

# GTR- 373 and preliminary integration into Forsythe II Project

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Forsythe II MMG GTR-373 webinar

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Past Decisions Informed Changes to Forsythe  
II Current Projects

# Past Project Purpose, Need, Objectives

## **Sugarloaf Fuel Reduction Project (2004)**

- **PURPOSE:** Support the fuel reduction goals and objectives of the National Fire Plan and the Front Range Fuels Treatment Partnership and to move the area towards the desired conditions identified in the Revised Forest Plan
- Reduce trees that serve as ladder fuels
- Create gaps in the forest canopy to prevent crown fire initiation and spread
- Prune lower dead and live branches that create ladder fuels to the forest canopy
- Road objectives (i.e. decommissioning of specific roads)
- Prepare landscape for and introduce broadcast burn to restore fire to a fire adapted ecosystem

# Past Project Purpose, Need, Objectives

## Gold Lake Vicinity (2009)

- ~8600' – Ecological objectives were incorporated into the implementation of fuel reduction projects.
- Promote structural diversity by removing trees of all size classes (not just ladder fuels) while still meeting fuel reduction objectives.
- Started to demonstrate that multiple objectives (fuels reduction and ecological) could be met at the treatment scale level.



# Past Project Purpose, Need, Objectives

## Taylor (2010)

- ~8700' - Taylor was one of the first Collaborative Forest Landscape Restoration Projects to be implemented on the South Zone.
- A large portion of the treatment area was in Inventoried Old Growth (large trees were cut).
- Taylor combined a fuels reduction project (St. Vrain Fuels Reduction Project) with the primary emphasis on fuel reduction and incorporated ecological objectives (stand structural heterogeneity) in an area where neighbors had a high social value for the old growth integrity.



# Forsythe Fuels Reduction Project



## Project Purpose, Need, Objectives

### **Forsythe Fuels Reduction Project (2012)**

- **PURPOSE:** Need to apply vegetative treatments to maintain or improve watershed and forest health, reduce hazardous fuels and modify wildfire behavior; need to increase the amount and vigor of quaking aspen stands and meadows across the project area.
- Selectively cut conifers while leaving healthier and more fire resistant trees and conifer stands less susceptible to MPB infestations.
- Prescribed broadcast burning would be used to reduce flammable fuels.
- To maintain the size and vigor of aspen and meadows, individual conifer trees would be cut by various methods.

# Forsythe II Project Objectives

- **Objective 1:** Reduce the severity and intensity of a wildfire within the wildland urban interface
- **Objective 2:** Restore ponderosa pine/mixed conifer stands, aspen, and meadows/shrublands toward their characteristic species composition, structure, and spatial patterns in order to increase resistance and resiliency to future natural disturbance
- **Objective 3:** Emulate natural disturbance in lodgepole pine dominated stands to mimic variable structural and spatial patterns across the landscape in order to increase resistance and resiliency to future natural disturbance
- **Objective 4:** Provide private property landowners the opportunity to complete defensible space mitigation around their homes on adjacent NFS lands

# Fuel Reduction, Ecological, and Social Objectives in a WUI Environment

**Desired outcomes of Forsythe II project are to achieve multiple outcomes across the project, therefore success can be measured when fuel reduction objectives and ecological and social values at broader scales have been addressed**

- Forest management today often seeks to restore ecological integrity and enhance human well-being by increasing forest complexity, resilience (*sensu* Holling), and functionality (Rietbergen-McCracken et al.)
- All of this is Scale dependent:
  - spatially (landscape and treatment levels) and
  - temporally (just after treatment is completed and both in the near and distant future)
- Fuel Reduction: Tree density reduction
- Ecological or Restoration: Maintain and promote resistance and resiliency in stands across the landscape
- Social: Sense of place, quality of life, wildlife viewing, being in nature
- Almost all of the planned units at this point have the possibility of meeting more than one, if not all of the objectives outlined above and in the Decision Notice

# GTR Recommendation for Fuel Reduction vs. Ecological Restoration

- Fuel treatments focus on changing forest structure and fuels that reduce wildfire hazard and the potential for active crown fire
- Fuels treatment involve removal of ladder fuels, reducing the loading and continuity of surface fuels, increasing canopy base heights, and increasing the spacing between tree crowns
- “Fuel reduction is an outcome of ecological restoration as well, though restoration typically involves additional objectives and focuses on restoring complexity and heterogeneity and enhancing features that are currently missing or rare on the landscape today that were present historically.” (GTR-373, pg. 65)
- Fuels reduction and restoration are not mutually exclusive
- Restoration principles can also be applied where possible to achieve benefits beyond hazard fuels reduction
- The larger landscape matrix between homes is well suited to a restoration-based approach

# Treatment Comparison

**Fuel Reduction Treatment**



**Restoration w/ Fire Hazard Reduction**



GTR recommendations and preliminary  
incorporation into Forsythe II Project

# Practices for restoration

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Step-wise process to facilitate implementation of principles

- **Step 1:** Identify ecological values, restoration goals, and desired conditions at the landscape scale
- **Step 2:** Assess landscape conditions to identify treatment needs and priorities
- **Step 3:** Develop landscape treatment plan
- **Step 4:** Define goals and desired conditions at the stand scale
- **Step 5:** Assess current conditions at the stand scale
- **Step 6:** Develop treatment plans and prescriptions
- **Step 7:** Monitor at all scales to inform adaptive management

# GTR-373 recommended steps and integration into Forsythe II Project

GTR recommended steps	USFS Forsythe II Project integration
<b>Step 1:</b> Identify ecological values, restoration goals, and desired conditions at the landscape scale	USFS assessment of values at risk & involvement in Collaborative Restoration Landscape Restoration Program (CFLRP)
<b>Step 2:</b> Assess landscape conditions to identify treatment needs and priorities	Habitat Structure Stages and Cover types analyses (part of NEPA analysis)
<b>Step 3:</b> Develop landscape treatment plan	Forsythe II Project unit identification through NEPA analysis
<b>Step 4:</b> Define goals and desired conditions at the stand scale	Developed from NEPA and specialists reports
<b>Step 5:</b> Assess current conditions at the stand scale	Perform forest inventories and step transects to assess current conditions
<b>Step 6:</b> Develop treatment plans and prescriptions	Integrate stand inventory data, desired conditions, and MMG collaboration into treatment plans and Rx
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# Forsythe II Desired Conditions

- **Objective 1:** Create a condition on the landscape where fire behavior is modified to reduce the threat of a catastrophic, wildfire in the direction of the values at risk. The condition could be achieved by reducing the surface fuel loading, increasing the spacing between tree crowns, and decreasing the canopy closure to less than 70%
- **Objective 2:** The desired condition is a fire resilient, multi-aged structure across vegetation cover types that represent a variety of habitats. The desired condition would resemble a forest structure that functioned similar to pre-settlement conditions yet adapts for fluctuations and variance in the face of a changing climate. Restoration activities would provide a landscape-level resilience to disturbance. (Ponderosa pine/Mixed Conifer, Aspen, Meadows & Shrublands)
- **Objective 3:** The desired condition would be patches of varying seral stages distributed across the area. The heterogeneous pattern of lodgepole pine stands would exhibit patches of even-aged stands mixed throughout the general forest to provide a discontinuous crown level that would provide a greater resiliency to large disturbances
- **Objective 4:** Private property owners would continue to initiate and maintain defensible space mitigation to the standards established by the CSFS on their personal property as well as adjacent NFS lands, as needed, to be compliant with home insurance companies

## Panel 7—Desired Conditions for Forest Structure and Composition Across Scales

Desired conditions describe expected patterns of vegetation and the arrangement of various patch types based on topography, disturbance regimes, and forest developmental processes. Dickinson and SHSFRR (2014) identified the following desirable patterns in landscape and stand structures for the Front Range, based on an assessment of current forest structures:

### Landscape Scale

- Open, low-density forest patches and openings occur on south-facing slopes, on ridges, and at lower elevations.
- Higher tree densities occur on north-facing slopes, at higher elevations, and in draws and drainages.
- Larger patches (forested or open) occur at higher elevations with mixed-conifer forest types (tens to hundreds of acres) dominating, in contrast with smaller patch sizes at lower elevations, where ponderosa pine forests dominate.
- Larger patches (forested or open) occur on north-facing slopes compared to south-facing slopes.
- Larger patches (forested or open) occur on steep topography; however, where the topography is highly dissected, substantial topographic breaks restrict patch size.
- Landscapes have a very large number of small (<10 acres) patches that cumulatively occupy less than half of a watershed, and a few large patches that occupy half or more of the watershed.
- Both even- and uneven-aged forest patches exist across the landscape; however, there is a predominance of uneven-aged patches, characterized by a range of tree sizes and ages.

### Stand Scale

- Openings, groups of trees, and single isolated trees are all present within stands; the proportion and size of openings, groups, and single trees vary within and among stands.
- On low-productivity sites (generally drier sites at lower elevations or south-facing slopes, or both), there is greater prevalence of openings and single isolated trees; ponderosa pine is the dominant tree species.
- On higher-productivity sites (generally with higher moisture availability at higher elevations or north-facing slopes, or both), there is greater prevalence of larger tree groups with fewer openings and isolated trees; ponderosa pine is still the dominant species but co-occurs with Douglas-fir.
- The proportion of trees in groups varies from stand to stand, ranging from 0 to 80 percent of trees in groups. However, most stands across the landscape have 30 to 60 percent of trees in groups. Groups range in size from 2 to 20 trees, with larger groups on more productive sites. On most sites the median tree group size is small (two to three trees per group).
- Stands contain old trees, snags, and downed wood that lend stand complexity and habitats for wildlife.

# GTR Identified Landscape Conditions

- **Current vegetation condition assessment**

- Openings
- Open-canopy forest patches
- Closed-canopy forest patches

- **Values at risk assessment**

- Wildland-Urban-Interface
- Water Resources
- Important Habitats
- Biological Legacies

- **Opportunity assessment**

- Opportunities for achieving multiple objectives
- Opportunities for the use of fire
- Recently burned areas
- Land ownership patterns
- Networks of restored forests

# Forsythe II Landscape Scale

# GTR-373 recommended steps and integration into Forsythe II Project

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# Forsythe II Project Vegetation Cover Types

Arapaho Roosevelt  
National Forest  
Boulder Ranger District



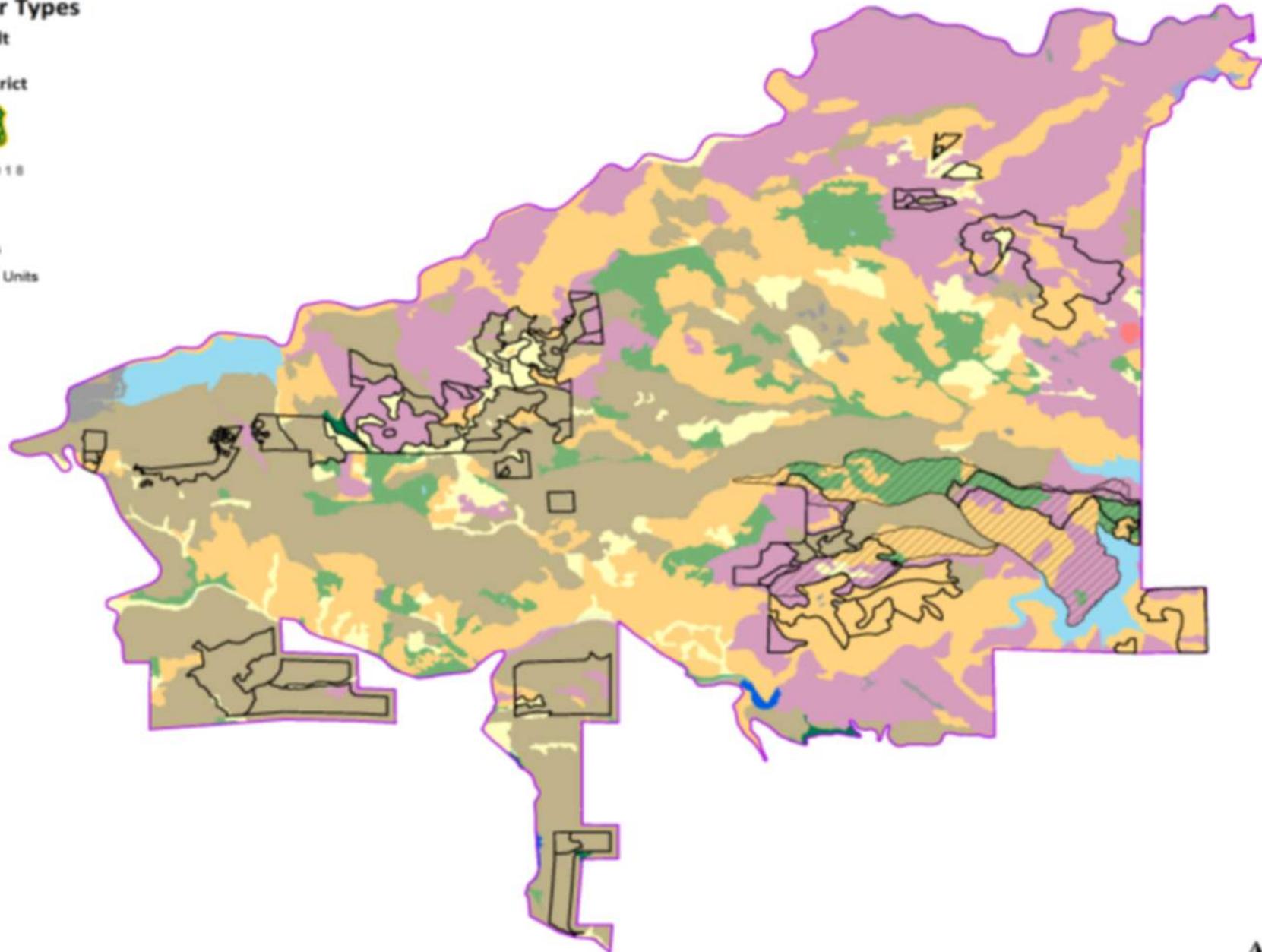
Map Date 3/22/2018

## Legend

- Final Decision Units
- Final Decision Burn Units
- Project Boundary

## Cover Type

- Water
- Bare Ground, Rock
- Grass
- Shrubs
- Willow
- Aspen
- Douglas-fir
- Lodgepole pine
- Ponderosa/Juniper
- Ponderosa pine
- Spruce/fir

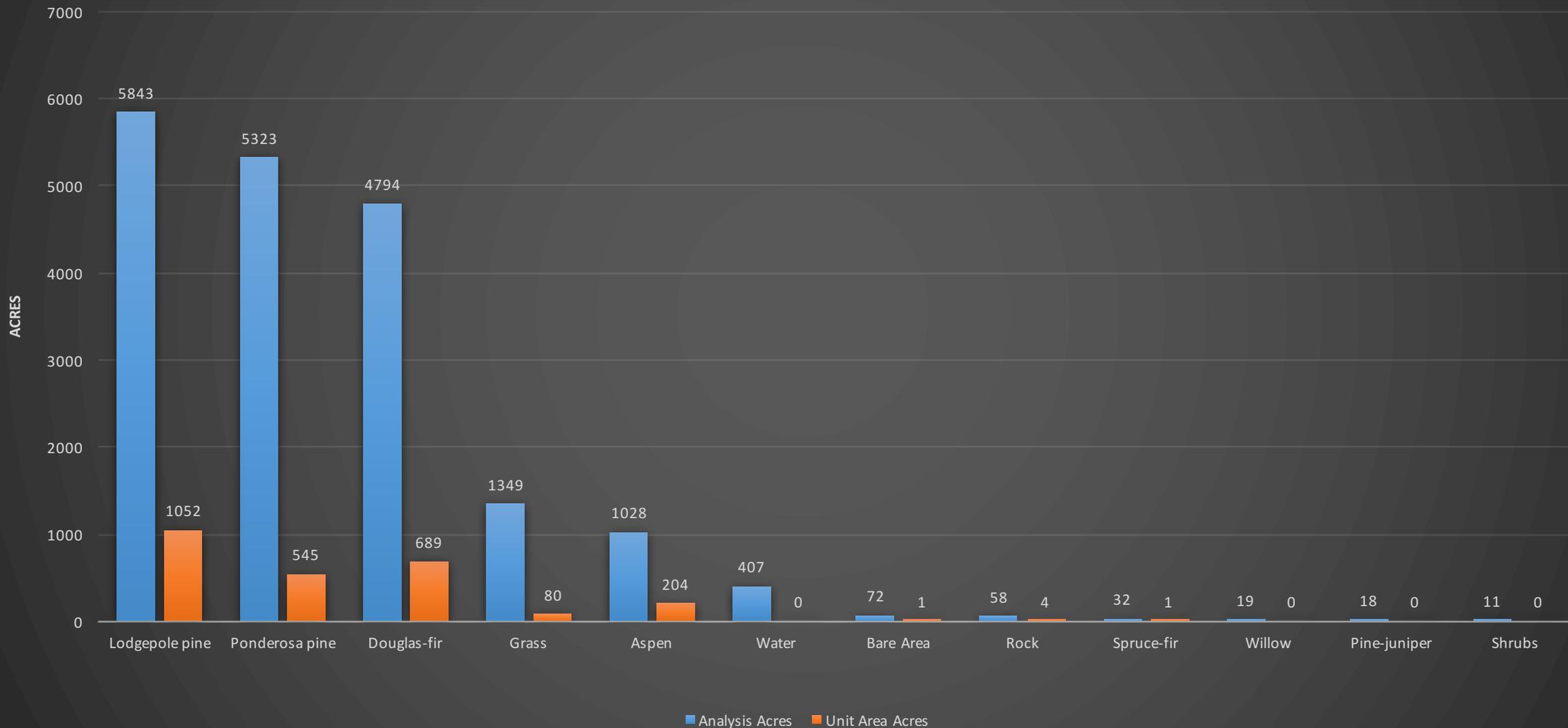


1 mile = 4 inches

0 0.5 1 Miles



# Forsythe II Cover Type Summary

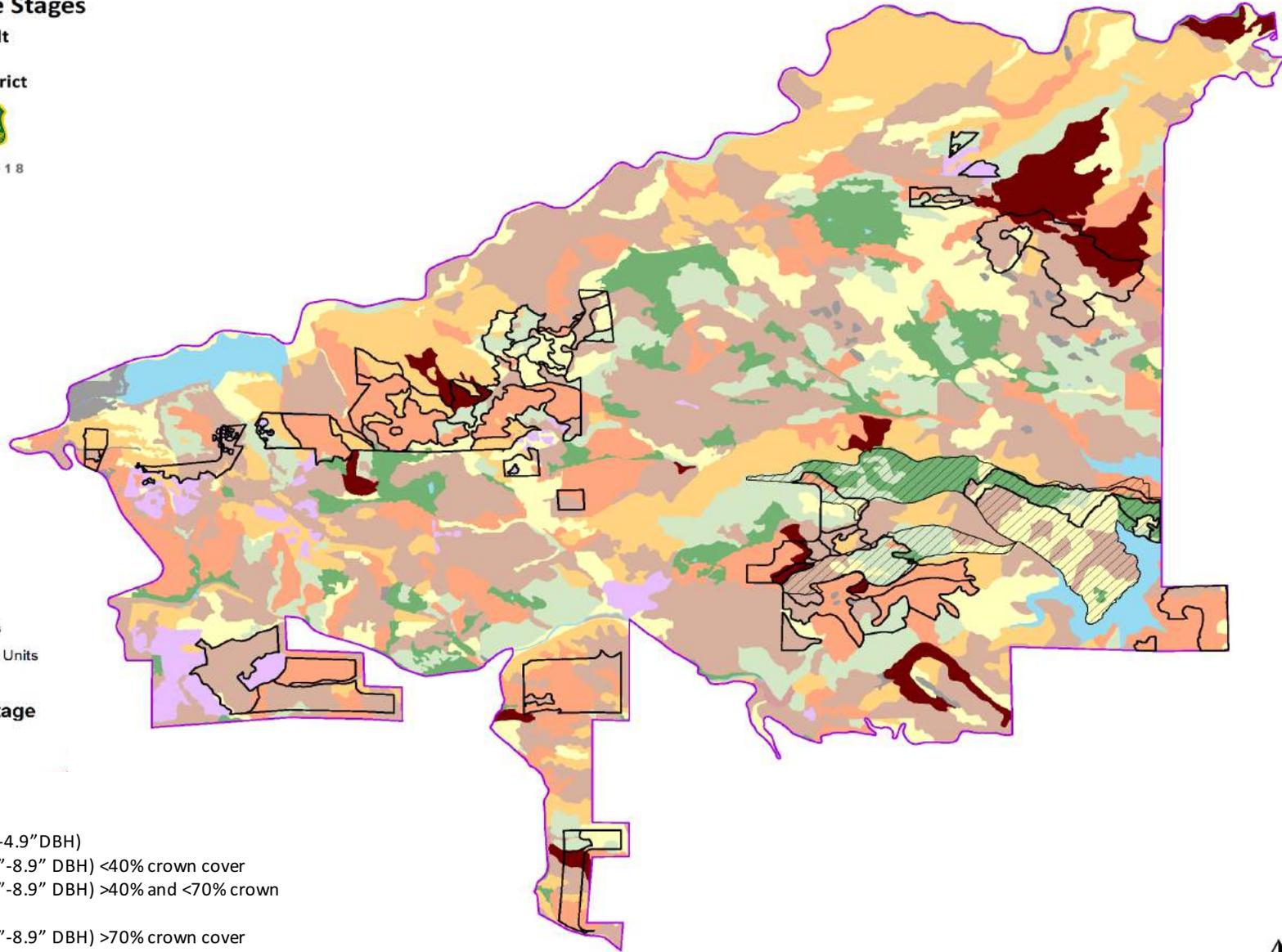


# Forsythe II Project Habitat Structure Stages

Arapaho Roosevelt  
National Forest  
Boulder Ranger District



Map Date 3/22/2018



## Legend

- Final Decision Units
- Final Decision Burn Units
- Project Boundary

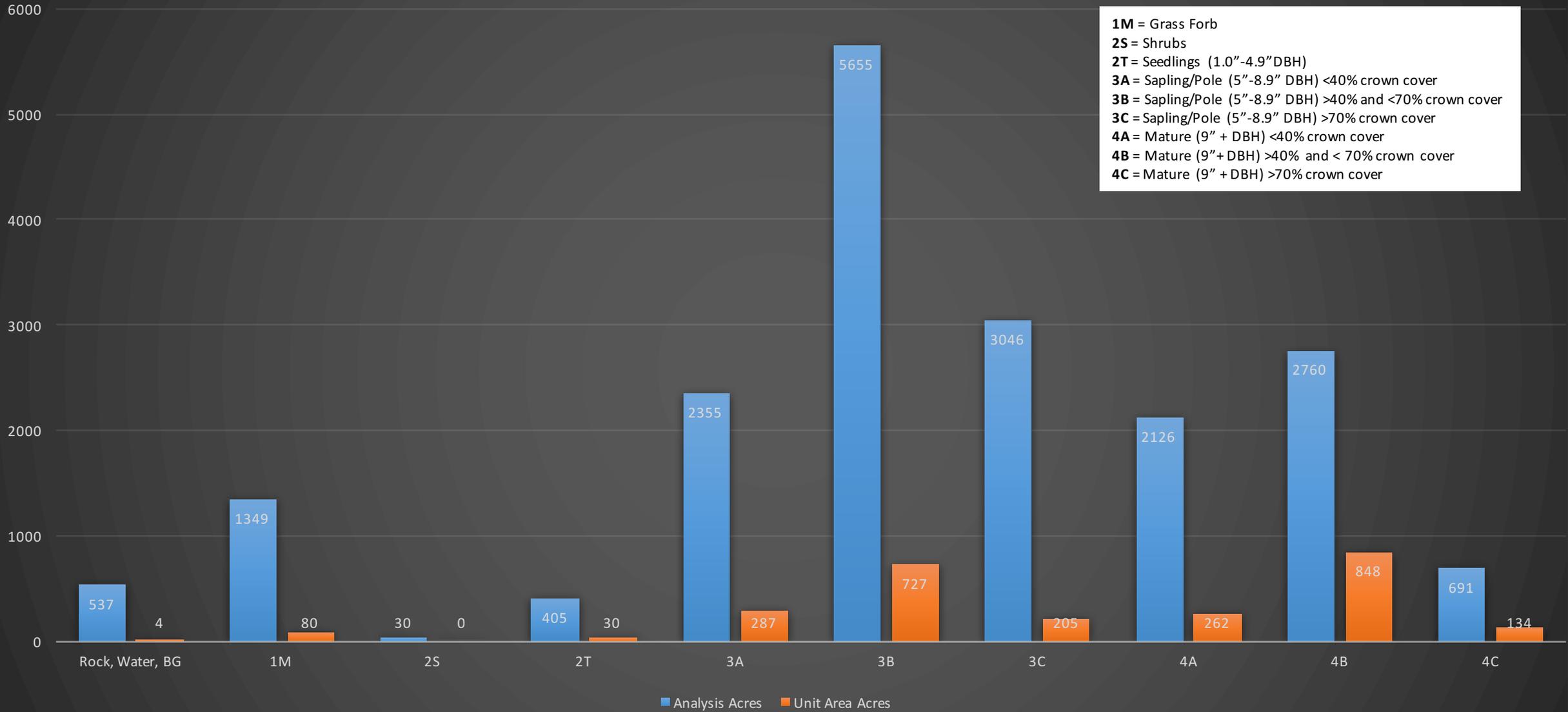
## Habitat Structure Stage

- Bare Ground/Rock
- Water
- Grass Forb
- Shrubs
- Seedlings (1.0"-4.9" DBH)
- Sapling/Pole (5"-8.9" DBH) <40% crown cover
- Sapling/Pole (5"-8.9" DBH) >40% and <70% crown cover
- Sapling/Pole (5"-8.9" DBH) >70% crown cover
- Mature (9" + DBH) <40% crown cover
- Mature (9" + DBH) >40% and <70% crown cover
- Mature (9" + DBH) >70% crown cover

1 mile = 4 inches



# Forsythe II Habitat Structure Stages Summary



# Forsythe II Unit Scale

# Forsythe II Decision and GTR Recommendations

## **In Alignment**

- Fine-Scale Forest Structure: Isolated Trees, Openings, Regeneration Clumps, Mixed Clumps, Mature Clumps
- Enhance landscape resilience to natural disturbances and climate change
- Reduce the potential for broad-scale, active crown fire, which results in large patches of tree mortality
- Create vegetation structure patterns that will allow natural disturbances to operate at characteristic scales and intensities without socially or ecologically undesirable consequences
- Provide ecological benefits for wildlife
- Increase heterogeneity on the landscape
- Incorporate prescribed broadcast fire
- Maintenance treatments to establish stand complexity will be needed in some locations in the future.

# Forsythe II and GTR Recommendations

## Challenges

- Where diameter caps are applied, the continued growth of residual trees following treatments will favor greater tree densities and basal area, and increased homogeneity of structure.
- With a lower percentage of basal area reduction in mixed conifer stands, the restoration and fuel reduction objectives will be minimized resulting in greater forest canopy densities and reduced openness of forested stands.
- Reduced tree canopy openings will
  - impede shade intolerant species (i.e. ponderosa pine) from being established and
  - promote shade tolerant species (i.e. Douglas-fir) on all aspects
- Reduction in basal area percentages encourages thinning from below, which limits overall stand structure, perpetuity, and heterogeneity as it contributes to the overall landscape.

# Mixed Conifer Stands Considerations

- Homogenous stands/landscapes are more susceptible to insects/disease/wildfire risk in a changing climate than more dynamic, complex, and heterogeneous stands/landscapes
- Current stand densities in relation to historic levels are much denser
- Lack of ponderosa pine regeneration due to lack of opening in stands (and other factors) contributes to reduction of species and structural diversity
- Tree species conversion are occurring, specifically on south aspects in the lower and mid-montane zone due to absence of low and moderate severity fire and other considerations
- Lack of fire, especially in the lower and mid-montane, which is contributing to shift from more historical stand conditions to novel conditions, raising concerns of forest dynamics considering potential changes for changing climate and shifting fire regimes

**From Forsythe II Final Decision & Silviculturist Report:** In Mixed Conifer stands or aggregations, cut and remove trees of all size classes (up to the diameter limit) concentrating on the upper %BA removal tolerances to promote resilience and stand structure complexity. Where conditions allow, create openings sufficient to incur ponderosa pine regeneration and/or gaps between the crowns of the trees (individuals/groups) to minimize the potential for continuous crown fire. Re-introduce fire on the landscape in the lower montane utilizing prescribed broadcast burn practices. Additional maintenance treatments may be required to obtain this given the limitations in the decision that were brought forward.

# Project Purpose, Need, Objectives

## Lodgepole Pine Patchcuts and Clearcuts

- Prior to treatment, lodgepole pine stands have closed canopies and experience stand replacing fires that burn with high intensity and severity.
- Homogenous stands, susceptible to widespread insect and disease under drought conditions.
- Patchcuts and clearcuts contribute to a diversity of age structures and promote resiliency to natural disturbances at a landscape scale.



# Lodgepole Pine Stands Considerations

- The number of continuous and homogenous acres are a dominant feature on the landscape
- The size of past treatments do not emulate the size and scale of natural disturbances (i.e.. fire) and are further limited in size with this project
- With anticipation of a warming and drier climate, lodgepole pine will move up in elevation retaining trees more susceptible to insect/disease/wildfire risk over time

**From Forsythe II Final Decision & Silviculturist Report:** In lodgepole pine stands and aggregations, utilize patchcuts and clearcuts to continue introducing structural diversity and landscape heterogeneity by promoting a new cohort on the landscape. Planting mixed conifer species along with the anticipated flush of natural lodgepole pine will improve the stands resiliency and complexity in a potentially changing climate and also allow for a variety of management opportunities in the future. If the climate warms and dries, the planted trees will be established to adjust to the migration of conifers in elevation and provide seed source to future cohorts. Conversely, if climates don't change, the lodgepole pine will remain the dominant species mixed with residual conifers which will add to overall stand complexity.

# Project Purpose, Need, Objectives

## Aspen Enhancement & Expansion

- The Forest Plan provides direction to encourage the growth and expansion of aspen clones.
- At a landscape level, aspen aggregations are limited, and at a stand level aspen are encroached by conifers.
- In the absence of disturbance, this early seral species will eventually convert to a coniferous forest.
- Aspen has the potential to mediate fire behavior
- Aspen enhancement and expansion can meet objectives for fuel reduction, ecological attributes, and social considerations.



# Aspen Meadow/Shrubland Restoration Considerations

- Limited Aspen, Meadow/Shrubland aggregations on the landscape
- The amount of conifer encroachment in an aggregation
- In the absence of fire, what disturbance mechanism is going to maintain these important aggregations and what they contribute to habitat for certain wildlife species

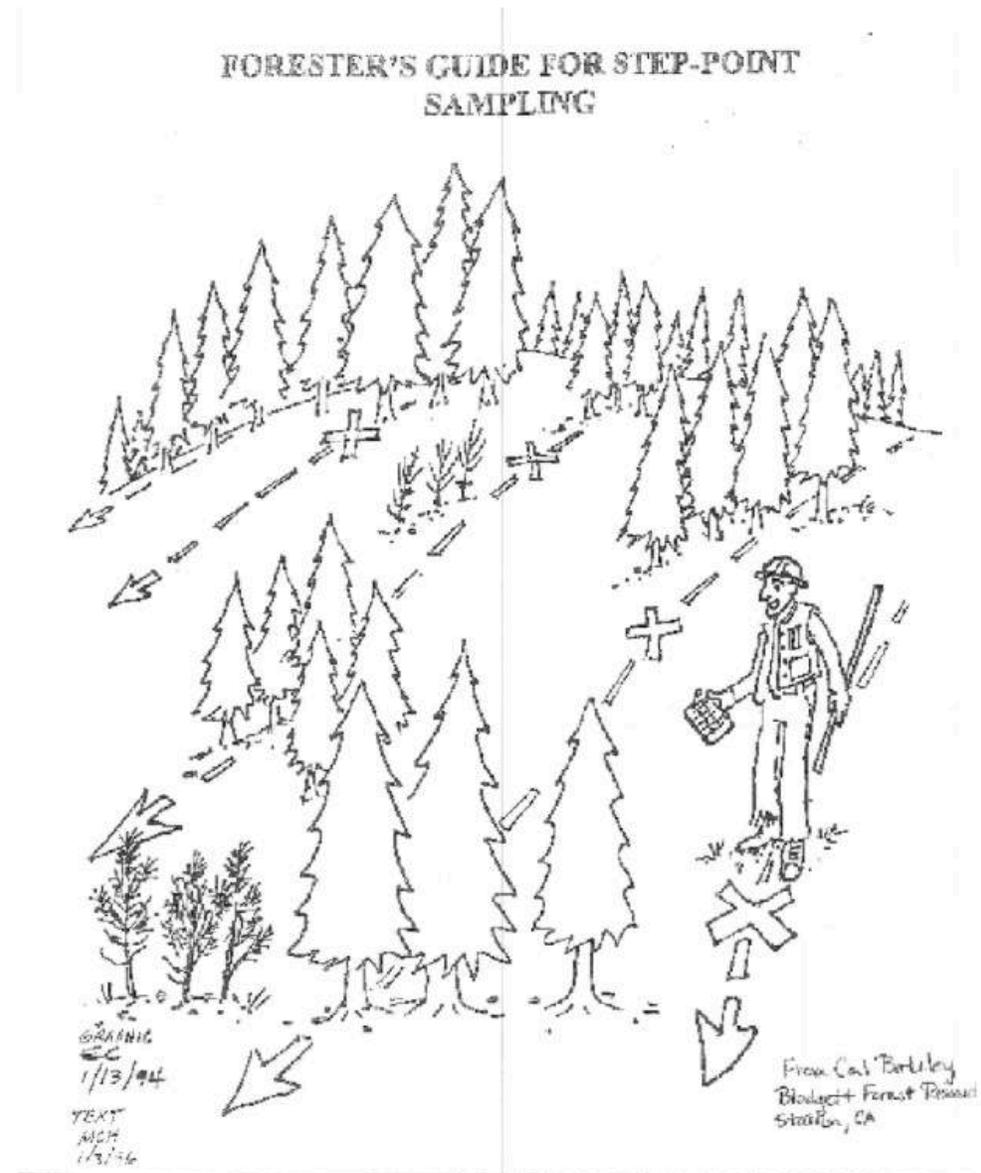
**From Forsythe II Final Decision & Silviculturist Report:** Expand and Enhance: In units identified as aspen, expand their edges (up to the design criteria limits) by cutting conifers and allowing for suckering to occur in aspen stands. To address the encroachment of conifers in the absence of fire, conifers will be cut (up to the design criteria limits) in order to set back successional processes in order to maintain these limited spatial and wildlife habitat aggregations on the landscape. Aspen aggregations mixed with another primary cover type can be expanded and enhanced in order to promote diversity within that cover type.

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## Step Transects

- The data describes the current existing forest structure and species composition to inform detailed tree cutting and management prescriptions for each unit
- The survey correlates both stand structure species associations
- The survey also provides information to assist in the development of tree marking guidelines



<b>F2 Unit 46 – Prescription and Implementation Guide</b>		WRITTEN BY: <i>K. Zimlinghaus</i>	
RX DATE: 10/12/2017 REVISED: 12/07/2017	DIAGNOSIS DATE: 10/10/2017	CERTIFIED BY: <i>K. Zimlinghaus</i>	
BASE FISCAL YEAR: 2018	NEPA ACRES: 12	UNIT ACRES: 4	
ENVIRONMENTAL ANALYSIS: Forsythe II Project	DECISION DATE: 7/10/2017	EXISTING BASAL AREA = 60 sq. ft./acre	

ACTIVITY	TIME	AC	DESCRIPTION, MARKING GUIDES, MONITORING, ETC.
Ponderosa pine Mixed Conifer Thin Aggregation	2018	4	<u>Objectives</u> <ul style="list-style-type: none"> <li>➤ Reduce the severity and intensity of a wildfire within the WUI.</li> <li>➤ Restore ponderosa pine/mixed conifer stands, aspen, and meadow/shrublands toward their characteristic species composition, structure, and spatial patterns in order to increase resistance and resiliency to future natural disturbance.</li> <li>➤ Old growth tree component: retain ponderosa pine greater than 14" DBH or ponderosa pine greater than 10" DBH with flat top crowns and/or bark that is orange over 50% of the bole of the tree. NOTE: Flammulated owl habitat; retain all conifers over 12" DBH.</li> <li>➤ Grouped ponderosa pine spacing will be emphasized where conditions allow and individual spacing where conditions aren't conducive or for other conifer species in order to meet the basal area reduction.</li> </ul>
			<u>Cutting Guides</u> <ul style="list-style-type: none"> <li>➤ Reduce the existing basal area by 50% (10'-15' crown spacing between individual trees and groups) through all size classes to enhance/maintain an uneven-aged structure where possible.</li> <li>➤ Retain all conifers &gt; 12" DBH. For individual spaced trees, cut all conifers &lt; 12" DBH within and up to 5' from the edge of the dripline on the selected leave tree unless part of a group.</li> <li>➤ Favor to retain the healthiest conifer (good vigor, at least 40% live crown ratio, insect/disease and damage free, regardless of size) and identified by the species preference.</li> <li>➤ Species preference to retain: limber pine &gt; ponderosa pine &gt; Douglas-fir &gt; lodgepole pine &gt; Rocky Mtn. juniper.</li> <li>➤ Retain all limber pine that do not pose a safety hazard.</li> <li>➤ Group and retain ponderosa pine identified as at least 2 to 10 ponderosa pine trees 8" to greater than 10" DBH with touching or intermingled crowns, or at least 3 to 7 ponderosa pine trees 5"- 8" DBH with intermingled crowns. Within each group range, cut all ladder fuel trees less than lowest DBH of the range that are within the dripline of the identified group regardless of species.</li> <li>➤ Space the groups of ponderosa pine 15'-25' crown dripline to the adjacent crown outline of individual or group of trees.</li> <li>➤ Cut all dwarf mistletoe infested trees (&gt; 50% infested) &lt; 12" DBH.</li> <li>➤ Retain all healthy (described above) ponderosa pine trees &lt; 10' tall. Cut overstory conifers, except ponderosa pine up to 12" DBH.</li> <li>➤ Where Rocky Mountain juniper occurs, leave an average of one large individual, or clump of three or more per acre if available.</li> </ul>

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We are here



# MMG & GTR recommendations

- **Step 6: Develop treatment plans and prescriptions**

- Integrate stand inventory data, desired conditions, and MMG collaboration into treatment plans and Rx
  - MMG collaboration = collecting input data & providing input to USFS

- **Step 7: Monitor at all scales to inform adaptive management**

- Monitoring and collaborative learning through multiple monitoring efforts and participation with CFLRP & Forsythe II Multiparty Monitoring Group
  - Main purpose of MMG is to have multiparty monitoring of Forsythe II Project, create collaborative learning and adaptive management with USFS and other stakeholders