Desired Conditions Introduction

Operational Draft: This document is prepared to provide guidance to Forest Plan revision teams. As this guidance is implemented, we expect to learn improved ways to do this work. As we learn, this document will be updated. This document was reviewed and revised as appropriate in April 2010 to conform to the requirements of the 1982 Planning Rule provisions.

This document provides the context, including concepts and definitions of terms, in which desired conditions should be construed. The information that follows will help to understand the nature and purpose of desired conditions as outlined in this plan.

Overview

As outlined in the provisions of the 1982 Planning Rule, desired conditions are descriptions of goals to be achieved at sometime in the future. They are normally expressed in broad general terms and are timeless in that they have no specific date by which they are to be completed. Goals and desired conditions are the focus of the plan and are the basis for developing objectives and other plan components. Desired conditions, together with the other plan components, constitute a framework for sustainability and should clearly articulate management intent over the life of the forest plan.

Concepts

The information below discusses the concepts used in describing desired conditions for forested vegetation communities.

Scale

Vegetation Desired Conditions should be described at multiple scales when possible. The three scales for description used herein are: the landscape scale, mid-scale, and fine scale. Descriptions at these various scales are necessary to provide adequate detail and guidance for the design of future projects and activities that will help achieve the desired conditions over time. In some cases, not enough information is available to provide descriptions at multiple scales. Descriptions begin with the landscape scale to provide the "big picture" desired conditions across the larger land area. Descriptions at the mid- and fine-scales provide additional detail necessary for guiding future projects and activities. The Regional Mid-scale Vegetation Mapping Project defines mid-scale differently than it is defined here.

The *landscape scale* is an assemblage of mid-scale units, typically composed of variable elevations, slopes, aspects, soils, plant associations, and disturbance processes. An area at this scale is comprised of multiple mid-scale units, most often 10 or more.

For our purposes, the *mid-scale* is a unit of 100 to 1,000 acres and is composed of assemblages of fine scale units which have similar biophysical conditions.

The *fine scale* is a 10 acre area or less at which the distribution of individual trees (single, grouped, or aggregates of groups) is described.

Important note: Desired Conditions for the pinyon-juniper types were not developed at multiple scales due to the lack of sufficient information and the evolving science related to the nature of these systems. These desired conditions may be adjusted as more information becomes available in the future.

Range (minimum and maximum values) of Vegetation Variables

Ranges of values presented in desired conditions account for natural variation in the composition and structure within a vegetation type. Desired conditions may differ within a vegetation type due to spatial variability in soils, elevation, or aspect. It may also be desirable to have different desired conditions within a vegetation type, such as a lower density of vegetation in the wildland urban interface (WUI) than outside of the WUI to achieve the desired fire behavior within the proximity of property and human occupancy.

Structure

Forest structure includes both the vertical and horizontal dimensions of a forest. The horizontal structure refers to patterns of trees or groups of trees and openings, as well as tree size and species composition. The vertical component refers to the layers of vegetation between the forest floor and the top of the canopy. Several descriptive terms related to forest structure are used in desired condition statements and are defined below. Other terms may be defined in more detail in the Plan Set of Documents or in the glossary to the forest plan.

Resilience

The concept of resilience within an ecosystem is the subject of much debate. For the purposes of these desired conditions, the term resilience is used to infer the capacity of a system to absorb disturbance and reorganize while undergoing change so as to retain essentially the same function, structure, identity, and feedbacks[1].

Mexican spotted owl Direction

Forest conditions for Mexican spotted owl (MSO) will be consistent with the habitat requirements specified in the MSO Recovery Plan. A link to the Recovery Plan can be found in the “Other Guidance” section of the plan.

[1] From: Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. 2004. Resilience, adaptability and transformability in social–ecological systems. Ecology and Society **9**(2): 5. [online] URL: http://www.ecologyandsociety.org/vol9/iss2/art5/

Definitions

Age class is defined as trees that originated within a relatively distinct range of years. Typically the range of years is considered to fall within 20 percent of the average natural maturity (e.g. if 100 years is required to reach maturity, then there would be five 20-year age classes).

Basal area is the cross-sectional area at breast height (4.5 ft above the ground) of trees measured in square feet. Basal area is a way to measure how much of a site is occupied by trees. The cross-sectional area is determined by calculating the tree's radius from its diameter (diameter/2 = radius) and using the formula for the area of a circle (π x radius^2 = cross-sectional area). Basal area per acre is the summation of the cross-sectional area of all trees in an acre or in a smaller plot used to estimate basal area per acre. Diameter at root collar (defined below) is used to calculate the cross-sectional area of multi-stemmed trees such as juniper and oak.

Clump refers to a tight cluster of two to five trees of similar age and size originating from a common rooting zone that typically lean away from each other when mature. A clump is relatively isolated from other clumps or trees within a group of trees, but a stand-alone clump of trees can function as a tree group.

Coarse woody debris is woody material on the ground greater than three inches in diameter, including logs.

Declining refers to the senescent (aging) period in the lifespan of plants that includes the presence of dead and/or dying limbs, snag-tops, and other characteristics that indicate the later life-stages of vegetation.

Diameter at breast height (DBH) is the diameter of a tree typically measured at 4.5 feet above ground level.

Diameter at root collar (DRC) is the diameter typically measured at the root collar or at the natural ground line, whichever is higher, outside the bark. For a multi-stemmed tree, DRC is calculated from the diameter measurements of all qualifying stems (≥ 1.5" diameter and at least one foot in length).

Even-aged stands are comprised of one distinct age class of trees.

Uneven-aged forests are forests that are comprised of three or more distinct age classes of trees, either intimately mixed or in small groups.

Fire regime refers to the patterns of fire that occur over a long period of time across an appropriately scaled area (outlined in Table 1 below) and its immediate effects on the ecosystem in which it occurs. There are five fire regimes which are classified based on frequency (average number of years between fires) and severity (amount of replacement on the dominant overstory vegetation) of the fire. These five regimes are:

Fire regime I – 0 to 35 year frequency and low (surface fires most common, isolated torching can occur) to mixed severity (< 75% of dominant overstory vegetation replaced);

Fire regime II – 0 to 35 year frequency and high severity (> 75% of dominant overstory vegetation replaced);

Fire regime III – 35 to 100+ year frequency and mixed severity;

Fire regime IV – 35 to 100+ year frequency and high severity;

Fire regime V – 200+ year frequency and high severity

Fire Regime	Average Fire Return Interval	Frequency	Fire Severity*	Recommended Scale of Fire in Flat - Rolling Terrain	Recommended Scale of Fire in Steep and Dissected Terrain
I	0-35 years	Frequent	Nonlethal fire	500 - 5,000 acres	500 – 2,500 acres
II	0-35	Frequent	Stand replacement fire	500 – 10,000 acres	500 – 5,000 acres
III	35-200+ years	Relatively infrequent	Mixed severity fire	1,000 – 20,000 acres	1,000 – 10,000 acres
IV	35-200+ years	Relatively infrequent	Stand replacement fire	20,000 – 500,000 acres	20,000 – 250,000 acres
V	200+ years	Infrequent	Stand replacement fire	300,000 – 500,000 acres	200,000 – 300,000 acres
				1,000 – 20,000 acres	1,000 – 10,000 acres

* Fire Severity Classes (LANDFIRE, Schmidt et al. 2002)

- Non-lethal/unburned – <25% cover loss in terms of mortality/top kill
- Mixed severity – 25-75% cover loss in terms of mortality/top kill
- Stand replacement – >75% cover loss in terms of mortality/top kill

Mortality/top kill refers to the primary stratum of a given vegetation type at the scale of plant communities (e.g., tree stratum in a ponderosa pine system; grass layer in a Great Plains system)

Functioning ecosystem is an ecosystem that contains all components and processes necessary to maintain resilience over time.

Gap refers to the space occurring in a forested area as a result of individual or group tree mortality from small disturbance events or from local site factors such as soil properties that influence vegetation growth patterns.

Group refers to a cluster of two or more trees with interlocking or nearly interlocking crowns at maturity surrounded by an opening. Size of tree groups is typically variable depending on forest type and site conditions and can range from fractions of an acre (a

two-tree group) (i.e. ponderosa pine, dry mixed conifer) to many acres (i.e. wet mixed conifer, spruce fir). Trees within groups are typically non-uniformly spaced, some of which may be tightly clumped.

Invasive species are species that are not native to the ecosystem being described. For all ecosystems, the desired condition is that invasive species are rarely present, or are present at levels that do not negatively influence ecosystem function.

Mosaic is described as the pattern of patches, corridors and matrix (forest or non-forest) that form a landscape in its entirety.

Natural fire regime is the fire regime that existed prior to human-facilitated interruption of frequency, extent or severity.

Old growth in Southwestern forested ecosystems is different than the traditional definition based on Northwestern infrequent fire forests. Due to large differences among Southwest forest types and natural disturbances, old growth forests vary extensively in tree size, age classes, presence and abundance of structural elements, stability, and presence of understory (Helms 1998).

Old growth refers to specific habitat components that occur in forests and woodlands – old trees, dead trees (snags), downed wood (coarse woody debris), and structure diversity (Franklin and Spies 1989, Helms 1998, Kaufmann et al. 2007). These important habitat features may occur in small areas, with only a few components, or over larger areas as stands or forests where old growth is concentrated (Kaufmann et al. 2007). In the Southwest, old growth is considered “transitional” (Oliver and Larson 1996), given that that the location of old growth shifts on the landscape over time as a result of succession and disturbance (tree growth and mortality). Some species, notably certain plants, require “old forest” communities that may or may not have old growth components but have escaped significant disturbance for lengths of time necessary to provide the suitable stability and environment.

Openings are spatial breaks between groups or patches of trees, as large or larger than groups, that contain grass, forb, shrub, and/or tree seedlings but are largely devoid of big trees, with a total tree cover of less than 10% in openings.

Patches are areas larger than tree groups in which the vegetation composition and structure are relatively homogeneous. Patches comprise the mid-scale, thus they range in size from 100 to 1,000 acres.

Reference condition – Environmental conditions that infer ecological sustainability. When available reference conditions are represented by the *characteristic* range of variation (not the total range of variation), prior to European settlement and under the current climatic period. For many ecosystems, the range of variation also reflects human-caused disturbance and effects prior to settlement. It may also be necessary to refine reference conditions according to contemporary factors (e.g., invasive species) or projected conditions (e.g., climate change). Reference conditions are most useful as an

inference of sustainability when they have been quantified by amount, condition, spatial distribution, and temporal variation.

Resiliency is the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change.

Restoration is process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecological restoration focuses on establishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystem sustainability, resilience, and health under current and future conditions.

Snags are standing dead or partially dead trees (snag-topped), often missing many or all limbs. They provide essential wildlife habitat for many species and are important for forest ecosystem function.

Definitions related to northern goshawk

Nest areas are the areas immediately around a nest that are used by northern goshawks in relation to courtship and breeding activities. They are approximately 30 acres in size and contain multiple groups of large, old trees with interlocking crowns.

Post-fledging Family Areas (PFAs) are the areas that surround the nest areas. They represent an area of concentrated use by the goshawk family until the time the young are no longer dependent on adults for food. PFAs are approximately 420 acres in size.

Foraging areas are the areas that surround the PFAs that goshawks use to hunt for prey. They are approximately 5,400 acres in size.