

# SUSTAINABLE FOREST



## A VISION

We focus on the forest--a total ecological system--a recycling system. It is a system involving birth, growth, maturity, death, and a rebirth. We acknowledge the need to manage for the whole cycle, the part we see and the unseen.

The focus is on a sustainable forest, versus sustained yield--the total forest cycle versus a product from one phase of the cycle. It is critical to keep the whole cycle healthy and stable. Only through a sustainable forest can we sustain options for the future.

Understanding the whole forest cycle is much like putting together a jigsaw puzzle--a puzzle with many pieces--a puzzle of pieces within pieces. We often overlook the pieces we don't readily see--the soil and the soil's inhabitants. Fortunately, we are gaining a better understanding, acceptance, and support as to what the different pieces are and how they interrelate--the air, birds, trees, fallen leaves, streams, soil, ants, fungi, micro-organisms, chemical processes, and yes, human beings.

But of all the pieces, there is one that is by far the largest, the most obvious, the most multicolored, the most complex, has the greatest impact on all the other pieces and can, in fact, rearrange or destroy the other pieces--yet is the least understood. We ask you to join us in increasing our understanding of the proper place in the sustained forest puzzle for us HUMAN BEINGS. Let's do something today to help all to better understand how the puzzle fits together, to interact within the puzzle, and to work within the larger global puzzle.

This looks into the future, although some may be happening now. It is stated in the "present tense" as if it is already that way. This gives a feel of where we are heading. It paints a general picture with a broad brush.

## C. Forest-wide Prescriptions

### MANAGEMENT HIGHLIGHTS

- We focus on the forest -- a total ecological system -- a recycling system. It is a system involving birth, growth, maturity, death, and a rebirth. We acknowledge the need to manage for the whole cycle, the part we see and the unseen. The focus is on a sustained forest, versus sustained yield--the total forest cycle versus a product from one phase of the cycle.
- Maintain options for the future -- invest in the future versus squandering our inheritance while allowing sound uses for today.
- Maintain genetic and ecological diversity, and soil productivity.
- Consider an area's position within the landscape in making all decisions. Develop diverse forest types and stand conditions, similar to that which occurred under prehistoric conditions.
- A key to the sustainable forest is old growth. We will manage old growth to provide the following values: blueprint and sustainability; habitat diversity, recreation and aesthetics; opportunities for spiritual nourishment; high quality products.
- Over time, we will have old growth well distributed throughout the Forest.

This snaps a more detailed picture. It gives a feel of the intent, purpose, and goals. It is the framework for the standards and guidelines.

## ECOLOGICAL CYCLE

### Setting The Stage

Recent evidence suggests some applications of intensive forest management to maximize products may lead to conditions which result in unsustainable forests. Sometimes intense management breaks the ecological cycle. Some scientists feel that every forested acre needs to periodically pass through an old-growth cycle to maintain soil productivity.

The current situation on the Carson is that most timber harvesting is still in essentially native stands of trees and soils. Our stands are similar to but more simple than an unmanaged, totally native forest.

The essence of our native forest is still in its soils and gene pools. The process is still intact. Our forest is NOT like the totally restructured, managed stands in plantation forestry. It is the plantation forest management approach that appears to be giving Europe and other parts of the country problems. They break the ecological cycle through the removal of too much material, disruption of soil and stream processes, and replacement of the native, genetically diverse trees.

While much more research is needed to answer the question, "What is a sustainable forest?" The following basic concepts will guide management on the Carson until better information is available.

## Standards And Guidelines

**MAINTAIN DIVERSITY...** Maintain the numerous natural processes, genetic and biological diversity, and soil productivity, which equates to ecological diversity.

**FOLLOW NATURES PATTERNS...** Harvest of forest products will be designed to resemble natural patterns of the landscape.

## OLD GROWTH

### Setting The Stage

There are many reasons to manage for old growth:

○ BLUEPRINT AND SUSTAINABILITY... They contain diverse genetic seeds for future forests. Old-growth forests are also places where we and future generations can study what makes forests sustainable. It is the key to having the long-term forest survivors for future generations.

○ HABITAT DIVERSITY... Old growth constitutes optimum habitat for some plants and animals. It is a part of the diversity of living organisms and processes that are the forest.

○ RECREATION AND AESTHETICS... Many people like to hike, take photos, and look for wildlife in old-growth stands. Old-growth stands can also be among the most scenic areas of the forest.

○ SPIRITUAL... Some people value old-growth stands for contemplation and spiritual renewal.

○ HIGH QUALITY WOOD... The quality of wood from old-growth trees is high and valued.

Users of the Carson have expressed similar thoughts on the value of old-growth forests:

● They are banks of knowledge about the intricate, complex interrelationships occurring in the forest ecosystem. They serve as blueprints for the natural forest processes.

● They ensure that future generations will have the opportunity to enjoy the benefits of ancient forests and continue to expand our knowledge and make informed decisions. They guarantee that our children will have options regarding the future of our forest ecosystem.

● They represent a high degree of biological diversity that is essential for plant, animal, and human survival.

● They mirror our feelings, values, ethics, and attitudes toward our environment. The condition of our environment reflects our ability to co-exist in harmony with our environment. Our ancient forests are a favorable reflection.

● They are an important part of our national heritage, which we will pass on to future generations.

● They are a source of inspiration, a place to reflect on ourselves and on the natural wonders and mysteries of nature. They challenge us to think about our role in nature.

● They provide a living story of nature in balance, a story of life and death, predator and prey, change and stability.

● They produce healthy feelings and emotions which tend to bind us with nature. Through the ancient forest, nature communicates with us in a spiritual sense that is non-verbal and seems to reach directly into our souls.

● Aldo Leopold, a former forest supervisor of the Carson, suggested an ethical aspect to wilderness management, and by extension to old growth: "It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land and a high regard for its value. By value, I of course, mean something far broader than mere economic value, I mean value in the philosophical sense."

### C. Forest-wide Prescriptions

Defining old growth is not easy, however, old growth is different things to different people. Conceptually, we can think of stands of trees being somewhere along a line. At one end are the old-growth characteristics that many people agree about. At the other end there is less agreement about the characteristics.

#### WHAT ARE THE CHARACTERISTICS OF OLD GROWTH?

More Agreement Among People <----->	Less Agreement Among People
Big, old trees .....	Small, young trees
Snags (standing dead trees) .....	No snags
Logs on the ground .....	No logs on the ground
Many layered tree canopy; ground vegetation ...	Single canopy layer; little ground vegetation
A lot of various wildlife species .....	Few wildlife species
Large stands .....	Small stands
No evidence of man-caused disturbance .....	Evidence of man-caused disturbance
Forest processes at prehistoric levels .....	Forest processes altered from prehistoric levels

To build a definition is to develop a mix of varying degrees of these different characteristics. You say, "That's easy just choose all those everyone agrees with." But what if we find a stand of trees that has all the characteristics but one? Say it's got big trees, snags, and everything else but no logs on the ground. Is it still old growth? What if two or three of the characteristics are absent? What if they are there but somewhere along the middle of the line between more agreement and less agreement?

While we recognize there is no way to develop a mix that would satisfy everyone, there is a need to establish a "best definition at this point in our understanding" to guide the old-growth inventory and allocation processes in which we decide what areas to set aside and save.

In developing definitions, the following factors were considered:

- Different areas have different inherent capabilities to produce the characteristics associated with old growth.
- Recurring disturbances, such as wildfires and insect epidemics, may have limited the establishment of large, contiguous stands of big, old trees. This is especially true in the mixed conifer and spruce-fir types, as well as on poorer sites and steep slopes.
- Stands with the big, old trees tend to be in the most limited supply and take the longest time to recreate. They also provide unique wildlife habitat and have high values for commercial products.

Since it is hard to say, "This is old growth" and "This is not," we have set up three conditions to guide the old-growth inventory and allocation processes.

- Old growth--stands dominated by trees that are large and old for the capability of the site.
- Possible old growth--stands not meeting the "old-growth" definition but with potential to develop into old growth within 50-100 years.
- Undisturbed--stands not meeting the "old growth" or "potential old growth" condition, but that have no history of human disturbance for at least 50 years.

## Standards And Guidelines

**DEFINITION...** Old growth is different things to different people -- varying combinations of physical and emotional factors. Therefore, it is impossible to define and put in a table. This is as close as we can get at this time trying to describe old growth on the Carson. Ultimately, the old-growth allocation will be made only after interpretation and judgement by an inter-disciplinary team (people with different training and backgrounds). For example: In some stands people might agree "this is old growth," but the stands may not fully meet the criteria in this table. Conversely, in some stands people may say "this isn't "old growth," but the stands might meet the criteria.

Table F-1. Definition of Old Growth, Potential Old Growth and Undisturbed Forest Sites.

OLD GROWTH <sup>1</sup>				
FACTOR	PONDEROSA PINE	MIXED CONIFER	SPRUCE FIR	PINON & JUNIPER
LARGE TREES <sup>2</sup>				
Diameter (inches) <sup>3</sup>	20	16	16	14
Basal Area <sup>4</sup>	30	30	60	NA
Trees Per Acre	10	10	20	10
Age (years) <sup>5</sup>	140	140	140	200
DENSITY OF ALL TREES	100	20 Basal Area <sup>4</sup>	120 Basal Area <sup>4</sup>	15 Trees/Acre
SNAGS				
Diameter at Breast Height (inch)		16	12	9
Height (feet)		15	15	10
Number Per Acre		3	3	1
DOWN LOGS				
Diameter (inches)	12	12	12	9
Length (feet)	12	12	12	9
Number Per Acre	2	2	2	2
YEARS SINCE MAN-CAUSED DISTURBANCE <sup>5</sup>	50	50	50	50
POTENTIAL OLD GROWTH <sup>1</sup>				
FACTOR	PONDEROSA PINE	MIXED CONIFER	SPRUCE FIR	PINON & JUNIPER
LARGE TREES <sup>2</sup>				
Diameter (inches) <sup>3</sup>	16	16	14	9
Basal Area <sup>4</sup>	30	30	30	NA
Trees Per Acre	10	10	20	10
Age (years) <sup>5</sup>	100	100	100	150
DENSITY OF ALL TREES	60 Basal Area <sup>4</sup>	80 Basal Area <sup>4</sup>	80 Basal Area <sup>4</sup>	15 Trees/Acre
UNDISTURBED <sup>1</sup>				
FACTOR	FORESTED SITE			
MAN-CAUSED DISTURBANCE <sup>5</sup>	50 years			

**DELETE ENTIRE PAGE (Amendment 11)**

<sup>1</sup> This table sets thresholds. Any area with factors equal to or greater than these can be inventoried as "old growth," "potential old growth" or "undisturbed."  
<sup>2</sup> The greater proportion of "large" trees and nearly large trees (e.g., 16-19 inches in ponderosa pine and mixed conifer) in a stand, the higher quality old growth it is, and the higher priority for allocation it should have.  
<sup>3</sup> Diameter is measured at breast height, except pinon/juniper, which is at the root crown.  
<sup>4</sup> Basal Area is a measure of tree density based on the number and diameter of trees.  
<sup>5</sup> Logging, thinning, etc., if man-caused disturbance is not evident, the "years since" does not matter.

### C. Forest-wide Prescriptions

**DISTRIBUTION...** Old growth sites will be scattered throughout the Carson in all forest types, stand sizes, and landscape positions except in areas where uneven-aged management is used. (Amendment 11)

**OLD, OVERSTORY TREES...** In diversity units where old-growth or potential old-growth stands occur on less than 6 percent of the land scheduled for harvest, consider maintaining some of the old, overstory trees. This will provide some of the old-growth structural characteristics for some wildlife species and provide future managers with the option of managing these trees to become large snags and down logs.

**TREATMENTS PERMISSIBLE...** Treatments, such as prescribed fire or thinning, may be done in stands allocated to old growth if it will enhance old-growth characteristics. Stands not allocated to old growth, but which meet the old growth definition, may be harvested, where an interdisciplinary team determines it will contribute to management objectives for a diversity unit.

**STAND SIZE... DELETE** (Amendment 11)

**MOVING OLD GROWTH AROUND...** It is recognized that, over time, old growth will move around the forest as the natural processes of growth and disturbance have always caused it to do or will be an integral part of uneven-aged management. For the old growth to continue, it must give way to the young. A forest is a living cycle with birth, maturity, death and a rebirth. (Amendment 11)

**TRACKING DECISIONS...** Areas allocated to old growth will be tracked in the Carson stand data base and on a map atlas at each ranger district. The atlas tracking system will be replaced by Geographic Information System once it is operable.

### ALLOCATION:

**OBJECTIVES...** Select old-growth stands to meet these following objectives. Attempt to meet as many of the old-growth management objectives as possible with each allocation. For instance, a 20-acre stand with old-growth characteristics may meet some aesthetic and recreation objectives. Allocation of surrounding stand(s) with potential old-growth characteristics may accomplish additional wildlife habitat objectives, now or in the future.

- ∞ Safeguard options for the future.
- ∞ Serve as genetic blueprints for unknown futures needs--needs of the forest and of the people.
- ∞ Contribute to the long term sustainability of the forests, realizing that it is hard to predict all the various types of stress the forest system may have to face.
- ∞ Maintain the soil productivity.
- ∞ Contribute to the diversity of vegetation on the Carson and the greater Southwestern United States landscape.
- ∞ Provide unique wildlife and fish habitats.
- ∞ Provide recreation opportunities.
- ∞ Maintain and add to the visual quality on the Carson.
- ∞ Enable spiritual strength and support.
- ∞ Recognize and respect special, local needs for old growth. Realize that there are local human interactions with the forest, often tied to historical and cultural heritages, which affect what old growth means.
- ∞ Produce high-quality wood.

**PRIORITY...** First priority for allocation will be stands meeting old-growth conditions, then potential old growth, then stands with characteristics close to old growth/potential old growth undisturbed. No stands allocated to old growth will be harvested this planning period. In the future, stands allocated to old growth should not be planned for harvest until similar replacement stands are allocated.

## C. Forest-wide Prescriptions

**UNDISTURBED STANDS...** Undisturbed stands, which have not attained old growth or potential old growth characteristics, might not be the best stands to allocate for old growth. They often occur on poor sites where trees will never attain the sizes specified in the definitions. These stands may often be worthy of protection for other values, such as very old trees or their untrammelled nature.

**MIXED FOREST TYPES...** Approximately 18 percent of each of the major forest types (ponderosa pine, mixed conifer, and piñon-juniper) will be allocated to old-growth/potential old-growth condition. It is recognized that a variety and/or more frequent natural disturbance, a significant portion of allocated stands may never attain old-growth/potential old-growth conditions. (The 18 percent old-growth figure was derived from models. It was inferred from the models that a variety of stand age and canopy densities best provide for old-growth/potential old-growth conditions. This allocation figure may change as the old-growth inventory is completed or the definition is refined.)

**WILDLIFE & VEGETATION DIVERSITY UNITS...** Allocate at least 6 percent of land scheduled for harvest and 18 percent total forested acres within each wildlife and vegetation diversity unit to old growth/potential old growth. (The 6 percent old-growth allocations will not be relegated solely to wilderness, sites not planned for harvest and semi-primitive areas. This allocation figure may change as the old-growth inventory is completed or the definition is refined.)

**GENETIC INTERCHANGE...** Consider landscape position in making old-growth allocations to promote genetic interchange.

## Old Growth

### Standards

Until the forest plan is revised, allocate no less than 20 percent of each forested ecosystem management area to old growth as depicted in the table on page 96.

In the long term, manage old growth in patterns that provide for a flow of functions and interactions at multiple scales across the landscape through time.

Allocations will consist of landscape percentages meeting old growth conditions and not specific acres.

### Guidelines

All analyses should be at multiple scales—one scale above and one scale below the ecosystem management areas. The amount of old growth that can be provided and maintained will be evaluated at the ecosystem management area level and be based on forest type, site capability, and disturbance regimes.

Strive to create or sustain as much old growth compositional, structural, and functional flow as possible over time at multiple area scales. Seek to develop or retain

old growth function on at least 20 percent of the naturally forested area by forest type in any landscape.

Use information about pre-European settlement conditions at the appropriate scales when considering the importance of various factors.

Consider the effects of spatial arrangement on old growth function, from groups to landscapes, including de facto allocations to old growth such as goshawk nest sites, Mexican spotted owl protected activity centers, sites protected for species behavior associated with old growth, wilderness, research natural areas, and other forest structures managed for old growth function.

In allocating old growth and making decisions about old growth management, use appropriate information about the relative risks to sustaining old growth function at the appropriate scales, due to natural and human-caused events.

Use quantitative models at the appropriate scales when considering the importance of various factors. These models may include, but are not limited to: Forest Vegetation Simulator, BEHAVE, and FARSITE.

Forested sites should meet or exceed the structural attributes to be considered old growth in the five primary forest cover types in the southwest as depicted in the table on page 96

## C. Forest-wide Prescriptions

### LANDSCAPE MANAGEMENT

#### Setting The Stage

We cannot just look at a stand of trees or an open meadow by itself. It is important to know how they interrelate with other stands and meadows, and how large areas of the forest interact with other large areas. Landscape management looks at the broad picture.

#### Standards And Guidelines

**PREHISTORIC CONDITIONS...** Develop diverse forest types and stand sizes, similar to the diversity of stand sizes that occurred under prehistoric conditions.

**INTERRELATIONSHIPS OF STANDS...** The biological value of stands is highest when they are positioned on the landscape so that there is plant and animal genetic interchange among stands. It is likely that stream courses and stringers of vegetation are key avenues for genetic interchange. Management of these areas and adjacent upland stands should be considered key to prevent fragmentation.

**RESEMBLE NATURE...** Harvest of forest products will be designed to resemble natural patterns in the landscape.

### ECOLOGICAL RESTORATION

#### Setting The Stage

The processes that produced old growth forests have been altered, particularly by putting out all fires and past harvest activities. These changes are often subtle but profound. Controlling fire in the ponderosa pine type has favored the establishment of dense understories (plants under the tree canopy), which sets these stands up for infrequent catastrophic fires. The pre-historic forests had frequent ground fires.

Another example -- a combination of fire control and livestock grazing has caused many pinon-juniper stands to develop denser overstories, while losing grass cover. As a result, soil loss has accelerated.

#### Standards And Guidelines

**DEMONSTRATION SITE...** Develop ecological restoration demonstration sites. The sites will demonstrate the effects of using prescribed fire, thinning, or other management techniques to re-establish natural processes.

**The Minimum Criteria for the Structural Attributes Used to Determine Old-Growth**

Forest Cover Type, Name	Piñon-Juniper		Interior Ponderosa Pine		Aspen	Mixed-Species Group		Engelmann Spruce Subalpine Fir	
Forest Cover Type, SAF Code	239		237		217	210, 211, 216, 219		206, 209	
Site Capability Potential Break Between Low and High Site			55 minor			50 Douglas-fir Edminster & Jump		50 Engelmann Spruce Alexander	
Site	Low	High	Low	High	All	Low	High	Low	High
<b>1. Live Trees in Main Canopy:</b>									
Trees/Acre	12	30	20	20	20	12	16	20	30
DBH/DRC	9"	12"	14"	18"	14"	18"	20"	10"	14"
Age (Years)	150	200	180	180	100	150	150	140*/170**	140*/170**
<b>2. Variation in Tree Diameters (Yes or No)</b>	ND	ND	ND	ND	No	ND	ND	ND	ND
<b>3. Dead Trees</b>									
<b>Standing</b>									
Trees/Acre	0.5*	1	1	1	ND	2.5	2.5	3	4
Size, DBH/DRC	9"	10"	14"	14"	10"	14"	16"	12"	16"
Height (Feet)	8'	10'	15'	25'	ND	20'	25'	20'	30'
<b>Down</b>									
Pieces/Acre	2	2**	2	2	ND	4	4	5	5
Size (Diameter)	9"	10"	12"	12"	ND	12"	12"	12"	12"
Length (Feet)	8'	10'	15'	15'	ND	16'	16'	16'	16'
<b>4. Tree Decadence</b>									
Trees/Acre	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>5. Number of Tree Canopies</b>	SS/MS	SS/MS	SS/MS	SS/MS	SS	SS/MS	SS/MS	SS/MS	SS/MS
<b>6. Total BA, Square Feet/Acre</b>	6	24	70	90	ND	80	100	120	140
<b>7. Total Canopy Cover, Percent</b>	20	35	40	50	50	50	60	60	70

*Piñon-Pine:* \*Dead limbs help make up dead material deficit.

\*\* Unless removed for firewood or fire burning activities.

*Spruce-Fir:* \* In mixed corkbark fir and Engelmann spruce stands where Engelmann spruce is less than 50 percent composition in the stand.

\*\* In mixed corkbark fir and Engelmann spruce stands where Engelmann spruce is 50 or more percent composition in the stand.

ND is not determined; SS is single-storied; and MS is multi-storied.