establishment will be delayed for an extended period of time (Bryan and Rynearson 2008). Lack of an available seed source will reduce the number and distribution of natural seedlings. Only 360 acres are anticipated to naturally regenerate within five years. Without the removal of dead and dying trees, future wind throw will inhibit seedling development. In addition, brush species such as ceanothus, mahalamat and manzanita can establish from existing live roots and seed banks (Hibbs 2011). Establishment of such species makes conifer establishment uncertain, especially given a limited seed source (Zhang et al.

2008). It is anticipated in 20 years that competing brush will have occupied sizeable portions of the project area.

Re-establishment of mountain mahogany will be delayed without planting. Mountain mahogany does not sprout well and regenerates most effectively through seeding (Gucker 2006). With a majority of the mahogany lost in the fire, the available seed source has been dramatically reduced; it will be difficult for mahogany to recolonize on lava flows that provided much of the habitat before the Little Deer fire. Significant regrowth of mountain mahogany is not expected over the next 20 years.

Regeneration of bitter brush is uncertain, at best, with high severity fire (Zlatnik 1999). This important browse species will be dramatically reduced for an extended period of time without planting. Other less desirable shrubs such as manzanita, rabbit brush and ceanothus will become established, further limiting opportunities for bitter brush.

Native grasses will have difficulty re-establishing, since invasive species such as cheat grass are prolific after disturbance such as from wildfire (Young 1995).

Table S- 1: Results of vegetation measures used for alternative 1

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	360 acres	No
Desirable Shrub Species	263 acres	No
Native grasses	0 acres	No

After 20 years, the project area is not anticipated to be on a path to meet desired future vegetation conditions with this alternative.

Cumulative Effects

The effects of past actions have been included in the description of the affected environment. The impacts of cattle grazing in the Horsethief grazing allotment are considered in cumulative effects analysis because grazing is a continuing action overlapping the analysis area for vegetation. The potential negative effects of continued cattle grazing to vegetation will be minimized by implementation of adaptive management through the allotment management plan and are not likely to have a measurable effect on the vegetation analysis indicators.

Salvage operations and anticipated reforestation on private land (666 acres) are ongoing activities within the project boundary (appendix C) that will increase the number of stocked acres of conifers after five years. However, these actions do not overlap the vegetation treatment acres of this project.

Adding the effects of alternative 1 to those of ongoing and reasonable foreseeable future actions is not likely to have measurable cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

Removing dead and dying trees, and planting conifers in areas where removal is implemented, will reforest 1,821 acres. Site preparation, and vegetative release (grubbing) around planted trees to reduce competition, will improve tree survival and increase growth.

The effectiveness of conifer planting is well documented (Zhang, 2008 and Landram 1996); planting stock consisting of 1-2 year old ponderosa pine seedlings will improve survivability compared to natural regeneration. With a well-developed root system, seedlings are able to draw moisture 8-12 inches below the ground surface. After reforestation, mosaic patterns will result due to the presence of rocky soils (on which planting is not likely to be successful) and seedling mortality (which may be up to 40 percent). Resulting stocking levels are expected to be commensurate with site productivity (FSH 2409.26) and provide desired spatial variability. Inter-planting shrubs and native grasses will provide a seed source and assist in developing a shrub and grass layer underneath planted conifers which will assist in meeting desired future conditions.

Mountain mahogany planting, especially along edges of lava flows and rock formations, will cover an estimated 10 percent of acres designated for shrub/grass planting, recolonize the areas where it historically grew, and provide seed for future establishment.

Bitter brush planting, especially in rocky areas and openings, will cover an estimated 10 percent of acres designated for shrub/grass planting, develop a younger age class of shrubs and provide a seed source to assists in its re-establishment.

Native grass seeding of up to 15 percent of acres designated for shrub/grass planting and seeding and 15 percent of the acres designated for conifer reforestation will improve re-establishment of grasses.

Table S- 2: Results of measures used for alternative 2

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	2,312 acres	Yes
Desirable Shrub Species	753 acres	Yes
Native grasses	513 acres	Yes

The proposed action helps to meet the ecological restoration goals identified for this project. After a 20 year period, the project area is anticipated to be on a path to meet desired future conditions described in chapter 1.

Cumulative Effects

Adding the effects of alternative 2 to the effect of ongoing and reasonable foreseeable future actions described in alternative 1 will not have any substantial cumulative effects.

Alternative 3

Direct Effects and Indirect Effects

Conifer planting will have similar effects as alternative 2 although 364 fewer acres will be treated. Mountain mahogany and bitterbrush planting will take place only within the "dead tree removal" units and the number of reestablished acres outside these units will be small. Native grass seeding will take place only within the "dead tree removal" and only be re-established within these stands.

Table S- 3: Results of measures used for alternative 3

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	1,955 acres	Yes
Desirable Shrub Species	423 acres	Yes
Native grasses	239 acres	Yes

After 20 years, vegetation will be on a path to meet desired conditions. However, the time frame will be longer than alternative 2 as fewer acres will be stocked with desirable species.

Cumulative Effects:

Adding the effects of alternative 3 to the effect of ongoing and reasonable foreseeable future actions described in alternative 1 will not have any substantial cumulative effects.

Comparison of Effects

Table S- 4: Comparison of vegetation measures by alternative

	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)			After 20 years is vegetation on a path to meet desired conditions?		
Vegetation Type	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Conifers	360	2,312	1,955	No	Yes	Yes
Desirable Shrub Species	263	753	423	No	Yes	Yes
Native grasses	0	513	239	No	Yes	Yes

Alternative 1 relies on natural regeneration of conifers, desirable shrubs and native grasses. As a result, relatively few acres are anticipated to be stocked after five years. After 20 years, natural processes will not be on a path to meet desired conditions. The time frame will take much longer than other alternatives without planting desirable species.

Alternative 2 reforests more acres than other alternatives and more acres of desirable shrubs/grasses will be planted in targeted areas. After 20 years, vegetation will be on a path to meet desired conditions. The time frame will be shorter than other alternatives, as more acres will be stocked with desirable species.

Alternative 3 reforests more acres than alternative 1 and fewer acres than alternative 2 as displayed in table 3-4. After 20 years, vegetation will be on a path to meet desired conditions. However, the time frame will be longer than alternative 2 as fewer acres will be stocked with desirable species.

Compliance with Law, Policy, Regulation, and the Forest Plan

All alternatives are in compliance with law, policy, regulation and the standards for the Forest Plan as displayed in the Forest Plan consistency checklist, available on the project website.

Vegetation Resource Report

Introduction

The focus of this report is on the effects of the Little Deer project on vegetation. The purpose and need for the project, and a description of the proposed action and alternatives, are discussed in chapters 1 and 2 of the environmental assessment (EA). In addition, desired conditions for land allocations within this project are also described in Chapter 1.

Methodology

Stand examinations were not available for this project. Pre-cruise plots were taken to determine species composition, tree size, volume, and percent mortality. These plots include a fixed and variable plot on a grid throughout harvest units. Field visits were also completed to verify collected data and begin the process of formulating treatments.

Geographic Information System (GIS) layers were used for past harvest activities, vegetation types, and stand boundaries.

The Rapid Assessment of Vegetation Condition model (RAVG) was used to estimate vegetation burn severity based on basal area (existing trees) mortality within the project area. The following categories were used to define high, moderate, low and unchanged:

- **High**- 75-100% mortality of basal area
- **Moderate**- 50-75% mortality of basal area
- **Low**- 25-50% mortality of basal area
- **Unchanged**- 0-25% mortality of basal area

Analysis Indicators

The indicator for evaluating alternatives will be number of acres trending toward ecological capability (desired conditions) 5 and 20 years after treatment. This indicator will be measured by:

1) Number of acres stocked with conifers (commensurate with site capability) evaluated 5 years after treatment.
2) Number of acres stocked with desirable shrub species and native grass evaluated 5 years after treatment.
3) Whether or not the project area is on a path to meet desired conditions (as described in Chapter 1 of the EA) 20 years after treatment. In addition, time required to meet desired conditions will be considered.

Spatial and Temporal Boundaries

- The spatial boundary for effects on vegetation will be limited to stands treated (or proposed for treatment) because vegetation changes will be visible in these units. Vegetation (conifers and browse species) can be affected by conditions that occur at the

landscape level, such as an insect epidemic or wildfire but these changes will be measured at the stand level.

- The temporal boundary for short-term effects is immediately after treatment for up to five years. Long-term effects will extend 20 years to evaluate whether stand conditions are on a path to meet desired conditions.

Affected Environment

After the wildfire, a majority of the overstory and understory vegetation was lost. In areas of low fire severity, patches of trees and understory vegetation survived, accounting for a relatively small percentage of the project area.

Before the fire, vegetation within the project area could generally be described as a lower montane forest type. The ponderosa pine series dominated the project area with the ponderosa pine/bitterbrush plant association (Smith, 1994) accounting for about 4,000 acres. Ponderosa pine/incense cedar accounted for about 500 acres around Little Deer Mountain and 150 acres of mixed conifer accounted for about 150 acres in the same vicinity. In addition, several isolated clumps of aspen are present within the project area.

Stand conditions before the fire were affected by selective harvest of mature ponderosa pine. This occurred during the railroad logging era from the 1900's to the middle 1940's. Stands were mid-seral in development before the fire with a scattering of larger remnant trees (mostly ponderosa pine) not removed during railroad logging. Stand densities were high, due to lack of frequent low intensity fires, making this area susceptible to disturbance factors such as wildfire, insect and disease (Larson and Churchill 2012, North 2012).

Before the fire, the shrub community was dominated by bitterbrush (*purshia tridentada*), growing under the exiting canopy of conifers. Mountain mahogany (*cerocarpus ledifolious*) generally occupied the rocky portions of the project area. Manzanita (*ceanothus velutinus*) and rabbit brush *(Chrysothamnus spp.)* were most prevalent in existing openings. Idaho fescue (*festuca idahoensis*) appears to have been the most prevalent native grass, which also occupied openings.

Based on the "Rapid Assessment of Vegetation Condition after Wildfire" (RAVG), high and moderate severity fire affected 82% of the project area. As a result, the majority of the overstory and understory vegetation was lost. Many of the low severity areas are on the edges of the fire with a few patches of live trees in the interior, limiting seed availability. Mountain mahogany that had occupied lava extrusions also experienced high mortality, with a relatively small percentage surviving.

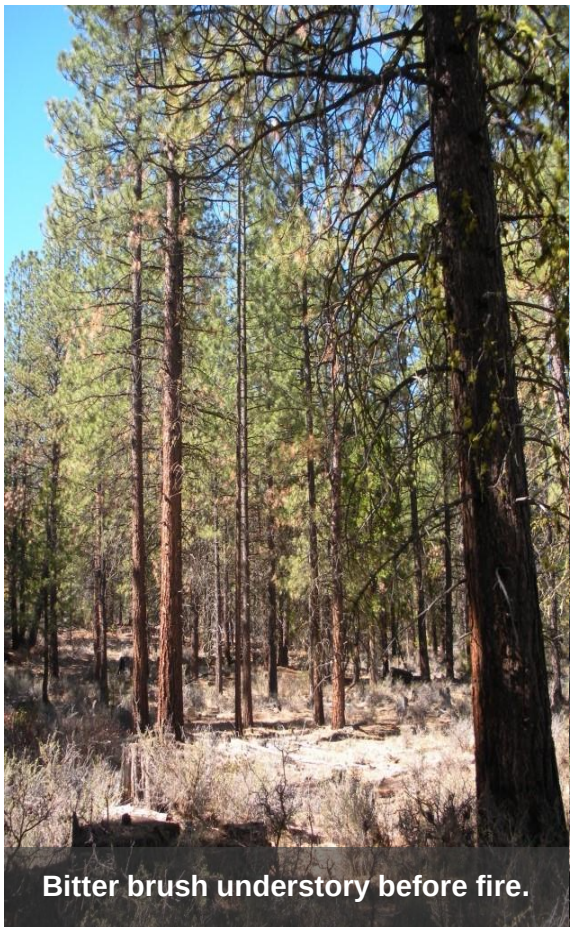

Figure 1: High stocking levels typical of this project area before fire, note bitter bush in understory.

Figure 2: Examples effects of high and low severity fire on vegetation

Environmental Consequences

This section will analyze the effects each alternative has on the affected environment. The effects will be analyzed using measures described under the analysis indicators.

Alternative 1

Direct and Indirect Effects

Alternative 1 does not have direct effects, but has indirect consequences. For example, additional tree mortality is anticipated in areas burned with high severity due to fire damage, drought stress, and subsequent insect attack, notably western (*Dendroctonus brevicomis*) and mountain (*Dendroctonus ponderosae*) pine beetle (Agwin, 2013, Wood, 2002, Hood and Smith, 2007). This further reduces the limited seed source within the project area. Without harvesting dead and dying trees, and not planting vegetation (including shrubs and native grasses), the establishment of desired (browse species and conifers) vegetation will be impeded (Savage and Mast, 2005).As a result, the ecological capability and plant diversity would not be fully realized.

Dead and dying trees will be most susceptible to windthrow over the next 5 years. During this period, it is estimated that 50% of standing dead trees will have fallen (based on observations of Mt. Hebron fire). As fuel loadings increase due to windthrow, so does the risk of high severity wildfire.

In general, without planting, conifer establishment will be delayed for an extended period of time (Bryan and Rynearson 2008). Lack of an available seed source will reduce the number and distribution of natural seedlings. Only 360 acres are anticipated to naturally regenerate after 5years. Without removal of dead and dying trees, future windthrow will inhibit seedling development. In addition, competing brush species such as ceanothus (*Ceanothus velutinus*), mahalamat (*Ceanothus prostratus*) and manzanita (*Arctostaphylos patula*) can establish from existing live roots and seed banks (Hibbs, 2011). Establishment of such species makes conifer establishment uncertain, especially given a limited seed source (Zhang et al. 2008). It is anticipated in 20 years, competing brush will have occupied significant portions of the project area.

Re-establishment of mountain mahogany will be delayed without planting. Mountain mahogany does not sprout well and regenerates most effectively through seeding (Gucker 2006). With a majority of the mahogany lost in the fire, the available seed source has been dramatically reduced and will be difficult to recolonize on lava flows which provided much of the habitat before the Little Deer fire. Significant regrowth of mountain mahogany is not expected over the next 20 years.

Regeneration of bitter brush is uncertain, at best, with high severity fire (Zlatnik, 1999). This important browse species would be dramatically reduced for an extended period of time without planting. Other less desirable shrubs, such as manzanita, rabbit brush and ceanothus would become established, further limiting opportunities for bitter brush.

Native grasses would have difficulty re-establishing, as invasive species, such as cheatgrass, are prolific after disturbance such as wildfire (Young, 1995).

Table 1: Results of measures used for Alternative 1

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	360 acres	No
Desirable Shrub Species	263 acres	No
Native grasses	0 acres	No

After 20 years, the project area is not anticipated to be on a path to meet desired future conditions with this alternative.

Cumulative Effects

The effects of past actions have been included in the description of the Affected Environment. The impacts of cattle grazing in the Horsethief grazing allotment are considered in cumulative effects analysis because this is a continuing action that overlaps with project activities. The potential negative effects of continued cattle grazing to vegetation will be minimized by implementation of adaptive management through the allotment management plan. Grazing is not likely to have a measurable effect on the analysis indicator. Therefore, is not likely to have measurable cumulative effects.

Another ongoing activity is salvage operations on private land (666 acres) that are within the project boundary (reference cumulative effects in project record). This will cumulatively increase an indicator used for this project measuring the number of stocked acres of conifers after five years.

Alternative 2

See Chapter 2 for alternative description.

Direct and Indirect Effects

Planting in areas where salvage logging has taken place will provide safety to forest workers and reduce future fire risk. Mechanical site preparation will be an option in plantations where excessive material exists. If needed, vegetative release (grubbing) will be implemented around planted trees to reduce competition, improve survival and increase growth.

The effectiveness of planting is well documented (Zhang, 2008, Landram, 1996). Planting stock will consist of 1-2 year old Ponderosa pine seedlings. With a well-developed root system, seedlings are able to draw moisture from 8-12 inches below the ground surface. Compared to natural regeneration, this greatly improves survival. After reforestation, mosaic patterns will result due to rocky soils and seedling mortality, which could be up to 40 %. if soil conditions are dry during planting. Resulting stocking levels are expected to be commensurate with site productivity (FSH 2409.26, 1991) and provide desired spatial variability. Inter-planting shrubs and native grasses will provide a seed source and assist in developing a shrub and grass layer underneath planted conifers. This will provide foraging opportunities for wildlife and assist in meeting desired future conditions.

Mountain mahogany planting will cover an estimated 10% of acres designated for shrub planting. Planting will be concentrated along edges of lava flows and rock formations, where it historically grew. As the mahogany becomes established, it will provide seed, and once again, colonize areas where it historically grew.

Bitter brush planting will cover an estimated 10% of acres designated for shrub planting. Planting will be focused in rocky areas and openings where it historically grew. This will improve browse conditions by developing a younger age class of shrubs and provide a seed source to assists in its re-establishment.

Native grass seeding will cover an estimated 15% of acres designated for shrub/grass planting and seeding and 15% of the acres designated for conifer planting. This will improve species diversity and browse conditions.

Table 2: Results of measures used for alternative 2

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	2,312 acres	Yes
Desirable Shrub Species	753 acres	Yes
Native grasses	513 acres	Yes

The proposed action meets the ecological restoration goals identified for this project. After a 20 year period, the project area is anticipated to be on a path to meet desired future conditions described in Chapter 2.

Cumulative Effects

Same as Alternative 1

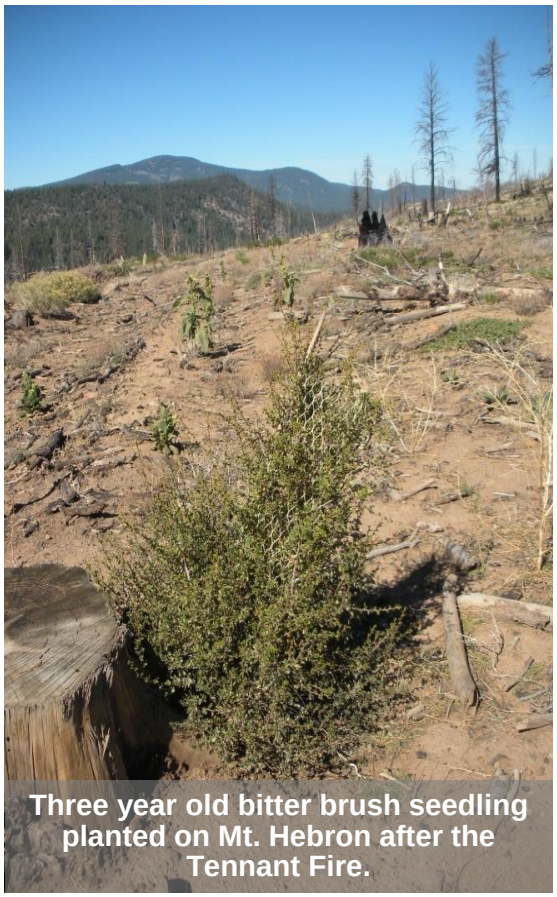

Figure 3: Example of conifer and bitter brush planting

Alternative 3

See Chapter 2 for alternative description.

Direct and Indirect Effects

Conifer planting would have similar effects as Alternative 2, with the exception of 364 fewer acres being treated. Mountain mahogany planting will not take place in many of the targeted areas for this species. Limited areas within the “dead tree removal” units may be planted if suitable conditions exist. Bitter brush planting will not take place in many of the targeted areas for this species. Limited areas within the “dead tree removal” units may be planted if suitable conditions exist. Native grass seeding will not take place in many of the targeted areas for this

species. Limited areas within the "dead tree removal" units may be planted if suitable conditions exist. Table 3.2 displays results of measures used for the analysis indicator.

Table 3: Results of measures used for alternative 3

Type of Vegetation	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)	After 20 years is vegetation on a path to meet desired conditions?
Conifers	1,955 acres	Yes
Desirable Shrub Species	423 acres	Yes
Native grasses	239 acres	Yes

After 20 years, vegetation will be on a path to meet desired conditions. However, the time frame will be longer than Alternative 2, as fewer acres will be stocked with desirable species.

Cumulative Effects:

Same as Alternative 1.

Comparison of Effects

Alternative 1 (No Action) relies on natural regeneration of conifers, desirable shrubs and native grasses. As a result, relatively few acres are anticipated to be stocked after 5 years. After 20 years, natural processes will not meet desired conditions. The time frame will take much longer than other alternatives without planting desirable species.

Alternative 2 (Proposed Action) reforests more acres than other alternatives. This alternative plants and seeds more acres of desirable shrubs/grasses in targeted areas than other alternatives. After 20 years, vegetation will be on a path to meet desired conditions. The time frame will be shorter than other alternatives, as more acres will be stocked with desirable species.

Alternative 3 reforests 364 fewer acres than Alternative 2. Shrub planting does not take place in as many targeted areas and plants 330 fewer acres than Alternative 2. Native grass seeding does not take place in as many targeted areas, and seeds 274 fewer acres than Alternative 2. After 20 years, vegetation will be on a path to meet desired conditions. However, the time frame will be longer than Alternative 2, as fewer acres will be stocked with desirable species.

Table 4: Comparison of vegetation measures by alternative

	Acres Stocked after 5 years (See appendix A of the Vegetation Resource Report)			After 20 years is vegetation on a path to meet desired conditions?		
Vegetation Type	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 1**	**Alt. 2**	**Alt. 3**
Conifers	360	2,312	1,955	No	Yes	Yes
Desirable Shrub Species	263	753	423	No	Yes	Yes
Native grasses	0	513	239	No	Yes	Yes

Compliance with Law, Policy, Regulation, and the KNF Forest Plan

All alternatives are in compliance with law, policy, regulation and the standards and guidelines for the Forest Plan as displayed in the Forest Plan consistency checklist, available on the project website.

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Appendix A- Assumptions

1) The period of 5 years was chosen as a reasonable length of time in which planted conifers and desirable shrub species would have established. Root systems should be well developed and able to withstand biotic (drought) and abiotic (browsing) factors.
2) Adequate stocking levels are based on site quality, using the region 5 silvicultural handbook 2409.26-44.91c, which specifies minimal and acceptable stocking levels for given site conditions (site class 3 100-150 TPA). Planting spacing is tentatively planned at 12' by 12'. This equated to 300 trees per acre. With plantability estimated at 60% and up to 40% mortality this leaves 110 trees per acre, which is compatible with recommended stocking levels.
3) 10% of planting acres was estimated to be planted with bitter brush, and 10% with mountain mahogany. This value could vary depending on seed availability and site conditions.
4) Methods used to determine acres of treatment
    - Alternative 1
    - Natural conifer regeneration: totals 360. 1,440 acres were low to moderate severity in which live conifers remain. 25% of these acres are estimated to regenerate naturally (based on Mt Hebron information)
    - Existing shrub component: totals 262 acres. 18% was low intensity with 1,463 available to plant equals 262.
    - Existing native grass: totals 0 acres. Due to lack of data.
    - Alternative 2
    - Conifer planting: totals 2,312 acres. 360 acres were estimated after 5 years, 1,952 acres of planting conifers.
    - Shrub planting: totals 753 acres. 263 were existing after fire, plus 293 acres (20% of shrub and grass planting 1,463 acres) plus 197 (10% of conifer planted acres).
    - Native grass seeding: totals 513 acres. 15% of conifer planted area equals 294ac and 219ac in shrub and grass planting area.
    - Alternative 3
    - Conifer planting; totals 1,955 acres. 1,595ac shown on treatment map and 360 acres of existing natural regeneration.
    - Shrub planting: totals 423 acres. 263 existing and 10% of conifer planted acres = 160.
    - Native grass seeding: totals 239. 15% of treated acres of 1,598.