

SETTING THE STAGE FOR DESIRED CONDITION DIALOGUE

DESIRED CONDITION WORK SHOP

PURPOSE OF WORKSHOP

Initiate a Desired Condition dialogue related to ponderosa pine and dry mixed conifer forest types to guide landscape-scale restoration and inform Forest Plan revision in Region 3.

OBJECTIVES OF WORKSHOP

1. Begin a dialogue about desired conditions for Forest vegetation types
2. Share the Forest Service's Desired Condition perspective
 - a. Share the current Desired Conditions for ponderosa pine and dry mixed conifer.
 - b. Explain why they are important to our landscape scale restoration efforts.
3. Present a clear picture of Desired Conditions and gain a common understanding through field visits that illustrate Desired Conditions, function, and processes.
4. Hear social and scientific perspectives about desired conditions from others interested parties.
5. Explain how the Desired Conditions will be used in Forest Plan revision, and landscape and small scale project development.
6. Explain how the Desired Conditions can be used as a measure of success.

OVERVIEW OF DESIRED CONDITION

The desired conditions describe tree species compositions, densities, structural and age-class distributions, as well as spatial distribution of trees. Specific to some of the forest types (ponderosa pine and dry mixed conifer), the composition, location, and amount of grass/forb/shrub openings (the degree of openness) is described, as are the dimensions, spatial distributions, amounts and densities of snags, down logs, woody debris, and various natural processes such as nutrient cycling, trophic interactions, fire, insect, and diseases. Because the desired conditions incorporated forest dynamics – the spatial and temporal changes resulting from vegetation growth and succession and periodic resetting of these by natural and human-caused disturbances such as fire, wind, insects, diseases, and tree harvests – they describe forest and woodlands as shifting mosaics of different vegetation structural (age) classes and/or successional stages. This dynamic is described at three spatial scales (fine scale, mid-scale and landscape scale) and incorporate six forest ages classes (seedling, saplings, young, mid-aged, mature, and old forest). Refer to Tables 1 and 2 for comparisons of current and

desired forest conditions for ponderosa pine and dry mixed conifer by characteristic and function.

SCIENTIFIC BASIS OF DESIRED CONDITION

The process used to develop the desired conditions involved syntheses of scientific information on habitats of native plants and animals, their food webs, the ecologies of the dominant over story and understory vegetation and the types, frequencies, and intensities of natural and anthropogenic disturbances typical of the forest types. As a result of (1) the synthetic process used to develop the desired conditions, (2) the breadth of ecological knowledge on the composition, structure, and ecological function included in the syntheses, and (3) the incorporation of natural disturbances that shaped the historic conditions within ecosystems, the desired conditions fall within the range of natural conditions of each forest type. This suggests that the desired conditions are both attainable and sustainable. Natural conditions provide a good estimate of a functioning and sustainable system and are a powerful basis for evaluating desired condition. The scientific literature supporting the key characteristics and functions of these desired conditions are included in the summary of supporting science document attachment B.

BENEFITS OF DESIRED CONDITION

Desired conditions describe the characteristics necessary to restore and sustain ecosystems including structure, composition, landscape patterns, and processes and provide for habitats of native wildlife species including the Mexican spotted owl and the northern goshawk. They promote ecosystem functionality, hydrological function, reduce fire hazard, and provide for abundant and well-distributed old growth as a sustainable forest component.

RELATIONSHIP BETWEEN FOREST PLANS AND DESIRED CONDITION

Desired conditions are the foundation of current Forest Plan development. They describe the goals and outcomes of forest management and ecological, social, and economic attributes that a forest can achieve over time. Desired conditions guide the development of future projects and activities and establish a means for determining the consistency of projects with Forest Plans. Desired conditions, together with the other Plan components, constitute a framework for sustainability and should clearly articulate management intent over the life of the Plan.

ADAPTIVE NATURE OF DESIRED CONDITION

Desired conditions are a work in progress and will change over time as new scientific information is developed and as we adapt them to new monitoring information from ongoing efforts such as the Four Forest Restoration Initiative.

DESIRED CONDITION EXPRESSED AS A RANGE ACROSS THE REGION

Desired condition characteristics are expressed in ranges, as opposed to traditional target metrics, to account for natural variation in composition and structure that occurs within a vegetation type as well as for social and economic considerations. Desired conditions will vary somewhat within a vegetation type due to spatial variability in soils, elevation, or aspect.

Table 1: Comparison of Current and Desired Condition by Forest Characteristic (Ponderosa Pine and Dry Mixed Conifer Forest Types)

Characteristic	Current condition	Desired condition
Species composition	<p><u>PP type</u>: ponderosa pine and other minor species, little if any oak and other shade intolerant species</p> <p><u>Dry MC type</u>: species composition shifting towards shade-tolerant species (white-fir, blue spruce). Shade intolerant species becoming sub-dominant.</p>	<p><u>PP type</u>: ponderosa pine is dominant, but other shade intolerant species are present depending on appropriate local site conditions (ie: juniper species, oak and other hardwood species)</p> <p><u>Dry MC type</u>: dominated by shade intolerant species (ponderosa pine, Douglas-fir, white pine, aspen), other species present but are sub-dominant</p>
Forest tree density	Most sites > 80 sq ft of ba/acre	<p><u>PP type</u>: 20-80 sq ft of ba/acre</p> <p><u>Dry MC type</u>: 30-100 sq ft of ba/acre</p>
Spatial distribution	Typically even to random spacing, little in the way of tree groups	Groups of trees separated by forest openings
Forest openings occupied by grass/forb/shrub vegetation	Typically few openings with limited grass/forb/shrub vegetation	Openings are generally from 30% to 60% of the area occupied by grass/forb/shrub veg: 10% and 70% representing the extremes
Tree ages	Typically single- and two- aged forests = even-aged	All ages present, young, mid and old = uneven-aged
Habitats, biodiversity and food webs	Typically little biodiversity, primarily conifer tree cover, limited understory herbaceous/shrub composition due to closed canopy	Much greater biodiversity, multiple tree species; oak, aspen, and other hardwoods and broad number of herbaceous grass/forb/shrub species due to openings
Snags/acre, down woody material	Typically < 2/acre, generally greater than 7 tons per acre	<p>1-2 Snags/Acre 18 inches DBH</p> <p><u>PP type</u>: 3-7 tons per acre</p> <p><u>Dry MC type</u>: 5-15 tons per acre</p>

Note we are not likely to achieve desired condition in one treatment. It may take many years or even decades depending on how departed current condition is from desired.

Table 2: Comparison of Current and Desired Condition by Forest Function (Ponderosa Pine)		
Characteristic	Current Condition	Desired Condition
Fire Behavior/frequency and effects Surface fire, Crown fire potential passive and active	Fires infrequent become uncharacteristic resulting in active crown fire on a large scale (high mortality): limited nutrient cycling	Fires frequent, primarily surface fire, do not spread between tree groups as crown fire (low mortality): promotes nutrient cycling
Hydrologic function	Typically little precipitation penetration of closed canopy, most lost to evaporation and transpiration	Precipitation reaching the forest floor, improved infiltration, surface flow, soil moisture, herbaceous cover.
Visual attributes	Limited visual diversity due to dense even-aged continuous tree stands, limited viewing opportunities.	Improved visual diversity due to openness between the groups of trees. Greater variety due to tree age diversity and density variation
Sustainability and resilience	Limited resilience to insects, diseases, uncharacteristic fire, climate variability, change, and other stressors. Not sustainable over time	Increased resilience to insects, diseases, uncharacteristic fire, and climate variability, change and other stressors. Sustainable over time.

Desired Conditions Descriptions by Forest Types

PONDEROSA PINE (bunchgrass and Gambel oak subtypes)

The ponderosa pine forest vegetation community includes two subtypes: Ponderosa pine bunchgrass and ponderosa pine Gambel oak. The ponderosa pine forest vegetation community generally occurs at elevations ranging from approximately 5,000 to 9,000 feet. It is dominated by ponderosa pine and commonly includes other species such as oak, juniper, and pinyon. More infrequently species such as aspen, Douglas-fir, white fir, and blue spruce may also be present, and may occur as individual trees. This forest vegetation community typically occurs with an understory of grasses and forbs although it sometimes includes shrubs.

Landscape-scale conditions (10,000 + acres)

At the landscape scale, the ponderosa pine forest vegetation community is composed of trees from structural stages ranging from young to old. Forest appearance is variable but generally uneven-aged and open; occasional areas of even-aged structure are present. The forest arrangement is in individual trees, small clumps, and groups of trees interspersed within variably-sized open grass-forb-shrub interspaces, an association similar to historic patterns. Openings typically range from 10 percent in more productive sites to 70 percent in the less productive sites, based upon the make-up and aggregation of mid-scale units. Size, shape, number of trees per group, and number of groups per area are variable across the landscape. In the Gambel oak sub-type, all sizes and ages of oak trees are present. Denser tree conditions exist in some locations such as north facing slopes and canyon bottoms.

Old growth occurs throughout the landscape, generally in small areas as individual old growth components, or as clumps of old growth. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris) and structural diversity. The location of old

growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).

The ponderosa pine forest vegetation community is composed predominantly of vigorous trees, but declining trees are a component and provide for snags, top-killed, lightning- and fire-scarred trees, and coarse woody debris (>3 inch diameter), all well-distributed throughout the landscape. Ponderosa pine snags are typically 18 inches or greater at DBH and average 1 to 2 snags per acre. In the Gambel oak subtype, large oak snags (>10 inches) are a well-distributed component. Downed logs (>12 inch diameter at mid-point, >8 feet long) average 3 logs per acre within the forested area of the landscape. Coarse woody debris, including downed logs, ranges from 5 to 14 tons per acre with areas of Ponderosa Pine Gambel oak in the lower range and ponderosa pine bunchgrass in the higher range.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent and severity of disturbances and climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g. insects, diseases, fire, and wind), including snags, downed logs, and old trees. Grasses, forbs, shrubs, and needle cast (fine fuels), and small trees maintain the natural fire regime. Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. Frequent, low severity fires (Fire Regime I) are characteristic in this type, including throughout goshawk home ranges. Natural and anthropogenic disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

Mid-scale conditions (100 -1,000 acres)

At the mid-scale the ponderosa pine forest vegetation community is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area, resulting in less space between groups. Openings typically range from 10 percent in more productive sites to 70 percent in the less productive sites. Tree density within forested areas generally ranges from 20 to 90 square foot basal area per acre.

The mosaic of tree groups generally comprises an uneven-aged forest with all age classes present. Infrequently patches of even-aged forest structure are present. Disturbances sustain the overall age and structural distribution.

Fires burn primarily on the forest floor and do not spread between tree groups as crown fire.

Fine-scale conditions (<10 acres)

Trees typically occur in irregularly shaped groups and are variably-spaced with some tight clumps. Crowns of trees within the mid-aged to old groups are interlocking or nearly interlocking. Openings surrounding tree groups are variably-shaped and comprised of open grass-forb-shrub interspaces. Some openings contain individual trees. Trees within groups are of similar or variable ages and may contain species other than ponderosa pine. Size of tree groups typically is less than 1 acre, and may range from a few trees to 0.75 acres, but occasionally 1+ acres in size (Table 4). Groups at the mid-aged to old stages consist of 2 to 70+ trees per group. A spectrum of group sizes is desired.

PONDEROSA PINE - Evergreen Oak

Ponderosa Pine - Evergreen Oak generally occurs at elevations ranging from approximately 5,000 to 6,500 feet. It is dominated by ponderosa pine and can be distinguished from the Ponderosa Pine Forest by somewhat more even-aged dynamics, and by one or more well-represented evergreen oak species (e.g., Emory oak, Arizona white oak, silverleaf oak, grey oak). Other species include juniper species, pinyon pine species, and Arizona cypress in some locations. Ponderosa Pine - Evergreen Oak has two subclasses; one with a more continuous layer of perennial grasses and a relatively minor shrub component; and one with an understory of primarily evergreen shrubs including manzanita, turbinella oak, sumac species, and mountain mahogany species.

PONDEROSA PINE - Evergreen Oak (perennial grasses subtype)

Landscape-scale conditions (10,000+ acres)

At the landscape scale, the ponderosa pine-evergreen oak perennial grasses sub-type is composed of trees from structural stages ranging from young to old. Forest appearance is variable but generally uneven-aged and open; occasional areas of even-aged structure are present. The forest arrangement is in individual trees, small clumps and groups of trees interspersed within variably-sized open grass-forbs-shrub interspaces similar to historic patterns. Openings typically range from 10 percent in more productive sites to 70 percent in the less productive sites. Shrubs occur in low to moderate densities so as not inhibit ponderosa pine regeneration. Size, shape, number of trees per group, and number of groups per area are variable across the landscape. All structural stages of oak are present with old trees occurring as dominant individuals, and small groups occurring typically within openings. Denser overall tree conditions exist in some locations such as north facing slopes and canyon bottoms.

Old growth occurs throughout the landscape, generally in small areas as individual old growth components, or as clumps of old growth. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris) and structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).

The ponderosa pine –evergreen oak perennial grasses sub-type is composed predominantly of vigorous trees, but declining trees are a component and provide for snags, top-killed, lightning- and fire-scarred trees, and coarse woody debris (>3 inch diameter), all well-distributed throughout the landscape. Ponderosa pine snags are typically 18 inches or greater at DBH and average 1 to 2 snags per acre. Large oak snags (>10 inches) are a well-distributed component. Downed logs (>12 inch diameter at mid-point, >8 feet long) average 3 logs per acre within the forested area of the landscape. Coarse woody debris, including downed logs, ranges from 3 to 10 tons per acre.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent and severity of disturbances and climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from natural disturbances (e.g. insects, diseases, fire, and wind), including old growth. Grasses, forbs, shrubs, and needle cast (fine fuels), and small trees maintain the natural fire regime. Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. Frequent, primarily low severity fires (Fire Regime I) are characteristic including throughout goshawk home ranges. Natural and anthropogenic disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

Mid-scale conditions (100 - 1000 acres)

At the mid-scale the ponderosa pine-evergreen oak perennial grasses sub-type is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area. Openings typically range from 10 percent in more productive sites to 70 percent in the less productive sites. Tree density within forested areas generally ranges from 20 to 90 square foot basal area per acre.

The mosaic of tree groups generally comprises an uneven-aged forest with all age classes and structural stages present. Small areas of even-aged forest structure are present. The mix of natural disturbances sustains the overall age and structural distribution.

Fires burn primarily on the forest floor and do not typically spread between tree groups as crown fire. Mixed severity fires occur at less frequency and over smaller spatial extents than low severity fires occur.

Fine-scale conditions (<10 acres)

At the fine scale, trees typically occur in small groups in which they are variably-spaced with some tight clumps. Crowns of trees within the mid- to old-age groups are interlocking or nearly interlocking. Openings in between tree groups are variably-shaped and comprised of open grass-forb-shrub interspaces. Some openings contain individual trees, including large open-grown oaks. Trees within groups are of similar or variable ages and may contain species other than ponderosa pine. Size of tree groups typically may range from a few trees to 0.75 acres, but are occasionally 1+ acres in size. Groups at the mid-age to old stages typical range from 2 to 70+ trees. A spectrum of group sizes is desired.

PONDEROSA PINE - Evergreen Oak (evergreen shrub subtype)

Landscape-scale conditions (10,000+ acres)

At the landscape scale, the ponderosa pine-evergreen shrub sub-type is composed of trees from structural stages ranging from young to old. Forest appearance is variable but generally uneven-aged and open; areas of even-aged structure are present. The forest arrangement is in small clumps and groups of trees interspersed within variably-sized openings of moderate to high-density shrubs and limited grass cover. Openings typically range from 10 percent in more productive sites to 70 percent in the less productive sites. Size, shape, number of trees per group, and number of groups per area are variable across the landscape. All structural stages of oak are present, with old trees occurring as dominant individuals or in small groups. Denser tree conditions exist in some locations such as north facing slopes and canyon bottoms.

Old growth occurs throughout the landscape, generally in small areas as individual old growth components, or as clumps of old growth. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris) and structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).

The ponderosa pine –evergreen shrub sub-type is composed predominantly of vigorous trees and shrubs, but declining trees and shrubs are a component and provide for snags, top-killed, lightning- and fire-scarred trees, and coarse woody debris (>3 inch diameter), all well-distributed throughout the landscape. Ponderosa pine snags are typically 18 inches or greater at DBH and average 1 to 2 snags per acre; large oak snags (>10 inches) are a well-distributed component. Downed logs (>12 inch diameter at mid-point, >8 feet long) average 3 logs per acre

within the forested area of the landscape. Coarse woody debris, including downed logs, ranges from 3 to 10 tons per acre.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent and severity of disturbances and climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from natural disturbances (e.g. insects, diseases, fire, and wind), including old growth. Dwarf-mistletoe occurs in less than 15 percent of host trees in uneven-aged forest structures and less than 25 percent in even-aged forest structures. Limited grasses, forbs, and a moderate density of shrubs, needle cast, and small trees maintain the natural fire regime. Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. Low to mixed severity fires (Fire Regimes I and III) are characteristic in this type, including throughout goshawk home ranges. Natural and anthropogenic disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

Mid-scale conditions (100-1000 acres)

At the mid-scale the ponderosa pine-evergreen shrub sub-type is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area. Openings typically range from 10 percent in more productive sites to 70 percent in the less productive sites. Tree density within forested areas generally ranges from 20 to 90 square foot basal area per acre.

The mosaic of tree groups comprises a mix of even-aged and uneven-aged patches with all age classes and structural stages present. The mix of natural disturbances sustains the overall age and structural distribution.

Fires are of low- to mixed-severity burning on the forest floor as well as in the overstory. Crown fires occur in small patches.

Fine-scale conditions (< 10 acres)

Trees typically occur individually or in small groups in which they are variably-spaced with some tight clumps. Crowns of trees within mid- to old-age groups are interlocking or nearly interlocking. Openings in between tree groups are variably-shaped and comprised of shrubs and limited grass cover. Some openings may contain a high density of shrubs and/or individual trees, including large oaks. Trees within groups are of similar or variable ages and may contain species other than ponderosa pine. Size of tree groups typically are greater than 0.5 acre, and may be 1+ acres. A spectrum of group sizes is desired.

DRY MIXED-CONIFER

The dry mixed-conifer forest vegetation community is transitional with increasing elevation between ponderosa pine and wet mixed-conifer forests and generally occurs at elevations ranging from approximately 5,500 to 9,500 feet, depending upon aspect. It is very common for dry mixed-conifer forest types to occupy the north-facing slopes, and ponderosa pine forests the south-facing slopes at the lower elevations of the range. At the upper elevations of the range, this is often reversed, with dry mixed-conifer forests occupying south slopes, while wetter mixed conifer types are found on the north-facing slopes. Dry mixed-conifer forests are dominated by mainly shade intolerant trees such as ponderosa pine, southwestern white pine, limber pine, quaking aspen, and Gambel oak, with a lesser presence of shade tolerant species

such as white fir and blue spruce. Mid-tolerant species such as Douglas-fir are common. Aspen may occur as individual trees or small groups, but typically does not form a seral forest cover type. This forest vegetation community typically occurs with open grass-forb-shrub interspaces.

Landscape-scale conditions (10,000 + acres)

At the landscape scale, the dry mixed-conifer vegetation community is a mosaic of forest conditions composed of structural stages ranging from young to old trees. Forest appearance is variable but generally uneven-aged and open; occasional patches of even-aged structure are present. The forest arrangement is in small clumps and groups of trees interspersed within variably-sized open grass-forb-shrub interspaces similar to historic patterns. Openings typically range from 10 percent in more productive sites to 50 percent in the less productive sites. Size, shape, number of trees per group, and number of groups per area are variable across the landscape. Where they naturally occur, groups of aspen and all structural stages of oak are present. Denser tree conditions exist in some locations such as north facing slopes and canyon bottoms.

Old growth occurs throughout the landscape, generally in small areas as individual old growth components, or as clumps of old growth. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris) and structural diversity. The location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality).

The dry mixed-conifer forest vegetation community is composed predominantly of vigorous trees, but declining trees are a component and provide for snags, top-killed, lightning- and fire-scarred trees, and coarse woody debris (>3 inch diameter), all well-distributed throughout the landscape. Snags are typically 18 inches or greater at DBH and average 3 per

acre. Downed logs (>12 inch diameter at mid-point, >8 feet long) average 3 per acre within the forested area of the landscape. Coarse woody debris, including downed logs, ranges from 8 to 16 tons per acre.

The composition, structure, and function of vegetative conditions are resilient to the frequency, extent, severity of disturbances, and to climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from endemic levels of disturbances (e.g. insects, diseases, fire, and wind), including snags, downed logs, and old trees. Grasses, forbs, shrubs, needle cast (fine fuels), and small trees maintain the natural fire regime. Organic ground cover and herbaceous vegetation provide protection of soil, moisture infiltration, and contribute to plant and animal diversity and to ecosystem function. Frequent, low severity fires (Fire Regime I) are characteristic, including throughout goshawk home ranges. Natural and anthropogenic disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling.

Mid-scale conditions (100 -1,000 acres)

At the mid-scale the dry mixed conifer forest vegetation community is characterized by variation in the size and number of tree groups depending on elevation, soil type, aspect, and site productivity. The more biologically productive sites contain more trees per group and more groups per area. Openings typically range from 10 percent in more productive sites to 50 percent in the less productive sites. Tree density within forested areas generally ranges from 40 to 125 square foot basal area per acre.

The mosaic of tree groups generally comprises an uneven-aged forest with all age classes and structural stages. Occasionally small patches (generally less than 50 acres) of even-aged forest structure are present. Disturbances sustain the overall age and structural distribution.

Fires burn primarily on the forest floor and do not spread between tree groups as crown fire.

Fine-scale conditions (< 10acres)

Trees typically occur in irregularly shaped groups and are variably-spaced with some tight clumps. Crowns of trees within the mid-aged to old groups are interlocking or nearly interlocking. Openings surrounding tree groups are variably-shaped and comprised of open grass-forb-shrub interspaces. Some openings contain individual trees or snags. Trees within groups are of similar or variable ages and one or more species. Size of tree groups typically is less than 0.25 acre, but occasional patches may be 1 acre or greater). Groups at the mid-age to old stages consist of 2 to 70+ trees per group. A spectrum of group sizes is desired. Where the understory plant composition is dominated by grasses and forbs, fire severity is lesser and tree groups are smaller in size. Where the understory plant composition is dominated by shrubs, fire severity is greater and tree groups are larger in size.

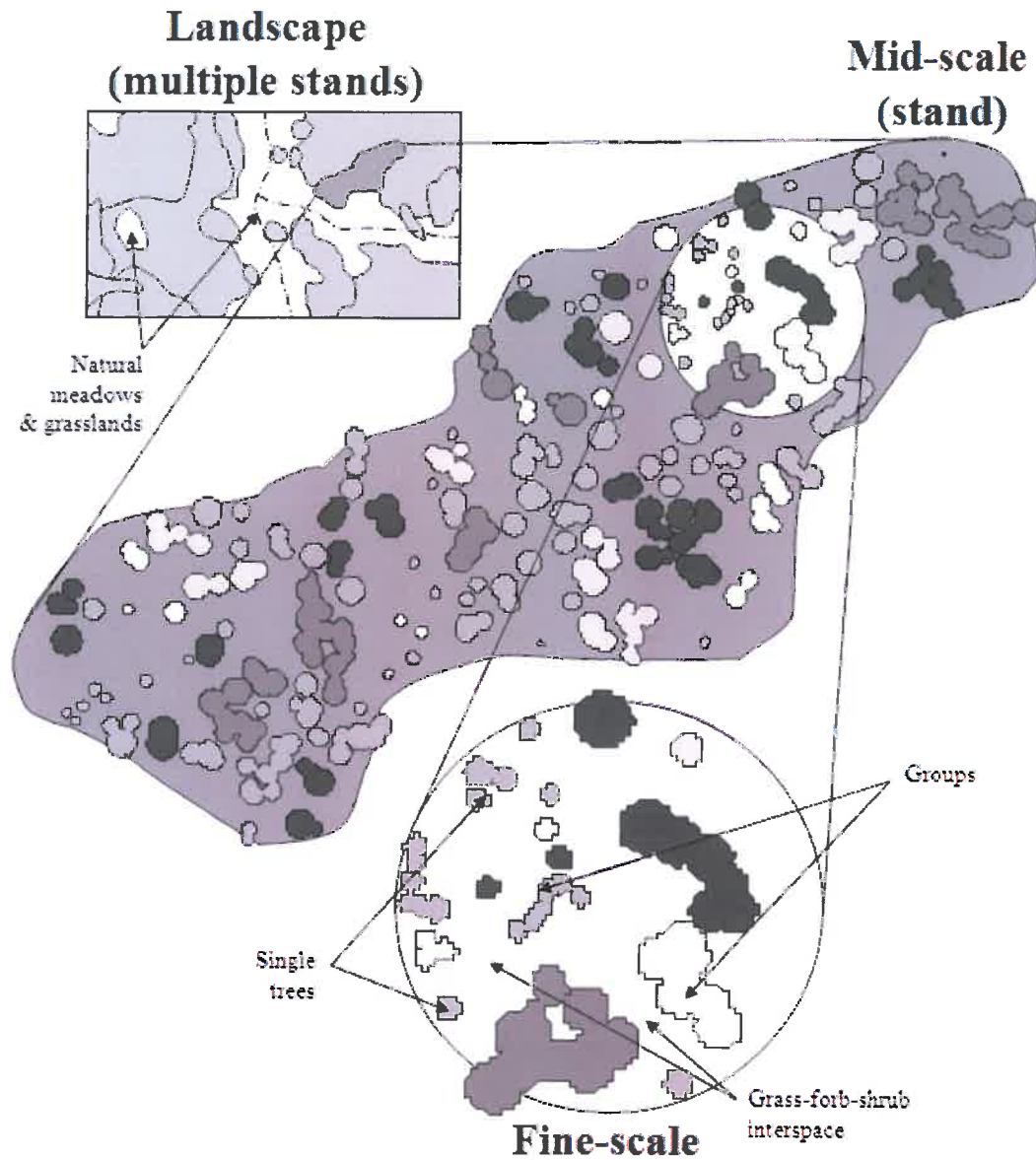


Figure 1. Conceptualized forest reference conditions at three spatial scales. The landscape-scale illustrates multiple stands and natural meadows and grasslands. The mid- and fine-scales illustrate open grass-forb-shrub interspaces and uneven-aged stand conditions consisting of single and grouped trees of different vegetation structural stages, young to old, represented by different shades and sizes.

