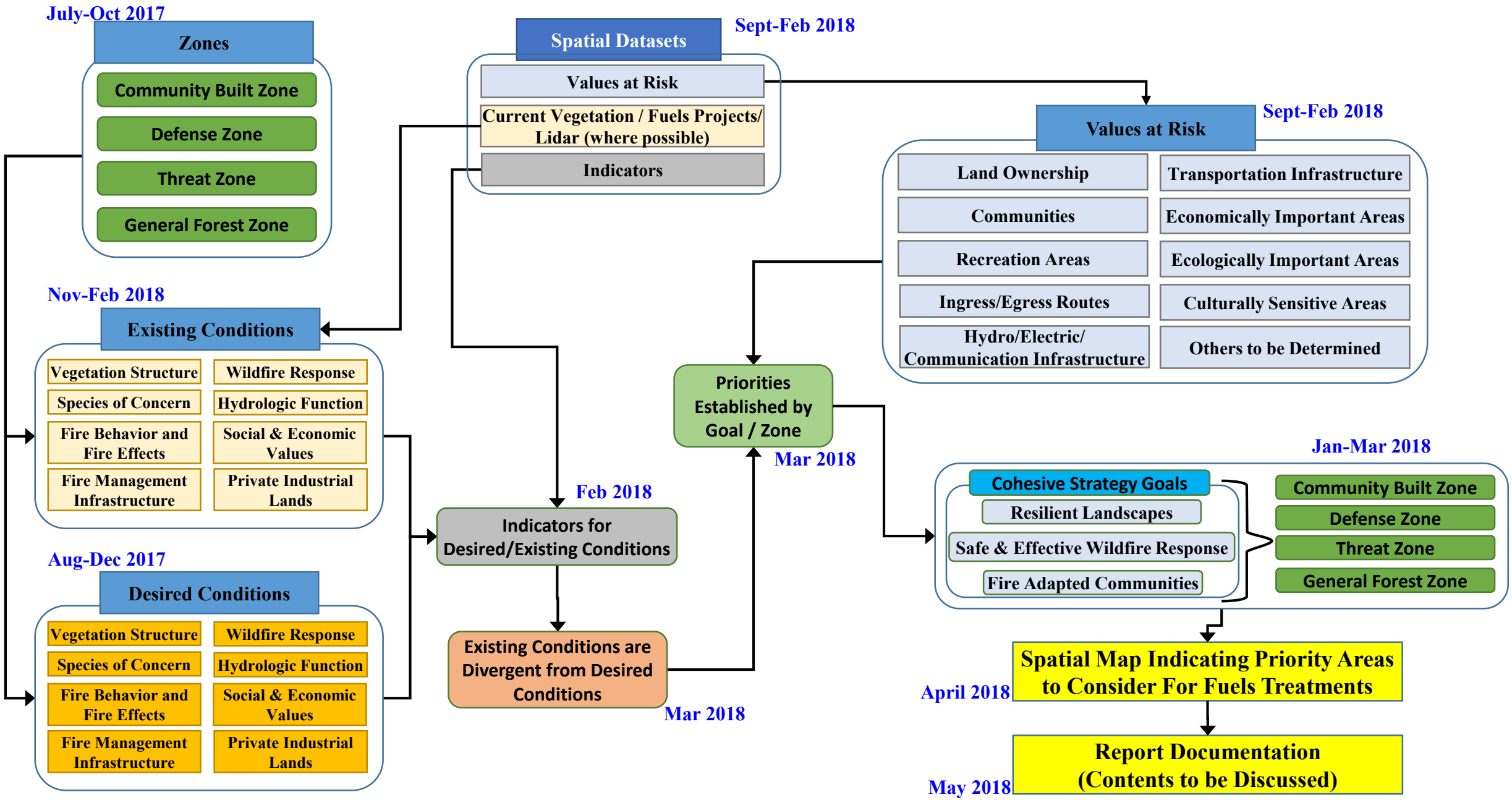
SOFAR Cohesive Strategy Landscape Vision Road Map



Desired Future Conditions by Zone

December 11, 2017

OVERVIEW

The South Fork American River Cohesive Strategy Collaboration is working to promote a fire-resilient, healthy forest ecosystem across all lands. On a watershed scale, the Collaborative will work to create a fire-resilient ecosystem that supports viable populations of all native species, sustainable fisheries, functioning and restored watersheds and water quality, protected cultural resources, and diverse recreational opportunities, while making steady progress towards the three primary goals of the National Cohesive Strategy:

- ***Restoring and maintaining resilient landscapes*** –Landscapes across all jurisdictions are resilient to fire related disturbances in accordance with management objectives.
- ***Creating fire-adapted communities*** – Human populations and infrastructure can withstand a wildfire without loss of life or property.
- ***Responding to Wildfires*** –All jurisdictions participate in making and implementing safe, effective, and efficient risk-based fire management decisions.

Defining the desired future conditions across the landscape is an initial step in working towards and defining the Collaborative's shared vision. Future desired conditions can be compared with current landscape conditions to identify areas in need of restoration actions and to identify treatment

priorities. Desired conditions are also the foundation for any monitoring program to track Collaborative efforts and make adaptive management decisions.

The following desired future condition table has been developed by the Landscape Vision Committee. Ten themes were identified by the committee that relate to the three goals of the National Cohesive Strategy. Desired conditions for 10 themes were described for each management zone.

Desired Condition Themes

	Goals of the National Cohesive Strategy		
Theme	***Restoring and maintaining resilient landscapes***	***Creating fire-adapted communities***	***Responding to Wildfires***
1) Vegetation structure: amount and distribution	X		
2) Fire behavior (fuel structure) and fire effects (fire return interval, severity)	X		
3) Fuels Conditions (fuel reduction areas)		X	X
4) Species of Concern	X		
5) Wildfire response (suppression vs. management, evacuation plans, incident management)			X
6) Social and economic values and benefits (recreation, utilities)			X
7) Hydrologic Function (water quantity and quality) / Soil Productivity (soil stability and productivity)	X		
8) Water, Power, and Communication Infrastructure		X	X
9) Industrial Forest Lands	X		
10) Non-Industrial Forest Lands	X		

Zone Purpose and Descriptions

Resources at risk to wildfire and fire management objectives are not uniformly distributed across the SOFAR landscape. To help guide wildfire management decisions within the SOFAR landscape, four management zones have been created: Built Community Zone, Defense Zone, Threat Zone, and General Forest Zone. Areas within each zone have similar levels of risk to human infrastructure, desired future conditions, and fire management objectives.

Built Community Zone

The Built Community Zone is the space needed to slow or stop the spread of wildfire to protect valuable infrastructure from being irreparably damaged from radiant heat or direct flames and to provide protection for firefighters defending infrastructure. Typically, the Built Community Zone corresponds to the area within 100 - 200 feet from valuable infrastructure that is susceptible to damage by wildfire flames or radiant heat.

Defense Zone

The Defense Zone is a buffer in closest proximity to the Built Community Zone. The Defense zone generally extends roughly ¼ mile out from Built Community Zone and valuable infrastructure that is susceptible to damage from radiant heat or direct flames. Defense zones are of sufficient extent that fuel treatments within them will reduce wildland fire spread and intensity to allow for suppression forces to succeed in protecting human life and property.

Threat Zone

The Threat Zone typically buffers the Defense Zone. The Threat Zone generally extends approximately 1¼ miles out from the Defense Zone boundary; however, the actual Threat Zone boundaries should be based on fire history, local fuel conditions, weather, topography, existing and proposed fuel treatments, and natural barriers to fire. Fuel conditions in the Threat Zone should moderate fire spread and intensity. Strategic landscape features, such as roads, changes in fuels types, and topography may be used in delineating the physical boundary of the threat zone.

General Forest Zone

The General Forest Zone corresponds to all areas outside of the Built Community, Defense, and Threat Zones. Forests conditions within this zone are resilient to most disturbance events and pose a low threat to valuable human infrastructure under most fire weather conditions.

Table Summarizing Desired Future Conditions by Zone

Desired Future Condition Theme	**ZONE: Built Community**	**ZONE: Defense**	**ZONE: Threat**	**ZONE: General Forest**
1. Vegetation Structure: Amount and Distribution (structure and composition)	● Species distribution and composition are commensurate with surrounding forested communities favoring large fire resilient pines and oaks when ecologically feasible; ● Density of small diameter trees and woody (shrub) species may be highly reduced in strategic areas (e.g. fuel breaks) relative to the general forest. ● Brush/shrub cover should be reduced by creating a mosaic of treated and untreated shrubs. ● Introduction and spread of of non-native invasive plants are avoided. Existing populations are not threatening native plant communities.		● Each vegetation type contains a mosaic of vegetation conditions, densities and distributions. These conditions are resilient to the frequency, extent and severity of ecological processes (e.g., fire, drought, flooding, insect mortality (Table 1). This mosaic occurs at a variety of scales across landscapes and watersheds and reflects conditions that provide for ecosystem integrity and ecosystem diversity; ● Forest patches (see Table 2) are a complex mosaic of groups of trees, shrubs, and herbaceous plants. Within forest patches, trees are highly irregular in spacing and size. Individual trees, small clumps, and groups of trees are interspersed with grass, herbaceous plants, and shrubs, in variably sized openings that vary by forest type. A mosaic of moderate to dense shrubs, tree litter, down wood and bare ground occurs between groups of trees. Vigorous understories of heterogeneous, patchy, and diverse native shrubs, herbs, and grass species (Table 2). ● Introduction and spread of of non-native invasive plants are avoided. Existing populations are not threatening native plant communities.	

2. Fire Behavior and Fire Effects	• Vegetation structure and composition in this zone result in zero probability of crown fire ignition due to sufficient horizontal and vertical spacing between grasses, shrubs, and trees.	• Fires that ignite in this zone will result in less intense fire with low likelihood of crown fire ignition or a sustained crown fire; • Spacing and density of canopies stops the progression of crown fire beginning outside of this zone; typically constructed as a linear feature 300 to 500 ft.	• Areas in the threat zone are characterized by a variety of fuel conditions that have reached a balance of reduced excessive fuel loading while maintaining vegetation desired conditions (see above); • The Threat Zone is resilient and can tolerate varying effects of fire. Risk to communities is reduced sufficiently in the Threat Zone to allow some areas to be placed in a lower risk zone. • The landscape is resilient to a range of fire effects, and wildland fire has a predominantly positive benefit to the ecosystem and resources. • Fire behavior is modified to allow some areas to be placed in the general forest zone.	• The landscape is resilient to a range of fire effects, and wildland fire has a predominately positive benefit to ecosystems and resources.

3. Fuels Condition	• Horizontal (up to 15-20 feet) and vertical (10 feet for conifers and up to 6 feet hardwoods with ⅓ live crown)) fuels are discontinuous across the zone. The number of trees less than 10 inches dbh is sufficient to meet the horizontal vegetation spacing requirements. • Surface fuels are reduced to keep fire on the ground.	• Fuels are strategically reduced to provide for the safe ingress of emergency personnel and egress of evacuees. • Fuels are sufficiently reduced to provide safety zones within communities; schools, parks, meadows, reservoirs, etc. • Fuels are modified along ridgelines to provide a secure location to conduct suppression activities.	• Fuels conditions maintains flame lengths at the head of the fire at less than 4 feet under 90th percentile fire weather conditions and minimizes the likelihood of sustained crown fire;	• A variety of fuel conditions occur, with small patches exhibiting excessive fuel loading.

4. Species of Concern	● When compatible with defensible space requirements around structures and important human infrastructure, ecological conditions necessary to support at-risk plants and wildlife species are provided and help support population stability, species viability, and habitat connectivity.	● When compatible with desired wildfire behavior objectives (e.g., rate of spread, intensity, firefighter safety, canopy base height, etc.) adjacent to the Built Community, ecological conditions necessary to support at-risk plants and wildlife species, including species associated with mature dense forests, are provided and help support population stability, species viability, and habitat connectivity.	● Within the plan area, ecological conditions support resilient, well-distributed, and viable populations of at-risk species. ● Necessary ecological conditions for species that rely on mature dense forests are appropriately distributed, commensurate with high quality growing sites, lower slope positions, and/or cold air pools that would have likely supported mature dense forest habitat under the natural disturbance regime. ● Mature dense forest habitat is resilient to disturbances, with the frequency, severity, and extent of wildfire, drought, and insect and disease events being consistent with the natural range of variation. ● For species that rely on habitat conditions created by periodic high severity disturbance events, such events occur outside of strategic fuel breaks and exhibit results that are within the range of natural variation and provide a range of fire severity patch sizes that support viable populations of wildlife that thrive in these habitats (e.g., black-backed woodpecker and pyrophytic plants).

5. Wildfire Response	• Fire safe clearance around structures complies with Public Resource Code 4291 • Access routes, including driveways, lanes, roads and highways allow for safe evacuation of public and deployment of fire suppression personnel with compliance of Public Resource Code 4290. • Emergency community evacuation planning shall be conducted and exercised with all cooperators input and participation annually. • All unplanned ignitions are to be safely and effectively suppressed to minimize risk to public (life), infrastructure, economic and natural resources .	• Conditions are such that lightning caused fires may be used to reduce fuel loads or to provide other resource benefits under most weather conditions. • Suppression response options include "confine, contain, control" where appropriate and aggressive suppression, consistent with public and firefighter safety and commensurate with values at risk based on expected fire behavior. • Fire frequency and fire effects are within the natural range of variation, helping to restore and maintain resilient fuels and vegetation conditions. • Highways and major forest roads (including adjacent vegetation) are well maintained and provide for safe evacuation of public, deployment of suppression personnel and, when appropriate, anchor points to manage fire for resource benefits • Fire managers employ strategies to reduce the amount of land burned at high severity and increase the proportion of low to moderate severity to the point that fire effects and vegetation patterns are within the natural range of variation.
	• Employ containment strategies to mitigate wildland fires that prioritize firefighter and public safety, while minimizing cost and resource damage, and are consistent with values to be protected and management objectives. • Community Evacuation Plans and Structure Protection Plans are in place and shared among all responding agencies. • Fully integrated "Closest Resource Concept" response system shall be utilized as it is the most effective and efficient model of service delivery . • Appropriate dispatch levels determined by observed (actual) and predicted weather and fire fuels conditions shall be implemented. . • A cost-effective and well maintained system of lookouts, cameras and over flights allow for rapid detection and reporting of new ignitions. • Redundant communications infrastructure should be developed to ensure continuity of operations should	

	fire damage or impact critical sites. ● Interagency fuels reduction/projects shall be mapped and shared so that Fire Managers/ Incident Commanders may quickly and effectively identify opportunities for fire containment lines. ● Critical Infrastructure Plans are developed and identify location (e.g. power, communications facilities and repeater locations) have adequate clearance and are identified as a priority for protection. (PRC 4292, 4293) ● A network of fuel breaks along major roads, ridges and drainages are established and maintained in a condition safe for the deployment of fire personnel and resources to effectively engage wildfire. Vegetation in fuel breaks is maintained in a condition to reduce crown fire and torching and snags are greatly reduced to minimize threat to firefighters. ● Pre-Incident plans including values at risk, past wildfire and prescribed fire areas, and operational information, such as helispots, dip and drafting sites, and staging and camp locations are pre-identified and known to initial attack resources. ● Incident Command Posts and Camps are pre-identified to handle a full range of incidents (Type 1-3 Glossary) with sufficient infrastructure developed to allow immediate use. ● A robust Interagency Communications Program to ensure that there is greater public awareness and understanding of fire/fuels management programs and objectives.
6. Social and Economic Values and Benefits	● Social and economic systems are diverse and resilient in the event of catastrophic disturbance. ● Homeowners understand the components of a Fire Adapted Community, manage vegetation for defensible space, and know what products make their homes ember resistant. ● Communities within and adjacent to the SOFAR area are Firewise USA certified or equivalent. ● Communities within and adjacent to the SOFAR area understand the risks and benefits of fire managed for ecological and other objectives. ● A sustainable wood products processing infrastructure is appropriately located to maximize woody debris removal and economic benefits (e.g. log mil, biomass, renewable energy production; biochar production and distribution; job creation; and post and poll mill operation) of timber products delivered to market. ● Recreation, fuel management, agricultural commodities, and related activities contribute to local economies. ● Local workforce is trained and capable of bidding competitively and completing a diversity of forest restorations projects.

7. Hydrologic Function/ Soil Productivity	● Adequate quantity and timing of water flows and sustained water quality to support ecological structure and functions, including aquatic species diversity and riparian vegetation and ecosystem services (e.g. domestic water supply). ● Soil cover and porosity is maintained so that infiltration is favorable and accelerated erosion is minimized. ● Transportation facilities, including system, non-system, and timber related logging systems such as skid roads and landings, are maintained and improved so that hydrologic disconnection and sediment delivery associated with those transportation facilities is minimized. ● Soil moisture regime of meadows, fens and floodplains are maintained at, or restored to, natural conditions. ● Sediment filtering capacity of near stream and meadow systems is maintained or improved. ● Surface fuel loads are maintained or reduced to minimize damage to soils during a wildfire.			
8. Water, Power, and Communication Infrastructure	● Assets are maintained such that they may be used for accessing and suppressing fire whenever possible. ● Free of diseased, weakened, or dead trees that may damage assets or increase risk of fire.		● Risk to priority assets are minimized. ● Linear infrastructure assets are maintained to function as fuel breaks and/or contingency lines. ● Temporary interruption of service through powerlines and above ground water conveyance infrastructure (flumes, penstocks, etc) are minimized but may occur due to firefighter safety concerns.	
9. Industrial Forest Lands (e.g. SPI)	Zone: Built Community Will seek to work with various agencies to develop and coordinate forest and fuels treatments that result in safer communities while continuing to protect the vital infrastructure that facilitates rapid response to incidents when they occur.	Zone: Defense Will seek to plan and implement contiguous areas of fuels reduction for the protection of resources including, but not limited to communities, forests, water, wildlife and recreation that occurs throughout the SOFAR project	Zone: Threat Will seek to maintain a forest ecosystem that is resilient to the occurrence of fire, drought, flooding and insect mortality with active management of the land that results in a landscape of various age classes and species, while also providing the social and economic benefits of managed forest lands.	Zone: General Forest Will seek to reduce the risk of catastrophic fire spread, while also providing the ecosystem services necessary to support all life stages of forest ecosystem components. This includes a diversity of conifer species in various age and size classes that support a diversity of animal and plant life, as well as the aesthetic and recreational aspects of forested land.

10. Non-industrial Private Forest Lands	● Stem density and canopy cover are heterogeneous across a watershed scale, where in general, tree densities would be higher on northeast aspects as compared to southwest aspects. Likewise, stem densities and canopy cover would be highest in the drainages and riparian areas, and then decrease over the mid slopes with lower densities on ridge tops. ● Species distribution and composition are commensurate with surrounding forested communities. ● The distribution of values at risk associated with agriculture are not uniformly distributed across the SOFAR landscape. In addition, the proximity of variable cover types to agricultural lands also vary to a large extent. The desired condition in any of the management zones presented should account for the distribution of agricultural resources, like other resource values at risk, and be the basis for prioritizing and designing fuel management projects.

Table 1. Development Stage Percentage in Canoy Cover

Percentages (median and range (5-95% percentiles) of developmental stage (early, mid or late) in canopy cover class (open, moderate, or closed) for the corresponding cover type in a similar watershed representing approximately 450,000 acres.

Seral Stage[1]	Ponderosa pine/Jeffrey pine	Dry Sierra mixed conifer	Mesic Sierra mixed conifer	Mixed Evergreen	Red fir
ED	10% (7-12)	10% (7-12)	7% (5-14)	7% (3-13)	8% (3–20)
MDO	9% (8-14)	9% (8-14)	11% (4–10)	1% (0-1)	1% (0 -2)
MDM	3% (2-5)	3% (2-5)	7% (5–10)	4% (2-10)	1% (0 -2)
MDC	1% (0-2)	1% (0-2)	6% (7–15)	1% (0-3)	19% (12-29)
LDO	38% (29–50)	38% (29–50)	34% (8–23)	6% (3-13)	4% (2 7)
LDM	26% (20–31)	26% (20–31)	18% (15–24)	11% (8 – 15)	7% (5–8)
LDC	13% (7–21)	13% (7–21)	14% (21–45)	68% (57-79)	60% (47–70)

[1] Seral stage refers to overstory tree DBH (inches) and overstory tree canopy from above. Early development (ED): ≥5" & <25%; Mid development open (MDO): 5-19.9" & <40%; Mid development moderate (MDO): 5-19.9" & 40-70%; Mid development closed (MDC): 5-19.9" & >70%; Late development open (LDO): >20" & <40%; Late development moderate (LDM): >20% & 40-70%; Late development closed (LDC): >20" & >70%.

Table 2. Characteristics of dominant vegetation types in Sierra Nevada forests.

Vegetation Type	Species Dominance[1]	Tree Stocking (trees/acre)	Overstory Tree Canopy (percent and range)	Openings (acres)[2]	Tree Group Sizes (acres)	Shrub Cover (percent)	Litter (tons)	Coarse woody debris (tons)	Snags[3](snags /acre)
Ponderosa Pine	Ponderosa pine, California black oak, white fir	150 (20 – 200)	30 (10-60)	0.05 – 0.12	0.007-0.34	0-15	5 – 10	1 - 10	2-40
Dry Sierra Mixed Conifer	Ponderosa pine, sugar pine, incense cedar, California black oak white fir, red fir, Jeffrey pine	150 (20 – 200)	30 (10-60)	0.05 – 0.12	0.007-0.34	0-18	5 – 10	1 - 10	2-40
Moist Sierra Mixed Conifer	white fir, Douglas fir, incense cedar, Ponderosa pine, sugar pine, red fir, Jeffrey pine, tan oak	200 (50 – 300)	30 (20 -90)	0.17 - 0.75	0.17 – 2.89	0-20	5-15	5 - 10	5 - 60
Mixed Evergreen	Douglas fir, tan oak, madrone, canyon live oak, California black oak, sugar pine, ponderosa pine	200 (50 – 300)	30 (20 -90)	0.17 - 0.75	0.17 – 2.89	0-20	5-15	5 - 10	5 - 60

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Jeffrey Pine	Jeffrey pine, white fir, juniper, lodgepole	150 (20 – 200)	40 (10-40)	0.05 – 0.12	0.007-0.34	0-70	3-10	1-10	2-40
Red Fir	Red fir, Western white pine, white fir, Jeffrey pine	200 (50 – 300)	40 (20-75)	n/a	n/a	0-70	5-20	1-10	5-40
Lodgepole Pine	Lodgepole pine, red fir, Jeffrey pine, Western white pine, hemlock	120 (20 – 200)	40 (20-70)	n/a	n/a	0-70	5-30	1-20	5-40

[1] Species dominance is in order of most dominant to least dominant.

[2] Openings are characterized by areas having less than 10 percent tree cover with ranges of 10-60 percent shrubs in xeric Sierran Mixed Conifer and 10-90 percent in mesic Sierran Mixed Conifer. These areas make up about 10-30 percent mesic and 10-50 for xeric of the stand.

[3] Snags are greater than 20 inches in diameter

Glossary

Accelerated erosion - Erosion much more rapid than natural, geological erosion, primarily as a result of the influence of the activities of humans, or in some cases, animals.

Closest Resource Concept-

Firewise USA Certified

Hydrologic Function - The behavioral characteristics of a watershed described in terms of ability to sustain favorable conditions of water flow. Favorable conditions of water flow are defined in terms of water quality, quantity, and timing.

Industrial Forest Lands - Forest ownerships larger than 2,500 acres.

Non-industrial Forest Lands - Forest ownerships 2,500 acres or less and the owner does not own a wood processing facility.

Public Resources Code 4290, 4291, 4292, 4293

Resilient - capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks (Walker et al. 2004).

> Tahoe West version - The term "resilience" is used to signify the "capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks" (Walker et al. 2004). In other words, social-ecological systems that are resilient may adapt and exhibit a variety of conditions, but will retain the dominant feedbacks and remain within the given stability domain.

Soil Productivity - The inherent capacity of a soil to produce plant growth, due to the soil's chemical, physical, and biological properties (such as depth, temperature, water-holding capacity, and mineral, nutrient, and organic matter content).