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Sustaining Our Aspen Heritage into the Twenty-first Century

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Introduction

Does this really portray the future of our aspen forests in the Southwest? Is it likely, improbable, or even a possibility? We hope it is improbable. But it's possible because almost everywhere in the Southwest aspen typifies a young forest that gradually yields to conifer trees as the aspen stands age. Without fire or some other method to remove the conifers and return the forest to aspen, the forest's aspen component will gradually diminish and likely disappear. Improbable, because we are beginning to realize just how fleeting our aspen is and how fast we must now act to retain it either as a component of the conifer forest or as a forest of its own.

Aspen is the most widely distributed native tree in North America. It forms extensive forests in western Wyoming, Colorado, Utah, and northern New Mexico. It also is found in scattered groves and small stands. These isolated remnants are a particularly important diversity element in otherwise pure conifer forests. In fact, throughout much of the interior West, aspen is the only upland hardwood tree in the conifer forest.

Trees genetically similar to our aspen have flourished throughout western North America for almost 15 million years. Given today's climate, conditions favorable to aspen reproduction by seed are extremely rare. Aspen can produce viable seed but usually regenerate vegetatively through root suckers, stems that sprout from the roots of the parent tree. The result is a clump of trees all identical in genetic composition. These clumps, or clones, can be as large as several acres. The largest have been estimated to cover as much as 300 acres. Most aspen stands represent a mosaic of a number of individual clones. No one really knows how long an aspen clone can persist by vegetatively reproducing generation after generation. Some clones may be thousands of years old and one estimate considered a few clones to be as much as a million years old.

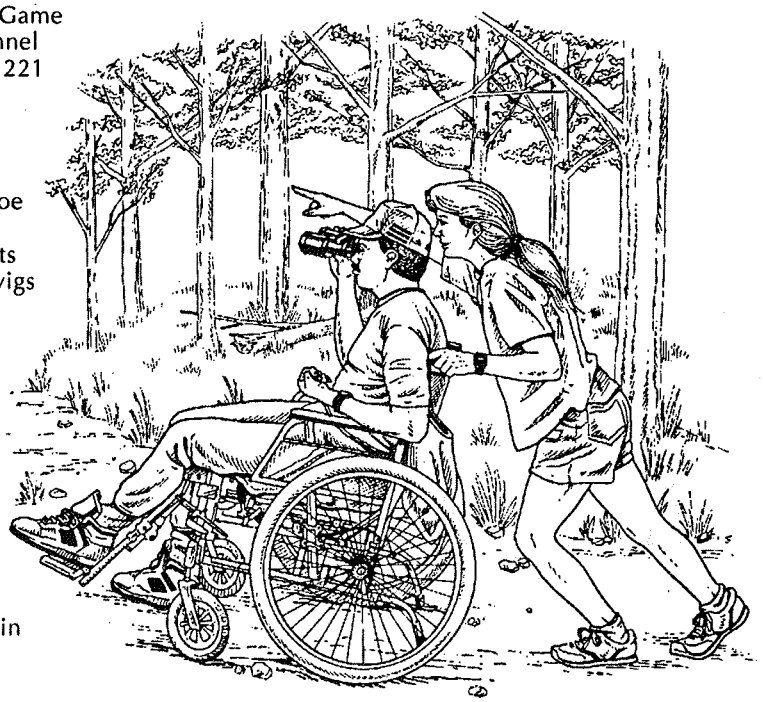
As clumps, stands, or entire forests, aspen has depended on fire for perpetuation through time. Western aspen are longer-lived as a single tree than those of the Great Lakes Region. Hundred-year-old tree stands are common and even 200-year-old stands are occasionally reported. Where aspen covers large acreages and no conifers exist close enough to provide a seed source, the aspen may exist as uneven-aged stands where the death of individual trees or groups of trees are replaced by suckers without the need of fire. The normal situation is for aspen to serve as a nursery or early successional stage for conifer forests. The natural ecosystem dynamics are for fire to periodically remove the conifers before the aspen has been completely replaced. This process can also be mimicked with a variety of tree harvest techniques designed to ensure aspen regeneration. In an aspen stand that has predominately changed to conifer, scientific knowledge is lacking on how many aspen should remain in order to provide adequate aspen regeneration after a fire occurs and removes the conifer. We do know the fewer the aspen remaining in the stand, the less the potential for producing suckers.

Aspen forests and aspen stands within conifer forests provide important foraging, nesting, breeding, and resting sites for a wide variety of wildlife. New Mexico Department of Game and Fish personnel have identified 221 animal species using the aspen community. During the winter, snowshoe hares and cottontail rabbits eat the buds, twigs and bark of aspen. Elk make use of aspen year-round and research shows aspen provides 14 percent of the diet of mule deer on the North Kaibab Plateau in Arizona.

Aspen seeds and buds are edible for a wide range of birds. Aspen communities also provide important nesting habitat for many bird species, both those nesting on the ground, as well as those nesting in tree cavities. Large older aspen, as well as dead aspen or snags, serve as excellent sources for cavity nests. The large old aspen are important since dead aspen or snags usually do not remain standing long after they die. Aspen snags are usually useful as sources for cavity nests for long periods of time only if they lean against another tree.

Livestock, both cattle and sheep, and wildlife such as deer and elk, use small aspen trees and the lush understory of grasses and forbs typical of an aspen community. Aspen sprouts and suckers are so preferred that use by elk, sheep, cattle, and sometimes deer is often sufficient to impair or completely prevent aspen regeneration.

Aspen forests and conifer forests mixed with aspen provide important habitat for a wide variety of animals making these forests an important "watchable wildlife" recreational resource. For example, the Southwest is world-renowned for bird watching areas and many of them include aspen habitats. These areas attract significant



numbers of local, national, and international visitors contributing much needed dollars to rural economies.

Aspen forests provide an outstanding visual resource because of their brilliant fall color, white trunks, and delicate light green foliage that flutters in the gentle summer breezes. These visual characteristics attract many people who visit the national forests of the Southwest. Viewing scenery, an important part of which is viewing aspen, is a very popular recreational activity in the Southwest. It constitutes over six percent of the Southwestern Region's recreation use. Viewing aspen is so popular that the Region has developed the publication, "Go for the Gold," that explains when and where to go in New Mexico to take in "the most breathtaking displays of autumn color." Its popularity is also chronicled in hundreds of thousands, if not millions, of photographs and paintings done by both amateur and professional photographers and artists.

Many rural communities in the Southwest are beginning to diversify their economies and increase emphasis on tourism. Aspen-associated recreational activities, such as viewing scenery and watchable wildlife, can be key factors in attracting tourists.

Almost all of the pure aspen stands in Arizona and New Mexico were created by fires near the end of the last century and at the beginning of this century. Conifers have already replaced many of these aspen stands. Replacement is occurring throughout the elevational range of aspen, from the upper end of the ponderosa pine zone, through the Douglas and white fir ecosystems, into the lower end of the Engelmann spruce and subalpine fir forests.

Where Are We?

The replacement of aspen by conifers is a normal part of forest succession. The loss becomes a problem only where the aspen portion of our forested ecosystems is not being replaced in turn. Replacement can be in the same location or elsewhere within the same forest. The majority of the Southwestern Region's aspen stands are slowly being replaced by conifer forests. A component is being lost that's critical to maintenance of the Region's biological diversity and ultimately the sustainability of our forests. The Region's Forest Health Initiative is an attempt to identify, highlight, and remedy the rapid decline in ecological "health" of our forests. This decline has been brought about by the change in forest structure and composition as a result of fire suppression, overgrazing, and many other factors. The aspen issue is an important part of the Forest Health Initiative.

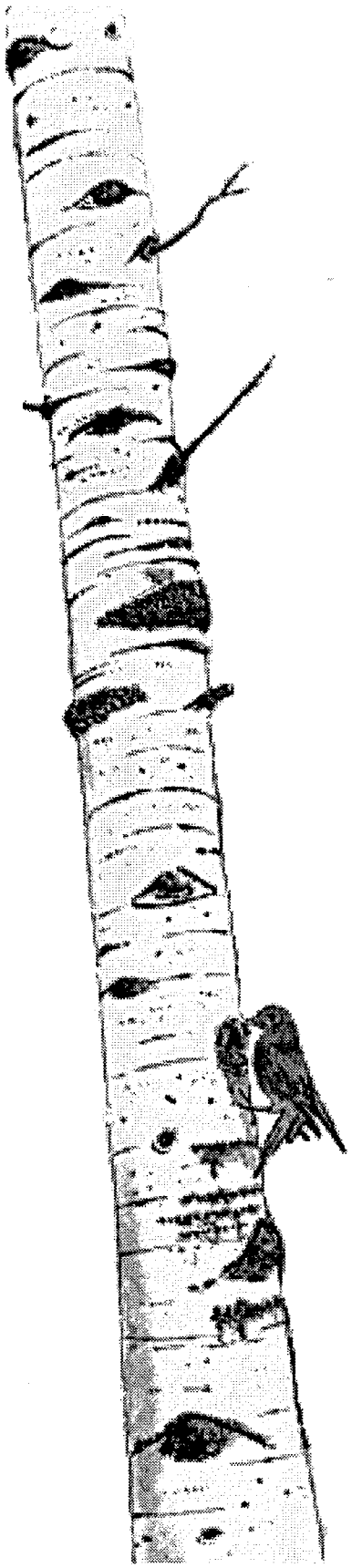
The document "Changing Conditions in Southwestern Forests and Implications on Land Stewardship" produced by the Southwestern Region of the Forest Service in July 1993 indicated a change in the acreage of aspen dominated forests in Arizona and New Mexico from 486,000 acres in 1962 to 263,000 in 1986. While changes in definitions and survey standards prevent detailed comparisons between inventories, replacement of aspen by conifers is both dramatic and real. Declines have been confirmed by visual observations and comparisons of old photographs.

The Forest Service is undergoing a metamorphosis in management. Under direction of the Chief of the Forest Service, we are to use an ecological approach to multiple-use management, an approach commonly referred to as "ecosystem management." Heightened management attention is required before aspen management falls within the concept of ecosystem sustainability, that is, perpetuating all parts of an ecosystem through time. Considerable progress has been made. This progress can be viewed as a continuing

evolution, growing with our understanding of ecosystem functioning and species interaction. We are more sensitive to the importance of the aspen component and to ecosystem functioning today than in the past. We are now focusing on regaining and perpetuating the aspen component of our forested ecosystems.

The traditional approach to aspen management is to remove the overstory of trees from the entire area where regeneration is needed. This remains the most effective method of inducing maximum sucker production. This method of regeneration, using either fire or timber harvest, can be used when coordinated activities ensure success and the location is appropriate. Visual qualities of aspen are usually best presented with larger stands that require extensive treatment for rejuvenation. However, aesthetic considerations are of paramount importance in planning management actions. Small and isolated remnant stands in particular will usually require regeneration that does not sacrifice the existing aspen trees. Achieving a "desired future condition" representing our current understanding of ecosystem sustainability for aspen stands within conifer forests and for aspen forests themselves will require innovative methods of management.

Effective fire control for much of this century permitted development of denser forests with an ever increasing tendency toward catastrophic fires. If we were to continue the course of the recent past, we could expect more and larger catastrophic wildfires. These fires might burn up existing aspen but would promote aspen renewal. This positive



benefit cannot counter the negative impacts of a catastrophic fire. The large-scale and high intensity fires that once created our aspen are rarely desirable or practical because of overwhelming negative impacts.

Although we have progressed in our prescribed natural fire program, policies, and management ignitions, maintenance of aspen as part of a functioning ecosystem requires innovative, extensive management well beyond that currently in place. For aspen management in wilderness, the prescribed natural fire program will remain our primary tool for thinning small conifers from aspen stands and for regenerating aging stands.

In some large, old stands of pure aspen, browsing by animals prohibits sucker survival. In many other stands, removing conifers by thinning small trees or group removal of larger conifers and aspen to promote suckering would also be ineffective because of excessive browsing. Heavy browsing of the suckers can deplete aspen root reserves, jeopardize successful regeneration, and threaten the very survival of the aspen stand. Coordinated and difficult decisions are needed before suckering will be successful. Actions to induce suckering must not be initiated before relief from excessive browsing is obtained. This may include temporary actions such as fencing, removal of some portion of the large herbivores from the area, broadcast burns, or seeding to attract large herbivores away from the aspen project areas. Where aspen is widespread, treatments to rejuvenate aspen stands can be large in acreage, distributed across the landscape to help distribute herbivore grazing pressures. Such large scale treatments can be light in intensity to maintain visual integrity. Planning should not create isolated, attractive patches of aspen regeneration that concentrate animal use without appropriate protection.

The Forest Service is only now beginning active implementation of ecosystem management concepts. Projects are not yet adequately planned across sufficient time or space (area extent). Perpetuation of the aspen community, the creation of aspen mosaics, and integration of the needs of the plants and animals within, must be planned for long periods of time and on a landscape scale. Monitoring is recognized as critical but remains inadequate to determine effectiveness of our management or validity of our assumptions.

The remnant, isolated aspen stands typical of much of the Southwestern Region are critical links in providing for biological diversity. The costs of perpetuating these small stands will be far greater than maintaining the large expanses of aspen such as those found on the Carson and Santa Fe National Forests. For the isolated stands, temporary fencing from browsers such as elk and livestock is often needed before any regeneration succeeds.

The actual rate of aspen loss and location of the aspen component is inadequately known for long-term planning. Figures cited in different documents vary because of methods used and statistical reliability. The extent of and immediate need for regeneration, suitable methods of treatment, and complicating factors vary. The aspen problem can generally be divided into two situations, one where the aspen now or in the past covered large areas and, second, where aspen persists in small remnants. Most critical are remnants in the southern half of the two states. For these, treatments retaining and expanding existing aspen are favored. The larger expanses provide greater opportunity for a variety of less restrictive treatments including some commercial harvest.

Where Do We Want To Be?

Our vision for ecosystems with an aspen component in the Southwestern Region is one where the aspen community will be recognized as a critical element in forest ecosystems. Planning for the aspen community will encompass a variety of scales ranging from landscape to site-specific, and will be managed within long-term ecosystem capabilities or sustainability. Adaptive management, where actions are appropriately monitored, evaluated,

and modified as necessary, will be used to implement actions to achieve a desired future condition. Desired future conditions will be determined through the Integrated Resources Management process. In isolated and remnant stands, management actions are to be conservative to prevent otherwise good intentions from violating the concept of sustainability. In large, contiguous aspen stands, and in mixed-conifer forests where a good but declining representation of aspen requires attention, well-planned, large-scale actions will be taken where necessary and feasible. Forest land and resource management plans will be routinely updated as new inventory, monitoring, and evaluation information becomes available.

Concerted efforts will be made to stay within the natural limits of the aspen community's ability to recover from disturbance. For example, since fire is a natural process in the perpetuation of most aspen communities, light controlled fires can be experimentally used to thin young conifers from aspen stands and thereby lengthen the time the stand remains dominated by aspen. As a thin-barked species, aspen is readily damaged or killed by all but the lightest of fires. Damaged trunks provide avenues for disease to enter both the tree and the clone.

Visual quality will be of primary concern. Low-impact programs such as Christmas tree harvests will be used to help maintain aspen dominance without significantly changing the overstory structure. Modifications in existing aspen stands will be designed to maintain quality habitat for wildlife. Variations will be implemented according to needs of targeted species. In suitable locations and under proper conditions, sucker production will be encouraged in some stands for livestock and wildlife forage. In places, conifers, and sometimes aspen, will be removed to encourage herbaceous production in the understory of the aspen to benefit livestock, elk, or other wildlife. Innovative treatments will be planned to minimize visual quality and wildlife habitat conflicts.

Throughout the range of aspen in the Southwestern Region, proposed actions will be coordinated and integrated with all other resources for planning and implementation. Excessive use by large herbivores will be acknowledged as the primary impediment to the success of aspen regeneration. Livestock and wildlife management will include greater flexibility in choices to deal with overutilization problems.

Inventories and Geographic Information System mapping will more fully portray the condition and location of the aspen resource on all ownerships. These data bases will include wilderness and aspen on sites outside the commercial timber base. Priority will be given to treatment of those stands necessary to halt aspen loss where it is a critical component. Small isolated clones, particularly those in the southern half of both states, will be acknowledged as critical to maintenance of biological diversity.

Funding necessary to adequately provide for the aspen component in the long term, and to halt its loss in the short term, will be included in the budget process. Progress will be reported and funding allocated according to the importance of aspen in an area to provide for high-cost treatments that may be necessary in small, high-priority stands.

Use of natural and prescribed fire will play a significant and ever increasing role in management of aspen. All wildernesses and many areas outside of wilderness will contain prescribed fire plans that take into account the needs of aspen. Monitoring the effectiveness and validation of fire's impacts inside and outside wilderness will be routine and adequate to assess progress and modify prescriptions as needed.

Research will be conducted on plant and animal species within the aspen community. Research will be conducted on spatial relationships between conifer and aspen elements within various forest ecosystems to determine the amount and arrangement of aspen needed for sustainability. Research will also continue on methods of aspen treatments and their impacts on sucker generation.

Partnerships, environmental education activities, training and technology transfer products, such as symposia, brochures, and scientific literature, will share our growing understanding of the functioning of ecosystems containing aspen and the results of aspen management.

Strategies To Move From The Issues Of Today To The Desired Future Condition

Inventory And Analysis

Refine existing inventory information and, as appropriate, develop new integrated inventories, databases, monitoring and analysis techniques to deal with both spatial and temporal considerations of aspen communities and the larger ecosystems within which they exist.

Sustainability

Whenever possible, mimic the intensity, frequency, and size of naturally occurring disturbances in an effort to maintain biological diversity and keep disturbance within the aspen ecosystem's resiliency. Ensure a healthy aspen component at landscape scales and provide for amenities, commodities, and values that can be sustained in the long term.

Interrelationships

Move from a single species to an ecosystem approach in all aspects of aspen management. Evaluate the information base and its adequacy for determining alternatives that will provide for desired resource and landscape management goals.

Desired Future Condition

Descriptions of desired future conditions for ecosystems containing aspen at various geographic scales should integrate ecological, economic, and social considerations into practical statements that guide management activities. Gain recognition for and acceptance of a shared accountability role in managing the aspen resources with various users in particular, the livestock industry, the environmental community, the game and fish departments of Arizona and New Mexico, and the U.S. Fish and Wildlife Service.

Training And Partnerships

Develop a multi-resource training program and expand research and technology transfer partnerships. Strengthen working relationships with partners including livestock permittees, environmental groups, the game and fish departments and commissions of Arizona and New Mexico, and the U.S. Fish and Wildlife Service to facilitate quick, appropriate management actions.

Environmental Education

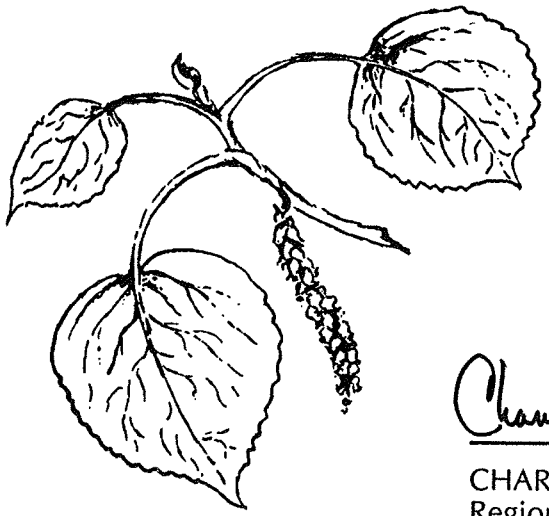
Collaborate with partners on environmental education and interpretive service programs that depict the workings of ecosystems containing aspen, management choices, and expected results. Ensure consideration of landscape aesthetics and recreation opportunities in development of management choices. Involve the public in describing and understanding aspen management concerns for each National Forest area.

Integrated Resource Management And Adaptive Management

Ensure consideration of the aspen component in planning and managing for broad-scale ecosystem sustainability. Ensure coordination among all levels of the organization and across ownerships. Use integrated resource management in designing and implementing adaptive management strategies.

Forest Plan Modification

Incorporate monitoring results and new information on aspen into land and resource management plans as the information becomes available.



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