MANAGEMENT FOR ESTHETICS AND RECREATION, FORAGE, WATER, AND WILDLIFE

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In the West, aspen forests have not been actively managed for wood products largely because of the lack of markets for quaking aspen timber from the Rocky Mountains (see the WOOD UTILIZATION chapter). Despite this, the aspen ecosystem has been used to provide a variety of resources and opportunities (see PART III. RESOURCES AND USES).

Although the aspen ecosystem can be managed for several resources simultaneously, on any given site, aspen usually has been managed primarily for a single resource. In situations emphasizing a single resource, high-quality clones on good sites are best suited for sawtimber, those on medium sites for other wood products, and poor clones and clones on poor sites for wildlife or forage production. Esthetics may be emphasized in key recreation areas. Management for water yield may be the primary consideration on important watersheds.

Even when management focuses on one resource, the others usually are affected and must be considered. For example, abundant forage will be produced even under the most intensive management for timber; aspen ranges will yield good quality water under all but the most abusive livestock or game management practices; and, the aspen-conifer-meadow mix in the montane setting will retain its scenic qualities under even the most intensive management for any other single resource.

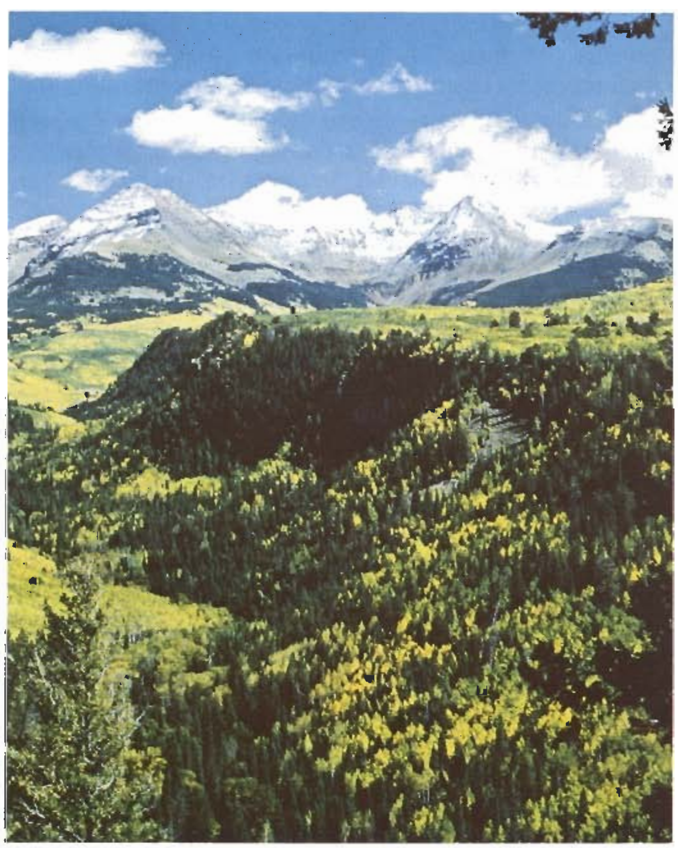

Figure 1.—Management of aspen for esthetics is important in the West.

Esthetics and Recreation

Most techniques for managing other forest types for scenic and recreational values, especially hardwoods, can be applied to the aspen type. Small, irregularly shaped clearcuts that blend into the natural landscape are preferable. Permanent scenic vistas are more appealing if they are kept open and intact (fig. 1). Minimizing the visual impacts of management activities, especially if the aspen is within sight of heavily used areas or public roads, helps to preserve the esthetic quality of these forests.

Aspen has qualities that make it relatively easy to manage for both consumptive uses and for esthetics. Even heavily grazed aspen forest retains most of its scenic quality; the trees are visibly unaffected by grazing and removal of the understory. Clearcutting is evident for only a few years, because of rapid regrowth of understory species and abundant aspen suckering (fig. 2) (see the VEGETATIVE REGENERATION chapter). After harvesting, scattered aspen slash may be left in place to decay and practically disappear within a very few years. Burned areas quickly revegetate, also, which lessens the visual impact of fire. In autumn, the leaves on stands of young aspen saplings and poles are just as colorful as the leaves on mature aspen.

Ohmann et al. (1978) and Perala (1977) stated that foreground landscapes in the Lake States could be improved by: (1) providing vistas to expose and frame scenic features; (2) utilizing clearcuts to create variety by opening up dense and continuous stands, and by providing curved lines and irregular openings; (3) leaving attractive or special interest trees; (4) providing diversity in forest types, species mixes, and age/size classes; (5) encouraging transition vegetation along edges; (6) varying the sizes and shapes of cuts; and (7) sometimes converting from aspen to other vegetation types.

At least in the foreground view, the apparent size of even large clearcuts can be reduced by limiting the amount that can be seen from any one point. Islands of trees within the clearcut and feathered edges (by thinning into adjacent timber) also help minimize the visual impact. Also, it is esthetically better not to harvest stands adjacent to clearcuts until an obvious forest stand has reestablished on the clearcuts. A visually pleasing mix of even-aged aspen patches in all size classes can be created if the harvesting plan includes esthetic considerations.

Ensuring that harvesting and intermediate treatment operations appear neat and organized, and, where appropriate, conducting them when public use is minimum will minimize negative visual impact (Perala 1977). Cutting during the dormant season and removing debris minimizes the unsightliness of slash and other material. Skid trails, landings, and logging roads that flow with the landforms and that are progressively treated as the operations are completed cause less visual disturbance. Some landings may have future value as permanent openings (wildlife food patches, parking areas, etc.), and a few logging roads may be kept open to provide public access. Others should be closed or obliterated. (See the INTERMEDIATE TREATMENTS chapter for a discussion of other esthetic considerations.)

Aspen fits well into management for dispersed recreation activities; but, it does not tolerate concentrated use, such as that often found in established campgrounds (Hinds 1976) (fig. 3) (see the DISEASES chapter). Although aspen groves are attractive, encouraging concentrated recreation or developing campgrounds within them can lead to serious damage to the trees, including carving and vandalism, destruction or removal of young suckers, and trampling and disturbance of the soil.

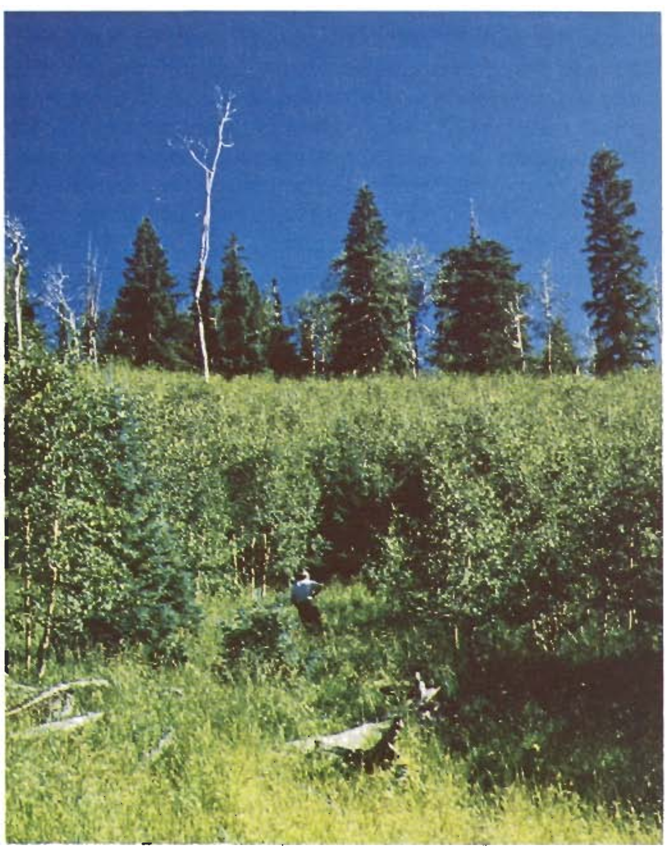

Figure 2.—Aspen clearcuts quickly regain a forested appearance.

Figure 3.—The once healthy aspen stand in this campground is in severe decline.

However, because of its esthetic qualities, existing aspen might be retained near areas of concentrated use.

Concentrated recreational use of snow-covered aspenlands in winter is less damaging than similar use during the growing season. Impacts on the understory, young suckers, and the soil are minimal. Because of uniform snow cover, skiing in open aspen stands is excellent (fig. 4). Developed runs may be cut through existing aspen without exposing soil to erosion; with care, the understory can be kept intact to protect the soil. A mix of aspen and conifer stands adjacent to these runs provides an esthetically pleasing setting.

In foreground landscapes, mixed stands of aspen and conifers probably are the most visually pleasing. However, these usually are temporary conditions. Using practices, such as selective removal of conifers before they dominate the site, may retain such mixes on a given landscape for longer than their usual 20- to 50-year life expectancy. On a long-term basis, landscape management to create a mosaic of discrete stands (conifers, aspen, other) in the middleground would provide pleasing visual diversity.

On many sites, pure aspen stands are essentially climax. They can be retained for their esthetic qualities without any special treatments (see the ROTATIONS chapter). In time, these stands become uneven-aged. Suckers develop in the understory as the overstory breaks up (fig. 5). Often, these climax stands are quite open, especially if insect or disease epidemics kills much of the overstory. Because no expensive stand treatment measures are necessary, these stands are well-suited to management that emphasizes esthetics, recreation, and watershed.

Forage

Successful management of both the aspen trees and the understory forage resource requires careful planning. Grazing practices that maintain or even improve understories may be harmful to the long-term welfare of the aspen. For example, if sheep graze an old aspen stand, heavily enough to remove all aspen suckers each year, the understory forage resource may not be harmed, but the aspen stand eventually will disappear (fig. 6). The aspen overstory is not a static resource. If aspen regeneration is not provided for, the aspen will be lost (see the REGENERATION chapter).

After killing or clearcutting a parent stand, deferment or close control of grazing is necessary to permit development of a new, even-aged stand (fig. 7). Sampson (1919) recommended deferring sheep grazing for 3 or 4 years or until the suckers reach a 45- to 50-inch (1.1- to 1.3-m) height; or, only lightly grazing with cattle for 4 or 5 years or until the sucker crop is 60–70 inches (1.5–1.8 m) tall. During this regeneration phase, it appears that grazing while the herbaceous understory is lush and succulent is less likely to damage aspen than grazing late in the season after the herbaceous plants begin to cure (see the ANIMAL IMPACTS chapter). Succulent aspen suckers often are preferred forage after the herbaceous vegetation cures.

Figure 4.—The uniform snow conditions and lack of branches make aspen particularly enjoyable for ski touring.

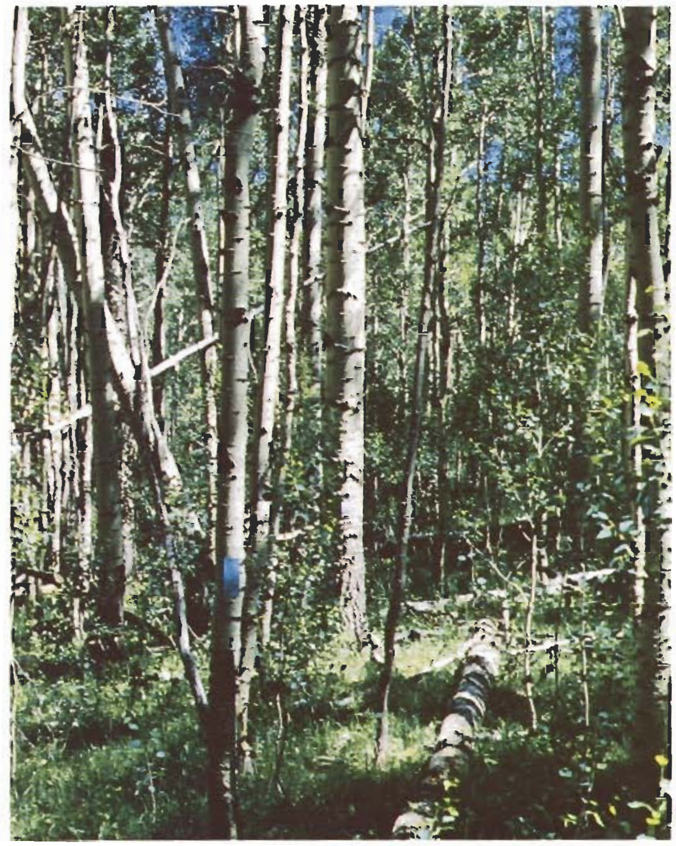

Figure 5.—A typical uneven-aged, multistoried aspen stand.

Aspen stands that are left to regenerate as the overstory dies and breaks up are more difficult to manage for optimum forage utilization. Until further research develops better information, perhaps the best recommendation that can be made is to moderately graze these stands until the aspen overstory begins to decline. Then graze heavily for a couple of years, thereby eliminating or weakening much understory competition. After this, remove virtually all grazing pressure for at least 3 to 5 years (fig. 8). A wave of sucker regeneration should arise and become adequately established under the declining overstory during this time. Then the stand may be moderately grazed. Such a sequence may be applied to climax, uneven-aged stands of aspen every 20 to 30 years.

Some clones and some sites with climax aspen will regenerate adequately with continuously light to moderate grazing, especially by cattle. Others may be difficult to regenerate even with the moderate-heavy-defer sequence recommended. For these, a shift from managing without killing or cutting the overstory to an even-aged management scheme, in which the old aspen stand is killed to provide abundant suckering, may be necessary.

Aspen growing as isolated groves on a shrub-grass range and aspen in riparian zones are most difficult to retain under the usual impacts of livestock grazing. Livestock concentrate in these groves and use them for shade and bedgrounds (fig. 9). If aspen is to be retained under these circumstances, more intensive and expensive measures are required. Fencing out livestock entirely from declining groves for an 8- to 10-year period should permit a crop of sucker regeneration to become established. Clearcutting just before fencing will stimulate many more suckers (see the VEGETATIVE REGENERATION chapter). When clearcutting, high stumps may be left around the perimeter to use as fence posts. However, to expand the grove, place the fence one or two tree heights outside the perimeter. Fire may be used instead of cutting (see the REGENERATION chapter), especially if it is the prescribed treatment for surrounding rangeland. However, because aspen often is difficult to burn (see the FIRE chapter), fire seldom is an effective treatment for only small patches of aspen. After a good stand is reestablished, the fence may be removed, and the grove again may be used by livestock for perhaps 80 to 100 years before retreatment becomes necessary.

Opportunities and methods for improving forage production in aspen communities depend upon forage values, other resource values, and management goals. These vary among regions and over time. For example, management objectives in the Canadian parklands have differed from those in the mountains of the western United States. In the northern parklands, there has been concern about restricting the spread of aspen and converting existing stands into pastures; whereas in the central and southern Rocky Mountains and on the Colorado Plateau, there has been concern about perpetuating aspen communities that are being lost through succession to other vegetation types.

Figure 6.—A declining clone with no regeneration.

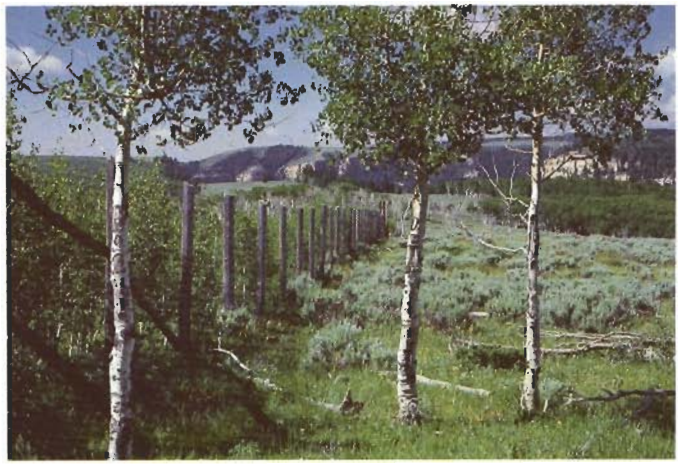

Figure 7.—After herbicide spraying in 1965, all ungulates were excluded from the fenced area on the left. Eighteen years later, profuse aspen suckers are present in the protected area; whereas only aspen skeletons, some old aspen trees, and severely browsed aspen suckers are on the outside.

Thousands of acres of aspen parklands in western Canada were cleared of aspen and were seeded solely to improve forage production for cattle (Bowes 1975). The trees were removed by bulldozing, piling, and burning. The cleared areas then were disked and were seeded to desirable forage species such as smooth brome and alfalfa. Herbicides were applied during the two following years to control 95% of the aspen reproduction. Although this intensive treatment resulted in a threefold increase in forage production, it was very expensive and it destroyed the aspen community.

In Alberta, Hilton and Bailey (1974) obtained more than a fourfold increase in herbage production by the second year after applying herbicide to the aspen overstory. Graminoids increased the most without appreciably reducing forbs. Although aspen suckers became dense, cattle still were able to move through the stand and consume 50% of the total herbage. Bailey (1972) suggested that fire, herbicides, and late-season heavy grazing, used singly or in combination, might be an economical means of controlling aspen suckers on such areas. Again, this ultimately destroys the aspen community.

Forage production in aspen stands that are badly depleted by overgrazing can be improved without altering the tree overstory. Desirable forage species can be seeded directly beneath the aspen canopy. Plummer et al. (1955) indicated that no seedbed preparation is necessary; the seed merely should be broadcast between August and early October, before or during leaf fall. The fallen aspen leaves then provide adequate seed covering for successful germination and establishment. They recommended the following seed mixture for aspenlands within the Intermountain Region.

	lbs/acre	kg/ha
smooth brome	7	7.8
mountain brome	3	3.4
orchard grass	2	2.2
tall oatgrass	2	2.2
timothy	1	1.1
meadow foxtail	1	1.1

For openings within the aspen type, Plummer et al. (1955) suggested reducing the first three grasses to 5, 2, and 1 pounds per acre (5.5, 2.2, and 1.1 kg per ha) respectively, and adding 3 pounds per acre (3.3 kg per ha) of intermediate wheatgrass and 2 pounds per acre (2.2 kg per ha) of either chickpea milkvetch or Ladak alfalfa. Thirty years after seeding some 37 species in openings adjacent to aspen at elevations between 7,400 to 9,000 feet (2,250 and 2,750 m) in northern Utah, Hull (1973) found only smooth brome, tall oatgrass, intermediate wheatgrass, and red fescue still had fair to excellent stands. He suggested that forbs such as birdsfoot trefoil, crownvetch, birdvetch, alfalfa, and horsemint might be valuable additions to seeding such rangelands (Hull 1974).

Some of the species suggested for seeding under aspen are not native to these ranges, and may not be desirable if pregrazing conditions are to be reestablished. Smooth brome and intermediate wheatgrass, for example, are highly competitive and persistent enough to slow or prevent reestablishment of native herbaceous species.

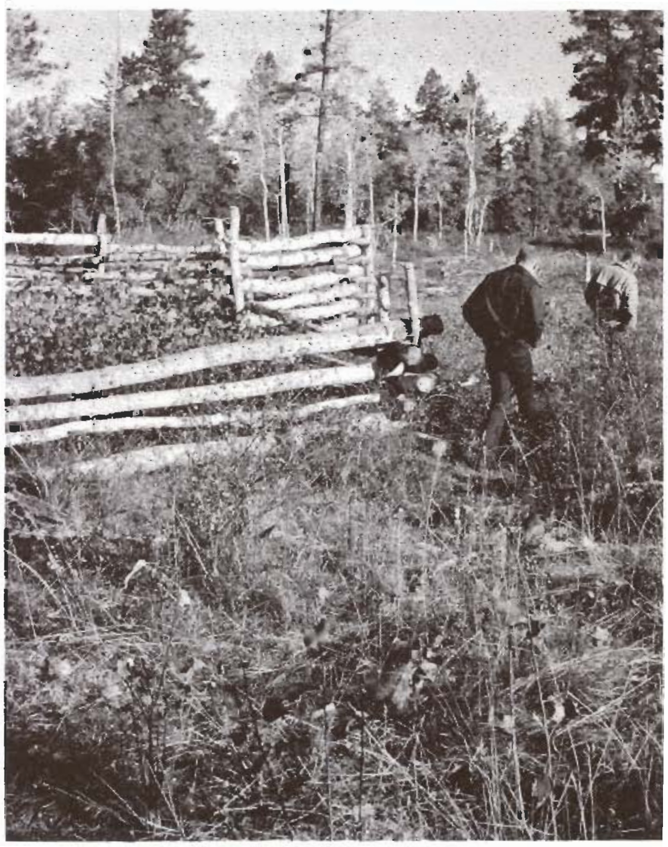

Figure 8.—Temporary fencing may be necessary in some situations to protect new regeneration.

Figure 9.—Aspen groves used as shade and bed grounds may be difficult to regenerate without protective measures to reduce concentrated use.

The value of fertilizing aspenlands for improved forage production is questionable. Studies of fertilizer application have yielded variable results, perhaps because of the wide variety of site conditions where aspen grows. Beetle (1974) indicated that application of fertilizers under aspen stands in western Wyoming greatly stimulated the production of native grasses but did not affect aspen growth. In contrast, Hull (1963) fertilized seeded grasses in openings adjacent to aspen communities in southeastern Idaho with no significant response. He attributed this lack of response to leaching and to denitrification in the acidic soil.

Water

Watershed management includes both minimizing soil erosion and preserving or improving the quality or quantity of streamflow (see the WATER AND WATERSHED chapter).

Erosion

Vegetation, litter, and stone control erosion by protecting the soil surface (Meeuwig 1970). Maintenance of at least 65% ground cover with only small bare soil openings helps to prevent undue erosion from intense storms (Marston 1952). This will maintain adequate infiltration. As a result, raindrop splash and overland flow will not move much soil.

Most aspen stands have nearly complete soil cover. Pocket gopher activity and heavy livestock grazing may expose some soil (see the ANIMAL IMPACTS chapter). Sometimes, this may become critical. Generally, however, if the forage resource is not abused, the soil will have sufficient protection.

Fire and harvesting also expose mineral soil. However, the exposure seldom lasts longer than one growing season, if there is adequate soil protection during treatment, especially on erosive sites. Most of the problems from overland flow and erosion come from drastically disturbed soil at roads, landings, skid trails, and fire breaks.

Erosion in the form of mass movement or slumping is common on many geologically unstable sites, which aspen often grows on in the West. Little can be done to control this type of erosion other than to provide careful management and protection of the anchoring vegetation. Structures, roads, and other activities may contribute to instability, and are likely to be damaged by erosion on these unstable areas.

Water Quality and Yield

Studies have shown that clearcutting aspen and keeping the herbaceous understory relatively intact can increase water yields from 4 to 6 area inches (10–15 cm) (Johnston et al. 1969) (fig. 10). In more familiar terms, each acre of aspen clearcut may yield up to an additional one-third to one-half acre foot of water. Verry (1972), in Minnesota, measured an increase of 3.4 inches (8.6 cm) the first year after clearcutting—42% more than pretreatment flows from the cut area. Storm flow volumes and snowmelt peak discharges also increased for 2 years after treatment, then declined to preharvest levels (Verry et al. 1983).

Figure 10.—Clearcutting aspen initially may enhance water yields; but the effect is short-lived because of aspen's rapid regrowth.

At Wagon Wheel Gap, Colorado, Bates and Henry (1928) reported an average increase of nearly 1 inch (2.4 cm) for the 7-year period after clearcutting a mixed aspen-conifer watershed; 83% of this increase occurred during spring snowmelt runoff. Despite the potential, clearcutting only a small portion of a catchment may not result in measurable increases in water yields (Johnston 1984). The increase may be in the stream; but because of natural variability, it may be statistically insignificant. Reduced evapotranspiration on the clearcuts also may be offset by increased evapotranspiration downslope by consumption of increased interflow.

Other methods of destroying the aspen overstory could increase water yields, too. Herbicide spraying, if it has negligible effects on the herbaceous understory or on the sprouting ability of aspen roots, will increase yields about the same as cutting. In central Utah, for example, yields were increased by 4 inches (10 cm) after herbicide spraying killed the aspen overstory.[1] In contrast, if fire is intense enough and uniform enough to kill virtually all aspen trees, it also will consume or kill much of the understory brush and herbaceous plants. Therefore, during the first 2 years after burning, depending upon rates of understory regrowth, water yields from burned watersheds could be about 1.5 inches (4 cm) greater than from clearcut watersheds. However, there are no watershed or plot data available to verify this hypothesis; instead, it is inferred from Croft and Monninger's (1953) and Johnston's (1970) findings that evapotranspiration from bare soil is 1.5 to 2 inches (4–5 cm) less than from the herbaceous cover on plots from which the aspen was removed.

Because aspen forests regrow rapidly, water yield increases may last only 10 years. Soil water savings noticeably declined within 3 years after clearcutting Utah aspen plots (Johnston et al. 1969). Based upon these data, and upon observations of sucker stand development, it is speculated that water yield increases resulting from clearcutting, burning, or herbicide spraying can disappear in as few as 12 to 15 years after treatment.

If entire working circles are managed on 100-year rotations, and water yields are significantly augmented for only 15 years after harvest, then only 15% of any working circle would produce increased yields at any given time. That 15% would yield an average of 1.5 to 2 inches (4 to 5 cm) of increased flow, with the newly cut areas producing 4 to 6 inches (10–15 cm), and those cut 10 or more years earlier yielding only about 0.5 inch (1

[1] *The Sheep Creek Water Evaluation Project by Max E. Robinson, Fishlake National Forest, Utah. Abridgement by Delpha M. Noble, 1973, USDA Forest Service, Intermountain Region, Ogden, Utah. 24 p., mimeographed.*

or 2 cm) of augmented flows. Average water yields from the entire working circle, therefore, would be increased only about 0.25 inch (0.6 cm). However, if technology changes, and economics permit utilization of small trees; or if the combined values of increased forage, more diversified wildlife habitat, and increased water yields result in rotations of 30 years in the aspen forest; then increased water yields of 1.5 to 2 inches (4–5 cm) over a 15-year period after clearcutting would produce increased yields of nearly 1 inch (2.5 cm) from entire aspen working circles. Hibbert (1979) expanded this line of thought to the entire Colorado River Basin. He calculated that if 20% of the 3.3 million acres (1.34 million ha) of aspen in the entire basin were put on an 80-year clearcut rotation and another 20% on a 25-year clearcut rotation, increased annual yields of 73,000 acre-feet could result.

Transpiration-suppressing chemicals have been tested and generally rejected as a feasible means of increasing streamflow from aspen forests. One foliar application of phenylmercuric acetate, for example, reduced water loss by 43% from potted aspen over a 53-day period, in the controlled environment of a growth chamber and greenhouse.[2] However, when the chemical was applied by helicopter to the forest, water use was delayed several weeks, but the amount of soil water consumption was not significantly affected (Hart et al. 1969).

Water yields may be increased substantially from local areas for a few years after clearcutting, burning, or herbicide killing of the aspen overstory. However, substantially increased water yields from entire river basins can be achieved only by converting aspen to vegetation types that use less water. Grass-herb types use less water per year than does aspen on deep soils. However, before planning vegetation conversion, the costs of conversion, the long range costs of maintaining replacement vegetation, and all negative impacts on other resource values should be considered. These then are compared to the values of predicted water yield increases and to the possible increases in quantity or value of other resources.

It may be possible to increase water yields by converting from conifers to aspen (see the WATER AND WATERSHED chapter). At least net precipitation can be increased substantially (Verry 1976). Models by Gifford et al. (1983, 1984) and Jaynes (1978) indicate that increased water yields are likely. However, because the amount of increase that might be realized by converting conifers to aspen has not been adequately tested, it can not be recommended as a management tool.

Limited studies, cited in the WATER AND WATERSHED chapter, indicated negligible changes in water quality from cutting or grazing aspen catchments. Again, if grazing is moderate, if the riparian zone is given adequate protection, and if logging is done with reasonable care, water quality is not likely to be adversely affected.

[2]*Robert S. Johnston. 1973. Phenylmercuric acetate reduces transpiration of potted aspen. Paper presented at the 46th Annual Meeting of the Northwest Scientific Association at Walla Walla, Washington.*

Figure 11.—Aspen is important habitat for many wildlife species.

Wildlife

The aspen forest type is important habitat for many species of birds and mammals (fig. 11) (Gullion 1977b), especially in the interior West, where it is the only upland hardwood tree species, and where it frequently is found in groves in the coniferous forests or as isolated stands in mountain grasslands and shrublands (see the WILDLIFE chapter).

Most aspen stands in the West have reached maturity because they have been protected from wildfire and have not been marketable for forest products for most of this century. In Colorado, stands averaged 80 years; those younger than 50 years were difficult to find (Shepperd 1981). During the 70 to 100 years it takes for a dense stand of young suckers to become a mature stand of aspen trees, a progression of different wildlife habitats will have developed.

Animals that depend upon the forage or cover produced in a young aspen community benefit from clearcutting, from prescribed fire (fig. 12), or possibly from top-kill using herbicides. They include many of the major game species—moose, elk, deer, ruffed grouse, and snowshoe hare. Other species do well in old, sometimes derelict, aspen stands—cavity nesting birds, for example. For these, treatment is not necessary for habitat management if the aspen on the site is stable or climax.

Other species of wildlife, such as red-backed voles, red squirrels, and pine martens, do best in coniferous forests. Disturbance that retards conifer succession is deleterious for these species.

To provide diversity of habitats and wildlife species, treatments (cutting, fire, or herbicides) usually are needed to maintain a mosaic of plant communities and age classes within these communities. To provide interspersion and edge, the same treatments also can be used to maximize boundary length among the units in this mosaic.

Elk

Elk prefer grassland, shrubland, and recent burns to the mixed forest community (Rounds 1981) (fig. 13). They choose aspen rather than coniferous communities in both summer and winter,[3] although conifers may be used for hiding and thermal cover during times of harassment or during severe weather (Thomas 1979).

To provide optimum habitat for elk, Thomas (1979) recommended managing 60% of the land area to provide forage. Good forage is provided by the herbaceous and shrubby understory in the aspen as well as any aspen suckers less than 6.5 feet (2 m) tall. Peak production of this component of the aspen type is reached within a few years after burning or clearcutting (Bartos et al. 1983) (fig. 14).

During the winter, elk require about 2 units of feed per day for every 100 units of body weight. This feed should have at least 5.5–6.0% crude protein content (Nelson and Leege 1982). Cured or leached grass forage in winter often has less than this minimum. Browse in winter contains more protein but less digestible dry matter than does grass. Elk need winter food with energy levels in excess of 1 kilocalorie per gram (Nelson and Leege 1982). Enhancing high energy foods on the elk winter range will help reduce winter losses and improve calving success. (Forage quality is discussed in the FORAGE and WILDLIFE chapters.)

[3]*Ackerman, Bruce, Lonn Kuck, Evelyn Merrill, and Thomas Hemker. 1983. Ecological relationships of mule deer, elk, and moose in southeastern Idaho. Idaho Department of Fish and Game, Project No. W-160-R, completion report. 123 p. Boise, Idaho.*

Figure 12.—Prescribed fire being applied with a helitorch to kill the declining aspen overstory, to stimulate suckering, and to provide increased forage for livestock, and food and cover for wildlife.

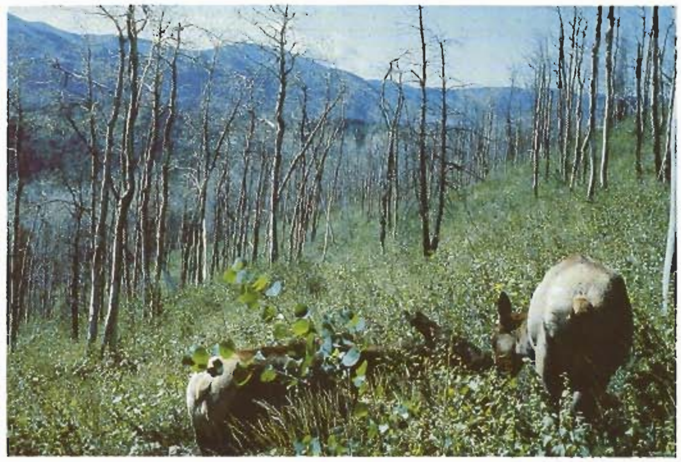

Figure 13.—Elk foraging in a 3-year-old burn within the the aspen forest community in southern Idaho. (Photo by Kem Canon)

In late spring, with emergence of green and succulent forage, the typical elk diet rapidly shifts from a winter regimen that is high in fiber and low in protein to one that is high in protein and low in fiber. High quality summer range is important, because that is when the elk raise calves and rebuild body condition for breeding and for winter survival.

A mix of cover can be provided on the remaining 40% of the elk range not devoted to forage production. Patches of at least 25 acres (10 ha), and preferably up to 65 acres (26 ha), provide best hiding or security cover for elk. Thermal cover is provided, also, if trees in these patches are more than 40 feet (12 m) tall and have a crown cover of at least 70% (Thomas 1979). Pole-sized aspen provide thermal cover in summer, as well as security cover and quality forage. After leaves drop in autumn, the thermal cover and much of the security cover is lost in aspen stands; conifer patches then provide the best security and thermal cover.

Elk commonly forage within 100 yards (90 m) of cover. They prefer to bed near where they finish feeding, in or near cover (Collins 1979). During summer, elk usually are found within a 0.5 mile (1 km) of drinking water. The prevalence of biting insects, especially horseflies, in the aspen type affects elk behavior (Collins and Urness 1982), and may force them away from otherwise optimal habitat.

Concentrated populations of elk may adversely impact the aspen ecosystem, especially aspen regeneration (see ANIMAL IMPACTS chapter). Under these conditions, long-term management of both the elk herd and the aspen is difficult. Elk are very difficult to control with fences; a more practical control is population manipulation. DeByle (1979) proposed cycling individual elk herds through high and low population densities. During the low population phase, treatments such as fire or cutting could be applied to any declining or overmature aspen stands to stimulate regeneration. That way, regeneration would be sapling-sized and out of reach of the elk before the herd rebuilds. Carrying capacity thereby becomes a dynamic concept, low during the regeneration phase, but quite high when aspen and shrub regeneration is not seriously threatened.

Moose

Moose primarily browse willow and aspen (see the WILDLIFE chapter). Small aspen suckers and the typical understory forbs and shrubs in the aspen type are favorite moose forage.

The best upland moose habitat in the West probably has a good distribution of aspen and associated trees and shrubs in a mosaic of age classes (Gordon 1976). Conifer patches for hiding cover are also desirable, perhaps essential. Thermal cover in winter appears to be unnecessary for moose; in summer it is abundant in either the aspen or coniferous forest.

Extensive regeneration of young vigorous stands of aspen, willow, and associated shrubs, often after fires, improves moose habitat and may result in a temporary moose population increase until the browse grows out of reach (see the WILDLIFE chapter).

Management of aspen to provide a variety of size classes on the landscape appears to provide the best moose habitat. The size of the treated areas is not as critical as it is for species with small home ranges (which must have all required habitat components relatively close), or for deer and elk (which may concentrate on small treated areas and destroy regenerating aspen). Clearcuts or burns of 40 to 240 acres (15–100 ha) may be satisfactory. Retention of conifer patches are likely to benefit moose. Encouragement of subalpine fir as an understory in the aspen will provide moose with a choice browse. However, the conifers may replace the aspen, if the stands are not treated later.

Deer

In the West, deer use aspen forests mostly in summer and fall. During these seasons, thermal and hiding cover as well as nutritious forage are abundant in the aspen type.

Figure 14.—A dense stand of aspen suckers exists amidst a profusion of other forage species 3 years after prescribed fire was applied to this aspen stand in southern Idaho.

The impact of deer on aspen regeneration can be greatest in late summer and autumn (see the ANIMAL IMPACTS chapter). They readily eat young, succulent aspen sprouts on recent burns and clearcuts. They also browse on aspen up to a 5-foot (1.5-m) height, and, therefore, can have a significant impact on aspen suckers younger than 4 or 5 years or on those suppressed by browsing to heights of less than 5 feet (1.5 m) (Mueggler and Bartos 1977).

On their summer range, deer benefit from having plenty of aspen habitat available, especially if it contains an abundance of understory forbs and shrubs. Because both aspen suckers and the aspen understory are in greatest abundance within a few years after burning (Bartos et al. 1983) or clearcutting (Bartos and Mueggler 1982), management to provide an array of aspen age classes on the range would seem to provide the best overall deer habitat. However, if units are too small, deer may overbrowse the aspen regeneration. Perhaps 10 to 40 acres (4–16 ha) per unit, managed with aspen rotations of 40 to 80 years, would provide optimum deer habitat.

Snowshoe Hares

In the Rocky Mountains, most pure aspen stands provide poor snowshoe hare winter habitat because of deep snowpacks (see the WILDLIFE chapter). Aspen with a very dense understory of tall shrubs may provide marginal winter cover; but usually only conifers will suffice (Wolfe et al. 1982). During summer, when snowshoe hares disperse somewhat from coniferous cover and shift to a diet of succulent plant material (Wolff 1980), the aspen type provides adequate cover and excellent forage.

Even the peak density of aspen suckers and shrubs on most aspen burns or clearcuts in the West probably do not provide adequate snowshoe hare habitat in winter. Working in Michigan, Conroy et al. (1979) recommended small clearcuttings that were shaped so that adequate canopy cover remained within 200 to 400 yards (200–400 m) of all parts of the opening. In the western United States and adjacent Canada, perhaps small, irregularly shaped clearcuts and encouragement of small but dense conifer patches throughout the aspen forest would provide maximum snowshoe hare habitat in the aspen type.

Beaver

As stated in the WILDLIFE chapter, potential beaver habitat is a strip 200–300 yards (200–300 m) wide along any relatively placid perennial stream flowing through the aspen type. By flooding, the beaver may be able to considerably widen that strip of habitat. If the aspen in this zone are managed for beaver, encouraging dense stands of 2- to 6-inch (5- to 15 cm) diameter trees is likely to result in greatest utilization by beaver.

Beavers often temporarily destroy their habitat in the aspen type. After removal of all trees within reach, they move on. The aspen then will resprout if they weren't flooded, killing the roots. After a new stand develops, and trees large enough for dam construction are present, the beavers may return and begin the cycle over again.

If aspen are to be managed in the riparian zone for products other than beaver dams and food, then beaver populations may have to be rigidly controlled.

Bear

The aspen forest appears to be better feeding habitat for black bears than the associated conifers, largely because of an abundant and varied aspen understory (see the WILDLIFE chapter). Biologists in Colorado have developed preliminary guidelines for aspen management to accommodate bears.[4] Where a mosaic of conifers and aspen occur, retaining the aspen will provide better bear feeding areas. Controlling livestock grazing will permit adequate development of understory forbs and berries, which are important bear food. Bears feed on aspen buds in the spring. It appears that they select and favor individual clones. If these clones are critical to the bear's food supply, management to retain mature trees of these clones at all times may be appropriate.

Ruffed Grouse

The aspen type is heavily utilized as food and as cover by the ruffed grouse (see the WILDLIFE chapter). The tree and associated vegetation provide a highly nutritious food source (Gullion and Svoboda 1972), protection from the weather (Bump et al. 1947), and escape from predation (Gullion et al. 1962).

Management for optimum ruffed grouse habitat centers on the aspen ecosystem and nearby dense, brushy vegetation. For Idaho and Utah conditions, Stauffer and Peterson[5] recommended a diversity of habitat structure within 40- to 50-acre (16- to 20-ha) units. Optimum drumming (breeding) sites have 200 to 450 trees per acre (about 450–1,100 trees per ha) that provide 80% to 95% tree cover and at least 2,500 small stems (shrubs and aspen sprouts) per acre (about 6,000 stems per ha). Hens with broods prefer 50% to 75% tree cover, about 600 to 2,800 small stems per acre (1,500–7,000 stems per ha), and openings with abundant herbaceous cover more than 20 inches (50 cm) tall. In winter, large, mature aspen provide food and some conifers add cover. In Minnesota, Gullion (1977a) recommended practices that maintain heavily stocked, fast-growing aspen stands in a variety of age (size) classes within the daily range of grouse. He questioned the value of conifers, because they harbor avian predators. Stauffer and Peterson[5] and Landry (1982) emphasized the importance of a dense shrub layer in aspen or mixed aspen stands for ruffed grouse habitat in the West.

Even-aged management of 10-acre (4-ha) units on rotations of about 60 years may produce the best ruffed grouse habitat in the interior West. Treating one unit (burning or clearcutting) every 15 years within each 40-to 50-acre (16- to 20-ha) block, should produce the diversity of habitat needed within the range of individual grouse. Clearcutting units as small as 10 acres (4 ha) usually is the most viable treatment. Larger areas that are being taken over by conifers may be burned to set back succession, then later put into the rotation system of small 10-acre (4-ha) units.[5]

Sharp-tailed Grouse

Aspen is useful as small thickets of young growth 3 to 6 feet (1–2 m) tall and as larger patches of taller trees for winter food and cover (Evans 1968, Hamerstrom 1963) (see the WILDLIFE chapter). However, significant invasion of grassland by aspen reduces sharp-tailed grouse habitat (Moyles 1981).

Fire in relatively short intervals (e.g., 20 years) could be used for management of sharp-tailed grouse habitat. Large units of several hundred acres could be burned, if patches of large aspen trees are protected.

Cavity Nesting Birds

About 34 bird species, most of which are insectivorous, are cavity nesters in the aspen type in the West (Scott et al. 1980) (see the WILDLIFE chapter). Guidelines have been published for snag management in some of the conifer types to retain cavity nesting habitat. As a general rule, snag management in the aspen type in the West may be fairly simple. Except to prevent indiscriminate removal of standing aspen snags by firewood cutters, very little modification of current management practices is needed to maximize this habitat. Currently, little or no cutting is done in the aspen forest until it is mature to overmature, and then most harvesting is in the form of small (2.5- to 12-acre (1- to 5-ha) clearcuts. This preserves natural cavity nesting habitat until the stand is overmature.

If scattered aspen are to be left for perching sites or for cavity nesters in clearcuts, the chosen trees should be dead or should be killed so they do not have adverse effects on the developing aspen suckers (see the REGENERATION and HARVESTING chapters). Small, irregularly shaped clearcuts, or clearcuts with islands of mature or overmature leave trees, may retain the best overall bird habitat in managed aspen forests.

[4] *Personal communication from Tom Beck to Mike Ward, Paonia Ranger District, and included in the Aspen Management Guidelines for the Grand Mesa, Uncompahgre, and Gunnison National Forests, Colorado on August 16, 1983.*

[5] *Stauffer, Dean F., and Steven R. Peterson. 1982. Seasonal habitat relationships of ruffed and blue grouse in southeastern Idaho. University of Idaho; College of Forestry, Wildlife and Range Sciences; Forest, Wildlife and Range Experiment Station, Moscow. 138 p.*