GUIDING PRINCIPLES FOR FOREST ECOSYSTEM RESTORATION AND COMMUNITY PROTECTION

Arizona Forest Health Advisory Council

September 2003

Preamble to the Guiding Principles

Arizona's high country is home to magnificent forests harboring a diversity of biological, cultural, and economic values. Yet many of Arizona's forests—especially Arizona's extensive ponderosa forests—have undergone a dramatic transformation during the past century due to land use, climate, and other factors. These changes have increased insect and disease outbreaks, abnormally severe fires, and adversely affected biological, cultural, and economic values. The unacceptable risk posed by these conditions requires immediate and strategic action.

Recognizing these factors, Arizona Governor Janet Napolitano convened a Governor's Conference on Forest Health and Safety in March 2003. Findings from this conference led to the development of an Action Plan for Arizona, and a call for the creation of a broad, science-based Forest Health Advisory Council to provide recommendations on how to improve the health of Arizona's forests.

The Arizona Forest Health Advisory Council has developed these Guiding Principles to provide an overall framework for planning and implementing forest ecosystem restoration and community protection projects statewide. In presenting these Guiding Principles, the Council emphasizes the following:

Different forest types have different natural disturbance regimes. For example, where crown fire is unnatural, thinning and prescribed burning may be needed to safely reestablish more natural surface fire regimes. But in forest types where crown fire is natural, such treatments may not be needed, at least from an ecological standpoint. Understanding these differences is fundamental to restoring more natural disturbance regimes in our forests.

Community stakeholders must take the lead to implement these principles and make the decisions for their communities at risk. The Council stresses the immediate and urgent need to adequately reduce the risk to communities. This will require a comprehensive effort to reduce hazardous fuels in and around at-risk communities regardless of the adjacent ecosystem type. Fire research and recent fires demonstrate that fuels reduction treatments in and around communities may not prevent the loss of homes. Homeowners must do their part to create defensible space and replace or mitigate flammable building materials.

Although Arizona's forest and woodland ecosystems need restoration, it is important to understand that restoration is a young science whose long-term outcomes are uncertain. The Council urges employing a diversity of restoration strategies that fit local ecological, social, political, and economic circumstances. A "one size fits all" approach is not appropriate.

Learning about restoration should be an active and ongoing process. A serious commitment to monitoring and adaptive management is critical to understanding the ecological, social, and economic dimensions of restoration. The Guiding Principles should be viewed as dynamic and adaptable to evolving conditions and experiences.

The costs of restoration must be weighed against the costs of inaction. Though restoration may seem a weighty investment, it pales in comparison to the immediate and long-term costs and risks of allowing current forest conditions to persist. Restoration is a process of recovery requiring a substantial and sustained investment of funds, and political and public support.

The Guiding Principles urge us to think big. Arizona's forests and the ecological processes that sustain them span landscapes. Assessing needs, identifying priorities, and charting progress toward community protection and forest ecosystem restoration goals must occur within an appropriately large landscape context.

The Council's ultimate hope is that the Guiding Principles will help guide our movement toward sustainable and reciprocal relationships between human communities and forest ecosystems – relationships that sustain the biological, cultural, and economic values that contribute to a healthy democratic society, both now and into the future.

Guiding Principles

The overall strategy for restoring forest ecosystem health and protecting communities must be dynamic, comprehensive and integrated. A primary component of the overall strategy is to perform a statewide forest health evaluation to identify high-priority communities, critical infrastructure, habitats, and watersheds at risk. This evaluation can also provide the framework for monitoring individual projects and cumulative effects.

The immediate focus should be on protecting human communities at risk, critical infrastructure, along with key watersheds and habitats. Distinguishing between forest ecosystem restoration and community protection, and focusing on community protection within the entire community—private, public and tribal lands and the wildland-urban interface—will improve the likelihood of success.

Close collaboration among all stakeholders is essential to a community-based approach to forest ecosystem restoration and community protection. Encourage and empower community-based collaborations to demonstrate and implement effective community protection and forest ecosystem restoration. Be sensitive and responsive to the diversity of individuals and communities who value and/or depend on the forest and its resources.

Decision-making about forest ecosystem restoration and community protection must occur with a serious commitment to rigorous adaptive management. Such an approach should include baseline data, short and long-term monitoring, and a transparent mechanism for tracking results, evaluating and incorporating findings into the decision-making process.

Forest ecosystem restoration and community protection requires a sustained investment of federal, tribal, state, local and private resources. Restoration is a long-term process requiring a sustained commitment of funding. Adequate, sustained investment in forest ecosystem restoration and community protection is more cost effective and socially desirable than fire suppression and rehabilitation.

Appropriate restoration methods are based on ecological need. These methods are further defined by the importance of the site in the watershed or landscape, and the timing, techniques and resources needed to restore ecological integrity. Restoration needs to be designed with a clear understanding of desired and ecologically appropriate future conditions.

Effective forest ecosystem restoration should reestablish fully functioning ecosystems. A primary goal of forest restoration is to enhance ecological integrity, natural processes and resiliency to the greatest extent possible. Fire hazard reduction must be linked to the reintroduction of fire as a keystone ecological process. An active program of prescribed and maintenance burns and natural fire use is essential.

Forest ecosystem restoration and community protection treatments should protect and enhance water and soil resources. The development and implementation of forestry best management practices will serve to protect these resources.

Forest ecosystem restoration should protect and promote development of old-growth trees and large trees needed to restore ecosystem structure and function.

Landscape scale forest ecosystem restoration should maintain native plant and wildlife populations and habitat features. A key consideration is the need to maintain and restore movement corridors and refugia to avoid biodiversity bottlenecks.

All forest ecosystem restoration and community protection treatments should use locally adapted native plant materials to the greatest extent possible. Non-invasive, non-native species may be considered for emergency rehabilitation.

Project work should be based upon landscape assessments of risks to and status of aquatic and terrestrial resources and of the potential for restoration to be successful. The assessment is used to identify the root causes of ecosystem degradation at the eco-regional, intermediate and site level scales, determine appropriate methods for restoring degraded systems and create a spatially-explicit prioritization of restoration needs.

Forest ecosystem restoration requires effective community protection to establish and maintain a fire-resistive condition for structures, improvements and vegetation. Methods for accomplishing this condition are based on public safety needs, fire hazard, and local capability and creativity. A fire-resistive condition will be accomplished by removing and modifying forest fuels, establishing defensible space, and use of fire-resistant construction materials and architectural design.

Forest ecosystem problems and solutions exist in a context of land use. In fire prone areas community officials must develop, adopt, and enforce comprehensive land use plans, zoning regulations and building codes for community protection, forest restoration, ecosystem health requirements and long-term fire management. Zoning and land use have a major impact on fire management, and can make a significant contribution to restoring forest health and protecting communities.

Forest ecosystem restoration must include evaluating and changing the public land use practices that are scientifically demonstrated to contribute to forest health degradation.

Forest ecosystem restoration and community protection programs should use the lowest impact techniques that will be effective and efficient. Explore, develop and utilize low impact technologies to sustain and enhance ecosystem integrity and productivity, and minimize negative cumulative effects.

Forest ecosystem restoration and community protection actions should comply with all applicable environmental laws and regulations.

Sustainable economies are linked to sustainable ecosystems. We should be building a sustainable future for Arizona's forests and communities

Glossary

Adaptive Management
A type of natural resource management in which decisions are made as part of an ongoing process. Adaptive management combines planning, implementing, monitoring, research, evaluating, and incorporating new knowledge into management approaches based on scientific findings and the needs of society. Results are used to modify future management methods and policy.

Biodiversity
The variety of life forms and processes including complexity of species, communities, gene pools, and ecological functions.

Biodiversity Bottleneck
A bottleneck in this context is the assemblage of environmental and/or human-caused factors or ecological "threats" that hamper the ability of ecosystems to support biodiversity at its current level through time. The bottleneck analogy is that fewer organisms (and their genes) in the bottle (current conditions) may be able to emerge on the other side (future conditions) due to resource limitations. (Source: this council.)
http://www.usembassy.it/file2001_04/alia/a1041704.htm;
http://www.clat.psu.edu/biodiversity/defined/populations/populations-p04.html

Community Protection
Actions or programs undertaken for the purpose of protecting human lives, property, and infrastructure. (Source: this council)

Crown fire
This is a fire that travels from one crown (or treetop) to another in dense stands of trees, killing most trees in its path. However, even in intense crown fires, unburned strips may be left due to powerful, downward air currents. A passive (or dependent) crown fire relies upon heat transfer from a surface fire burning below the crowns. An active (or independent) crown fire does not require transfer of heat from below the crowns. Source: Barnes, Burton V., Donald R. Zak, Shirley R. Denton, and Stephen H. Spurr. 1997. Forest Ecology (4th Edition). John Wiley and Sons, Inc. New York, NY. p. 282. (see also **Surface Fire**)

Cumulative Effects
Individual actions when considered alone may not have a significant impact on the quality of the human environment. Groups of actions, when added together may have collective or cumulative impacts that are significant. Cumulative effects that occur must be considered and analyzed without regard to land ownership boundaries. Consideration must be given to the incremental effects of past, present, and reasonably foreseeable related future actions of the Forest Service, as well as those of other agencies and individuals. Source: CEQ Regulations applied to US Forest Service regulations
http://www.fs.fed.us/emc/nepa/includes/epp.htm#c151

Defensible Space
This is an area around a structure where fuels and vegetation are treated, cleared or reduced to slow the spread of wildfire towards the structure. It also reduces the chance of a structure fire moving from the building to the surrounding forest. Defensible space provides room for the firefighters to do their jobs.(New Mexico State Forestry) Many communities are taking a more holistic approach of creating defensible neighborhoods rather than just individual properties.

Ecosystem
A spatially explicit, relatively homogeneous unit of the earth that includes all interacting organisms and components of any part of the natural environment within its boundaries. An ecosystem can be of any size-a log, pond, field, forest, range or grassland, or even the earth' s biosphere. *(Society of American Foresters*, 1998.)

Ecosystem Function
The process through which the constituent living and nonliving elements of ecosystems change and interact, including biogeochemical processes and succession.

Ecosystem/Ecological Integrity
The completeness of an ecosystem that at multiple geographic and temporal scales maintains its characteristic diversity of biological and physical components, spatial patterns, structure, and functional processes within its approximate range of historic variability. These processes include: disturbance regimes, nutrient cycling, hydrologic functions, vegetation succession, and species adaptation and evolution. Ecosystems with integrity are resilient and sustainable.

Ecosystem Process
The actions or events that link organisms and their environment, such as predation, mutualism, successional development, nutrient cycling, carbon sequestration, primary productivity, and decay. Natural disturbance processes often occur with some periodicity *(From Webster's dictionary, adapted to ecology).*

Ecosystem Resilience
The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states or successional stages.

Fire Frequency (Fire Return Interval)
How often fire burns a given area; often expressed in terms of fire return intervals (e.g., fire returns to a site every 5-15 years). (see also Fire Regime Group).

Fire Regime Group
A generalized description of the role fire plays in an ecosystem. It is characterized by fire frequency, predictability, seasonality, intensity, duration, and scale (patch size), as well as regularity or variability. (see also Fire Frequency).

Forest Ecosystem Health
A condition where the parts and functions of an ecosystem are sustained over time and where the system's capacity for self-repair is maintained, allowing goals for uses, values, and services of the ecosystem to be met.

Forest Ecosystem Restoration
Holistic actions taken to modify an ecosystem to achieve desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling the system to resume acting, or continue to act, following the effects of a disturbance. Restoration management activities can be active (such as control of invasive species, thinning of over-dense tree stands, or redistributing roads) or more passive (more restrictive, hands-off management direction that is primarily conservation oriented). Frequently, a combination or number of actions is used sequentially to achieve restoration goals.

Hazardous Fuel
Excessive live or dead trees and other vegetation and organic debris that increase the potential for uncharacteristically intense wildland fire and decrease the capability to protect life, property, and natural resources.

Invasive or Noxious Weed (also applies to animals and other organisms)
Any species of plant which is, or is liable to be, detrimental or destructive and difficult to control or eradicate and shall include any species that the director, after investigation and hearing, shall determine to be a noxious weed. Arizona Revised Statutes 3-201 http://www.azleg.state.az.us/ars/3/00201.htm

Landscape
An area composed of interacting and inter-connected patterns of habitats (ecosystems) that are repeated because of the geology, landform, soils, climate, biota, and human influences throughout the area. Landscape structure is formed by patches (tree stands or sites), connections (corridors and linkages), and the matrix. Landscape function is based on disturbance events, successional development of landscape structure, and flows of energy and nutrients through the structure of the landscape. A landscape is composed of watersheds and smaller ecosystems. It is the building block of biotic provinces and regions.

Natural Disturbance Regime
A natural disturbance (e.g. fire, insect outbreak, flood) with a characteristic frequency, intensity, size, and type that has influence on an ecosystem over evolutionary time.

Old Growth Tree
This is an old tree, one that exhibits the complex structural attributes associated with the oldest age class of trees in an old growth stand. In today's forests, an old-growth tree is one that has been standing since before the onset of commercial logging and fire exclusion. These trees are sometimes referred to as presettlement trees. Old-growth ponderosa pine trees typically have orange, platy bark. Source: Schubert, G.H. 1974. Silviculture of southwestern ponderosa pine: the status of our knowledge. USDA Forest Service General Technical Report RM , http://www.ancienttrees.org/cfogqa.php#1

Prescribed Fire
Any fire ignited by management actions to meet specific objectives. All prescribed fires are conducted in accordance with prescribed fire plans. (see also **Wildland Fire Use)**

Risk to Communities
The risk associated with adverse impacts to communities resulting from unwanted wildland fire.

Surface fire
A fire that burns over the forest floor, consuming litter, killing aboveground parst of herbaceous plansts and shrubs, and tyupically scorching the bases and crowns of trees. Source: Barnes, Burton V., Donald R. Zak, Shirley R. Denton, and Stephen H. Spurr. 1997. Forest Ecology (4th Edition). John Wiley and Sons, Inc. New York, NY p. 281 (se also **Crown Fire**)

Sustainable (Sustainability)
Meeting the needs of the current generation without compromising the ability of future generations to meet their needs. Ecological sustainability entails maintaining the composition, structure and processes of a system, as well as species diversity and ecological productivity. The core element of sustainability is that it is future-oriented. *(Committee of Scientists Report,* 1999.)

Wildland Fire Use
The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas outlined in Fire Management Plans. (see also **Prescribed Fire)**

Wildland-Urban Interface
The area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuel.

Unless noted, all definitions come from: **"**RESTORING FIRE-ADAPTED ECOSYSTEMS ON FEDERAL LANDS - A COHESIVE STRATEGY FOR PROTECTING PEOPLE AND SUSTAINING NATURAL RESOURCES" USDI/USDA Draft unpublished document, pp. 74-78, 12/19/2001**.**